JAGRAN
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Simplifying Test Prep

COMPREHENSIVE CSAT
MANUAL FOR IAS PRE EXAM
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TABLE OF CONTENTS

Unit-1

Unit 1

CHAPTER 1: DECISION MAKING AND PROBLEM SOLVING, INTERPERSONAL SKILLS AND COMMUNICATION SKILLS

INTRODUCTION

Being able to make decisions and solve problems effectively is a necessary and vital part of the job for every administrator, manager, planner, and responder. This course will help you in the following.

- The decision-making process
- Decision-making styles
- Attributes of an effective decision maker
- Ethical decision making and problem solving
- Traps in Decision making

As an emergency management professional, your ability to identify current and potential problems and to make sound, timely decisions before and during an emergency can literally affect the lives and well-being of the local citizenry. Your decisions can impact the ability of response agencies to do their jobs and can make the difference in how quickly the community is able to recover from an event.

WHAT'S AT STAKE?

The ability to make sound, timely decisions during an emergency event is critical. Good problem solving and decision making can avert tragedy and help the community recover from the event more quickly. Conversely, poor decision making— or the absence of decisions— potentially can result in injury or death to victims or responders.

Good decision-making skills are one of your most critical assets as a management professional and as an Administrator.

PROBLEM SOLVING VS. DECISION MAKING

To begin, let's clarify what we mean by problem solving and decision making and how they relate to one another.

- **Problem solving** is a set of activities designed to analyze a situation systematically and generate, implement, and evaluate solutions.
- **Decision making** is a mechanism for making choices at each step of the problem-solving process.

Decision making is part of problem solving, and decision making occurs at every step of the problem-solving process.

PROBLEM-SOLVING MODEL

There are many different decision-making/problem-solving models that you can use. The five-step model shown below has proven effective in emergency situations. When using this model, each step may be completed quickly, but every step must be considered. It is not necessary to document each step, but it is important to think through every step.
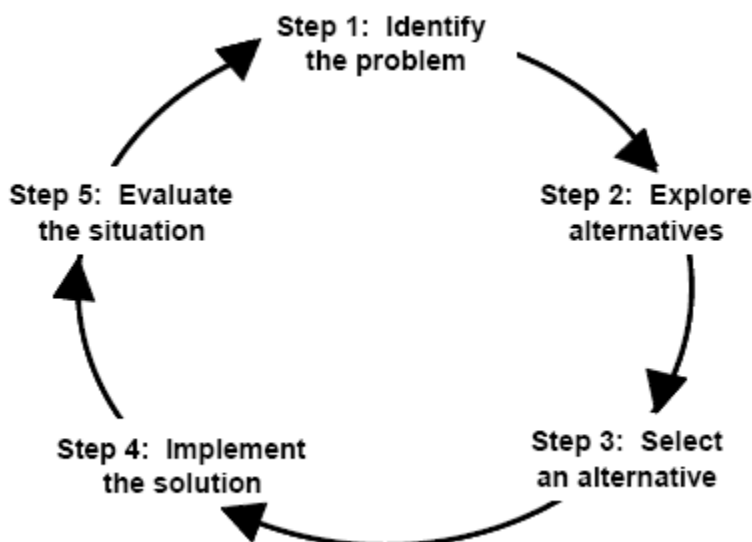
STEP 1: IDENTIFY THE PROBLEM

Problem identification is undoubtedly the most important –and the most difficult –step in the process. All subsequent steps will be based on how you define and assess the problem at hand.

What is a "Problem"?

A problem is a situation or condition of people or the organization that will exist in the future, and that is considered undesirable by members of the organization.

Problem or Solution?

In carrying out Step 1, you must distinguish between a problem and its solution. The most common error in problem solving is defining problems in terms of their solutions. Sometimes people think that they are articulating problems when actually they are stating a potential solution.

Here's an example: Someone might say, "The problem is that we don't have an Emergency Operation Committee (EOC)." The problem, however, is not that there is no EOC.

- The problem is really that the emergency management community cannot coordinate communications adequately during the response phase.
- Establishing an EOC is a solution.

Delineating the Problem Parameters

Identifying the problem also involves analyzing the situation to determine the extent of the problem. Problem parameters include:

- What is happening (and is not happening)?
- Who is involved?
- What the stakes are?

Questions for Identifying, Defining, and Analyzing Problems

1. Is this a new problem?

2. Is the problem clearly and precisely stated?

3. What assumptions am I making about the problem? Are they true?

4. What would happen if nothing were done about this problem?

5. Can the problem be restated in other terms? If yes, how?

6. What data are known that bear on the problem?

7. Is the information accurate?

8. Are there any precedents or rules about other procedures that apply to the problem? If so, what precedents or rules apply?

9. What additional facts are needed to analyze the problem? (List)

10. Is it possible to interpret the facts differently? How would that affect the problem's solution?

11. Do I have to make this decision, or does someone else? If this decision is someone else's to make, whose is it?

STEP 2: EXPLORE ALTERNATIVES

The second step in the decision-making process is to explore alternative solutions to the problem identified in Step 1. This step really consists of two parts:

- Generating alternatives
- Evaluating alternatives

TECHNIQUES FOR GENERATING ALTERNATIVES

So, what process did you use to generate the alternatives for the case study? There are three ways to generate alternatives.

- **Brainstorming** can be done individually or in a group. Brainstorming requires an environment in which the participants (individuals or group members) are free to

"think out loud." Participants blurt out as many ideas as possible within a specified time period. No evaluation of ideas is permitted so as to encourage the free flow of creative ideas. These ideas are recorded. When the specified time period ends, then evaluation of the ideas begins.

- **Surveys** economically tap the ideas of a large group of respondents. Surveys present respondents with the problem and a series of alternative solutions.
- **Discussion groups** should consist of those who are directly involved in decision making. In generating alternatives, the group members should:
  o Be comprehensive.
  o Avoid initial judgments (as in brainstorming).
  o Focus on the problem, not on the personalities of the people involved in the decision-making process. (But be sensitive to the impact of personalities on the process.)

CRITERIA FOR EVALUATING ALTERNATIVES

After you have generated alternative solutions, you must have some means of evaluating them. Below are some Criteria for evaluating alternatives.

Another part of evaluation is identifying contingencies—what could go wrong. Think in terms of **Murphy's Law ("If anything can go wrong, it will.")** and identify what could get in the way of solving the problem you are facing.

Step	Questions to Ask
1. Identify Constraints	Do any of the following factors serve as a limitation on this solution? • Technical (limited equipment or technology) • Political (legal restrictions or ordinances) • Economic (cost or capital restrictions) • Social (restrictions imposed by organized groups with special interests) • Human resources (limited ability of relevant people to understand or initiate certain actions) • Time (requirements that a solution be found within a prescribed time period, thereby eliminating consideration of long-range solutions)
2. Determine Appropriateness	Does this solution fit the circumstances?

3. Verify Adequacy	Will this option make enough of a difference to be worth doing?
4. Evaluate Effectiveness	Will this option meet the objective?
5. Evaluate Efficiency	What is the cost/benefit ratio of this option?
6. Determine Side Effects	What are the ramifications of this option?

STEP 3: SELECT AN ALTERNATIVE

The third step in the problem-solving model is to select one of the alternatives explored in Step 2 for implementation. After you have evaluated each alternative, one should stand out as coming closest to solving the problem with the most advantages and fewest disadvantages.

Implementing the solution may not be easy, however. There may be repercussions, and you should complete a "reality check" to identify and evaluate the possible consequences of implementing the solution. Carefully consider how the solution will be implemented before selecting an alternative.

When selecting an alternative, you will encounter factors that affect your decision making. These factors may include:

- Political factors.
- Safety factors.
- Financial factors.
- Environmental considerations.
- Ethical factors.

Not all of these factors may be readily recognizable. As you examine the situation and apply the problem-solving model, be alert for these potential limits on the solutions that you can implement.

STEP 4: IMPLEMENT THE SOLUTION

The fourth step involves **five subparts.**

- **Develop an action plan.** Implementation requires a series of steps to:
  o Articulate who has to do what, with what resources, by what time, and toward what goal.
  o Identify who must know about the decision.

- **Determine objectives.** Objectives are measurable targets that are:
  o Used to monitor progress and establish priorities.
  o Based on analysis of the situation and contingencies.

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- **Identify needed resources.** Resources include people, information (data), and things. Ask yourself:
  o What resources do I need?
  o Where will I get them?
  o How long will it take?
  o What can others offer?
  o Are there any special requirements?

- **Build a plan.** Your plan should state:
  o Who …
  o Will do what (and with whom) …
  o By when
  o Where
  o How

- **Implement the plan.** Use the action plan to put the decision in place.

Remember: Communicate the plan to all parties involved!

Use the following questions to help you develop any details needed to plan for implementation of the decision.

1. Will the decision be implemented as it stands or will it have to be modified?

2. Does the decision fit the problem and conditions specified earlier?

3. Is this still the best option?

4. What are the side effects of this decision?

5. Who is responsible for taking action?

6. Are the specific targets to be accomplished and the techniques for accomplishing them defined?

7. What specific activities must take place to implement this decision? In what sequence?

8. What resources will be needed to implement this decision?

9. What is the schedule or timetable for implementation of each step in the action plan?

STEP 5: EVALUATE THE SITUATION

Evaluation involves two parts:

- **Monitoring progress.** : The following questions needs to be asked;
  o Has the situation changed?
  o Are more (or fewer) resources required?

o   Is a different alternative solution required?

Monitoring the success and results of a decision is an ongoing process that is critical to fine tuning a course of action.

- **Evaluating the results.** Use the following checklist to help you evaluate the decision.

Questions for Evaluating the Results

1. How will you know if the proposed decision has worked? Is it measurable? If yes, how?

2. Does the decision and action plan make use of existing channels of communication to generate feedback?

3. Will the feedback test the effectiveness of the decision?

4. Will the feedback be sufficient to reflect changing circumstances and conditions that might occasion the need to modify the plan?

5. Is the solution achieving its purpose?

6. Is timely information generated so that it can be supplied to operational, administrative, and policy units in the jurisdiction?

A key to good decision making is that it uses both sensing and intuition to gather all the pertinent information, and both thinking and feeling to weigh all the factors involved. When we rely only on our dominant function, we tend to miss things and make poorer decisions.

STYLES OF DECISION MAKING

There are also four styles of decision making based on who makes the decision. As you read through the four styles, note that the amount of control that the leader has over the decision drops from total to almost none. Yet, the leader retains ultimate responsibility.

INDIVIDUAL DECISION MAKING

In individual decision making, the leader must make the decision alone, and input from others is limited to collecting relevant information.

DECISION MAKING THROUGH CONSULTATION

In consultation, the leader shares the issue with one or more people—seeking ideas, opinions, and suggestions—and then makes a decision. The leader considers the input of others, but the final decision may or may not be influenced by it.

GROUP DECISION MAKING

In this case, the leader and others work together until they reach a consensus decision. Each

group member's opinion and point of view is considered. As a result of helping to make the decision, group members buy into the final decision and commit to supporting its implementation.

DELEGATING THE DECISION

When delegating a decision, the leader sets the parameters, then allows one or more others to make the final decision. Although the leader does not make the decision, he or she supports it.

SELECTING A DECISION-MAKING APPROACH

Use the questions below as a guide to developing a decision-making approach. Answer each of the questions below.

- If the **response to question 1 is "No,"** it may be preferable to make the decision **individually or in consultation** with key players.
- If the **response to question 2 is "No**," it may be preferable to make the decision through **consultation, with a group, or by delegation**.
- If the **majority of your responses are "Yes,"** group decision making may be preferable.
- If the **majority of your responses are "No**," **individual decision making** may be preferable.

Question

1. Do you have a reasonable amount of time to make the decision?
2. Does the leader have enough expertise to make a good decision?
3. Do the potential group members have enough expertise to make a good decision?
4. Do the others involved share the organizational goals to be attained by solving the problem?
5. Is the decision complex with many possible solutions?
6. Is commitment to the decision by other people critical?
7. Is the decision likely to cause serious conflict among the people affected by it?
8. Will the decision directly impact many agencies, individuals, or community members?
9. Will the decision directly impact only a select few?

SUCCESSFUL GROUP DECISION MAKING

Group decision making requires good leadership to be successful. There are special conditions necessary for group decision making, such as adequate time. There are also particular pitfalls unique to group decision making, such as "groupthink" and "Decision Traps" (Discussed Later)

AVOIDING "GROUPTHINK"

"Groupthink" is a phenomenon that occurs in a cohesive group when members let their need to agree with each other interfere with their ability to think about the decision critically.

Three conditions may lead to "groupthink":

1. Overestimation of the group's ability and power:

- Allows members to ignore warning signals.
- Allows members to feel complacent.
- Could result from an overreaction to low self-esteem resulting from recent failures or a difficult task.

2. A "we" vs. "they" attitude:

- Leads to stereotypes of outsiders.
- Encourages rationalization of decisions.

3. Pressure toward conformity:

- Could result from direct pressure applied by the group to members who try to disagree.
- Does result in members censoring themselves to maintain their membership in the group.

The key to avoiding or mitigating groupthink lies in the behavior of the group leader. If you are the leader of a group with the potential to exhibit groupthink behavior, you may want to take one or more of the following preventive actions:

- Encourage everyone to air objections and doubts and to accept criticism.
- Describe the problem without revealing your preferred solution.
- Assign the group into subgroups and ask each to evaluate the problem.
- Invite outside experts to challenge the group's decision.
- Ask members to take turns playing "devil's advocate."

Groupthink is more likely to occur in an emergency situation for two reasons:

- Time pressure creates a need for quick decisions.
- Personnel responding to disasters typically have a high degree of cohesion.

To minimize groupthink:

- Encourage dissenting opinions consistently.
- Discuss the need to remain open to possibilities with responding personnel before an emergency.
- Examine patterns of decision making during previous emergencies and analyze them to take corrective measures.

When leaders can influence their groups to avoid groupthink, decision making becomes possible based on a healthy consensus. Consensus is not the same as 100-percent

agreement. In consensus, group members determine that they actively support the decision of the group, even though it might not be their personal choice.

HOW DO YOU KNOW WHEN YOU'VE REACHED CONSENSUS?

You've reached consensus when each member can say:

- "My personal views and ideas have been really listened to and considered."
- "I have openly listened to and considered the ideas and views of every other group member."
- "I can support this decision and work toward its implementation, even if it was not my choice."

Tips for reaching consensus

- Don't employ win/lose techniques, such as voting or negotiating favors back and forth.
- Look for alternatives that are next most acceptable as ways to break a stalemate.
- Don't encourage members to give in to keep harmony.

WHO IS AN EFFECTIVE DECISION MAKER?

Think of someone you know who seems to be a born decision maker. What makes him or her effective? Most likely:

- He or she makes decisions with competence and confidence.
- Most of his or her decisions work out right.

But what is underlying that decision-making skill? Research has shown that effective decision makers share several attributes.

ATTRIBUTES OF AN EFFECTIVE DECISION MAKER

Effective decision makers tend to have the following attributes:

- **Knowledge.** The most important requirement for making sound decisions is a deep understanding of all factors. The soundness of the decision depends on how informed the decision maker is.
- **Initiative.** Effective decision makers assume responsibility for beginning the decision-making process and seeing it through. They take an active part in making things better.
- **Advice-seeking.** Good decision makers know that they need help from others. They identify people who can make specific contributions to the decision-making process and ask them for their advice and counsel.
- **Selectivity.** Effective decision makers seek pertinent data. They avoid getting bogged down by extraneous facts and figures.
- **Comprehensiveness.** On the other hand, they look at all available options and

consider every possible alternative so as to make the best choice.

- **Currency.** Good decision makers consider current conditions and take advantage of opportunities that exist at the time.
- **Flexibility.** Effective decision makers remain open-minded about new concepts and ideas. They are willing to change course or try a different approach if better results seem likely.
- **Good judgment.** Sound decisions will not always result from merely following procedures. Decision makers must exercise their best judgment in considering factors particular to the situation.
- **Calculated risk-taking.** The risks and results of various alternatives must be weighed and the consequences accepted, whether positive or negative.
- **Self-knowledge.** Good decision makers know their own abilities, biases, and limitations.

In addition, smart decision makers will begin with a review of the information at hand (e.g., the EOP, SOPs, etc.) because, if the planning process is complete, many common situations will have been anticipated, and procedures for what to do in those situations will be in place.

ETHICAL DECISION MAKING

WHAT IS ETHICS?

As an emergency management professional, you represent your organization and your profession. Your actions must instill trust and confidence in those with whom you work and in those who depend on you for assistance. In an emergency, victims and coworkers must be able to count on you to carry out your responsibilities in a professional and fair manner.

WHAT'S AT ISSUE?

What is at issue in ethical situations arising from emergencies is your personal reputation, your agency's reputation, and ultimately, the public's trust in local government's ability to do the right thing. Also, it is not enough to do the right thing. Public officials must avoid even the appearance of impropriety.

DEFINITION OF ETHICS

Ethics is a set of standards that guides our behavior, both as individuals and as members of organizations. The ethical principles for this discussion are simple standards of right and wrong that we learn as children, such as being honest and fair and treating others with respect.

ETHICAL DON'TS

The following "don'ts" address specific ethical challenges in a crisis or emergency situation.

- Don't exceed your authority or make promises.
- Don't use your position to seek personal gain. Examples of seeking personal gain would include:
  - Soliciting gifts.
  - Making official decisions that benefit you financially.
  - Using inside information gained through your position to benefit you and/or your family.
  - Using agency time or property (e.g., a phone or car) for personal reasons.
  - Using your official position or accepting compensation to endorse a product.

Avoid even the appearance of ethical violations. Take the extra step of making sure that your actions (even if they are above-board) could not be seen as unethical. Think about how your actions would read on the front page of the newspaper.

ETHICAL DO'S

Keep these "do's" in mind:

- Place the law and ethical principles above private gain.
- Act impartially. Do not show favoritism to one group (e.g., victims or contractors) over another. Two aids in acting impartially include making sure that all affected parties have full disclosure, and seeking prior authorization before taking action.
- Protect and conserve agency property. This standard applies both to your actions and to the actions that you should take if you observe fraud, waste, or abuse.
- Put forth an honest effort in everything even remotely connected to your official position.

ETHICAL ISSUES AND EMERGENCIES

Decisions that seem simple or routine in a day-to-day context may become difficult and have serious ethical implications during an emergency. Furthermore, a poor decision with ethical implications can escalate an emergency into an unmanageable situation as the emergency response progresses, as the following scenarios illustrate.

COMPONENTS OF ETHICAL DECISION MAKING

Ethical decision making requires being aware of your own and your agency's ethical values and applying them whenever necessary. It involves being sensitive to the impact of your decisions and being able to evaluate complex, ambiguous, and/or incomplete facts. Three components of ethical decision making are:

- Commitment
- Consciousness
- Competency

ETHICAL COMMITMENT

Ethical commitment (or motivation) involves demonstrating a strong desire to act ethically and to do the right thing, especially when ethics imposes financial, social, or psychological costs. A crisis or emergency confronts us with many situations that test ethical commitment. Thus, you need to be very clear about your own ethical values and have a strong understanding of ethical standards of conduct.

ETHICAL CONSCIOUSNESS

Ethical consciousness (or awareness) involves seeing and understanding the ethical implications of our behavior and applying our ethical values to our daily lives. Understand that people's perceptions are their reality—and so what we understand to be perfectly legal conduct may be perceived by taxpayers as improper or inappropriate.

ETHICAL COMPETENCY

Ethical competency (or skill) involves being competent in ethical decision making skills, which include:

- **Evaluation.** The ability to collect and evaluate relevant facts, and knowing when to stop collecting facts and to make prudent decisions based on incomplete and ambiguous facts.
- **Creativity.** The capacity to develop resourceful means of accomplishing goals in ways that avoid or minimize ethical problems.
- **Prediction.** The ability to foresee the potential consequences of conduct and assess the likelihood or risk that person will be helped or harmed by an act.

APPLYING THE PROBLEM-SOLVING MODEL TO ETHICAL ISSUES

Think for a moment about the problem-solving model discussed in Unit 2 and reexamine it in light of what you've just learned about ethics. During Step 3, when selecting an alternative, you should eliminate any alternatives that are unethical—or even give the appearance of being unethical.

DECISION MAKING AND STRESS

Decisions can be as simple as delegating a routine task or as complex as responding to a major crisis. Decision making in a crisis is made more difficult because of stress.

Impediments to making good decisions under stress include:

- Perceived or real time pressure.
- Possible political pressures.
- High- or low-blood sugar levels as a result of erratic eating patterns.
- Caffeine.
- Sleep deprivation and resulting fatigue.
- Lack of information.

- Conflicting information.
- Uncertainty.

Under stress, decision makers are more likely to:

- Experience conflict with other key players.
- Perceive selectively because of sensory overload, and thus perhaps miss important information.
- Experience perception distortion and poor judgment.

Decision makers under stress also tend to:

- Be less tolerant of ambiguity and thus perhaps make premature decisions.
- Experience a decreased ability to handle difficult tasks and work productively.
- Experience a greater tendency toward aggression and escape behaviors.

They may also:

- Consider only immediate survival goals, sacrificing long-range considerations.
- Choose a risky alternative.
- Get tunnel vision.
- Succumb to "groupthink."

An important key to effective decision making in a crisis is being systematic. A good way to be systematic is to use the problem-solving model.

THE HIDDEN TRAPS IN DECISION MAKING

For executives, whose success hinges on the many day-to-day decisions they make or approve, the psychological traps are especially dangerous. They can undermine everything from new-product development to acquisition and divestiture strategy to succession planning.

In this article, we examine a number of well-documented psychological traps that are particularly likely to undermine business decisions.

THE ANCHORING TRAP

When considering a decision, the mind gives disproportionate weight to the first information it receives. Initial impressions, estimates, or data anchor subsequent thoughts and judgments.

Anchors take many guises. They can be as simple and seemingly innocuous as a comment offered by a colleague or a statistic appearing in the morning newspaper. They can be as insidious as a stereotype about a person's skin color, accent, or dress. In business, one of the most common types of anchors is a past event or trend.

This approach, while it may lead to a reasonably accurate estimate, tends to give too much

weight to past events and not enough weight to other factors. In situations characterized by rapid changes in the marketplace, historical anchors can lead to poor forecasts and, in turn, misguided choices. Because anchors can establish the terms on which a decision will be made, they are often used as a bargaining tactic by savvy negotiators.

WHAT CAN YOU DO ABOUT IT?

No one can avoid their influence; they're just too widespread. But managers who are aware of the dangers of anchors can reduce their impact by using the following techniques:

- Always view a problem from different perspectives. Try using alternative starting points and approaches rather than sticking with the first line of thought that occurs to you.
- Think about the problem on your own before consulting others in order to avoid becoming anchored by their ideas.
- Be open minded. Seek information and opinions from a variety of people to widen your frame of reference and to push your mind in fresh directions.
- Be careful to avoid anchoring your advisers, consultants, and others from whom you solicit information and counsel. Tell them as little as possible about your own ideas, estimates, and tentative decisions. If you reveal too much, your own preconceptions may simply come back to you.
- Be particularly wary of anchors in negotiations. Think through your position before any negotiation begins in order to avoid being anchored by the other party's initial proposal. At the same time, look for opportunities to use anchors to your own advantage—if you're the seller, for example, suggest a high, but defensible, price as an opening gambit.

THE STATUS-QUO TRAP

We all like to believe that we make decisions rationally and objectively. But the fact is, we all carry biases, and those biases influence the choices we make. Decision makers display, for example, a strong bias toward alternatives that perpetuate the status quo. On a broad scale, we can see this tendency whenever a radically new product is introduced.

They find the status quo comfortable, and they avoid taking action that would upset it. "Maybe I'll rethink it later," they say. But "later" is usually never.

The source of the status-quo trap lies deep within our psyches, in our desire to protect our egos from damage. Breaking from the status quo means taking action, and when we take action, we take responsibility, thus opening ourselves to criticism and to regret.

Other experiments have shown that the more choices you are given, the more pull the status quo has. More people will, for instance, choose the status quo when there are two alternatives to it rather than one: A and B instead of just A. Why? Choosing between A and B requires additional effort; selecting the status quo avoids that effort.

WHAT CAN YOU DO ABOUT IT?

First of all, remember that in any given decision, maintaining the status quo may indeed be the best choice, but you don't want to choose it just because it is comfortable. Once you become aware of the status-quo trap, you can use these techniques to lessen its pull:

- Always remind yourself of your objectives and examine how they would be served by the status quo. You may find that elements of the current situation act as barriers to your goals.
- Never think of the status quo as your only alternative. Identify other options and use them as counterbalances, carefully evaluating all the pluses and minuses.
- Ask yourself whether you would choose the status-quo alternative if, in fact, it weren't the status quo.
- Avoid exaggerating the effort or cost involved in switching from the status quo.
- Remember that the desirability of the status quo will change over time. When comparing alternatives, always evaluate them in terms of the future as well as the present.
- If you have several alternatives that are superior to the status quo, don't default to the status quo just because you're having a hard time picking the best alternative. Force yourself to choose.

THE SUNK-COST TRAP

Another of our deep-seated biases is to make choices in a way that justifies past choices, even when the past choices no longer seem valid. Most of us have fallen into this trap.

Our past decisions become what economists term sunk costs—old investments of time or money that are now irrecoverable.

A bad decision is often a very public matter, inviting critical comments from colleagues or bosses. If you fire a poor performer whom you hired, you're making a public admission of poor judgment. It seems psychologically safer to let him or her stay on, even though that choice only compounds the error.

WHAT CAN YOU DO ABOUT IT?

For all decisions with a history, you will need to make a conscious effort to set aside any sunk costs—whether psychological or economic— that will muddy your thinking about the choice at hand. Try these techniques:

- Seek out and listen carefully to the views of people who were uninvolved with the earlier decisions and who are hence unlikely to be committed to them.
- Examine why admitting to an earlier mistake distresses you. If the problem lies in your own wounded self-esteem, deal with it head-on. Remind yourself that even smart choices can have bad consequences, through no fault of the original decision maker, and that even the best and most experienced managers are not immune to

errors in judgment.

- Be on the lookout for the influence of sunk-cost biases in the decisions and recommendations made by your subordinates. Reassign responsibilities when necessary.
- Don't cultivate a failure-fearing culture that leads employees to perpetuate their mistakes.

This bias leads us to seek out information that supports our existing instinct or point of view while avoiding information that contradicts it.

THE CONFIRMING EVIDENCE TRAP

The confirming evidence bias not only affects where we go to collect evidence but also how we interpret the evidence we do receive, leading us to give too much weight to supporting information and too little to conflicting information.

There are two fundamental psychological forces at work here. The first is our tendency to subconsciously decide what we want to do before we figure out why we want to do it. The second is our inclination to be more engaged by things we like than by things we dislike—a tendency well documented even in babies. Naturally, then, we are drawn to information that supports our subconscious leanings.

WHAT CAN YOU DO ABOUT IT?

It's not that you shouldn't make the choice you're subconsciously drawn to. It's just that you want to be sure it's the smart choice. You need to put it to the test. Here's how:

- Always check to see whether you are examining all the evidence with equal rigor. Avoid the tendency to accept confirming evidence without question.
- Get someone you respect to play devil's advocate, to argue against the decision you're contemplating. Better yet, build the counterarguments yourself. What's the strongest reason to do something else? The second strongest reason? The third? Consider the position with an open mind.
- Be honest with yourself about your motives. Are you really gathering information to help you make a smart choice, or are you just looking for evidence confirming what you think you'd like to do?
- In seeking the advice of others, don't ask leading questions that invite confirming evidence. And if you find that an adviser always seems to support your point of view, find a new adviser. Don't surround yourself with yes men.

THE FRAMING TRAP

The first step in making a decision is to frame the question. It's also one of the most dangerous steps. The way a problem is framed can profoundly influence the choices you make.

WHAT CAN YOU DO ABOUT IT?

A poorly framed problem can undermine even the best-considered decision. But any adverse effect of framing can be limited by taking the following precautions:

- Don't automatically accept the initial frame, whether it was formulated by you or by someone else. Always try to reframe the problem in various ways. Look for distortions caused by the frames.
- Try posing problems in a neutral, redundant way that combines gains and losses or embraces different reference points.
- Think hard throughout your decision making process about the framing of the problem. At points throughout the process, particularly near the end, ask yourself how your thinking might change if the framing changed.
- When others recommend decisions, examine the way they framed the problem. Challenge them with different frames.

ESTIMATING AND FORECASTING TRAPS

Most of us are adept at making estimates about time, distance, weight, and volume. That's because we're constantly making judgments about these variables and getting quick feedback about the accuracy of those judgments. Through daily practice, our minds become finely calibrated. Making estimates or forecasts about uncertain events, however, is a different matter.

THE OVERCONFIDENCE TRAP

Even though most of us are not very good at making estimates or forecasts, we actually tend to be overconfident about our accuracy. That can lead to errors in judgment and, in turn, bad decisions. If managers underestimate the high end or overestimate the low end of a crucial variable, they may miss attractive opportunities or expose themselves to far greater risk than they realize.

THE PRUDENCE TRAP

Another trap for forecasters takes the form of over cautiousness, or prudence. When faced with high-stakes decisions, we tend to adjust our estimates or forecasts "just to be on the safe side."

THE RECALLABILITY TRAP

Even if we are neither overly confident nor unduly prudent, we can still fall into a trap when making estimates or forecasts. Because we frequently base our predictions about future events on our memory of past events, we can be overly influenced by dramatic events—those that leave a strong impression on our memory. We all, for example, exaggerate the probability of rare but catastrophic occurrences such as plane crashes because they get

disproportionate attention in the media. A dramatic or traumatic event in your own life can also distort your thinking.

In fact, anything that distorts your ability to recall events in a balanced way will distort your probability assessments.

WHAT CAN YOU DO ABOUT IT?

The best way to avoid the estimating and forecasting traps is to take a very disciplined approach to making forecasts and judging probabilities. For each of the three traps, some additional precautions can be taken:

- To reduce the effects of overconfidence in making estimates, always start by considering the extremes, the low and high ends of the possible range of values. This will help you avoid being anchored by an initial estimate. Then challenge your estimates of the extremes. Try to imagine circumstances where the actual figure would fall below your low or above your high, and adjust your range accordingly. Challenge the estimates of your subordinates and advisers in a similar fashion. They're also susceptible to overconfidence.
- To avoid the prudence trap, always state your estimates honestly and explain to anyone who will be using them that they have not been adjusted. Emphasize the need for honest input to anyone who will be supplying you with estimates. Test estimates over a reasonable range to assess their impact. Take a second look at the more sensitive estimates.
- To minimize the distortion caused by variations in recall ability, carefully examine all your assumptions to ensure they're not unduly influenced by your memory. Get actual statistics whenever possible. Try not to be guided by impressions.

UNDERSTANDING COMMUNICATION

Intended message is frequently mis-communicated, misunderstood, mis-quoted or even missed altogether because of ineffective interpersonal communication skills. The ability to effectively communicate with other people is an important skill.

Through communication, people reach some understanding of each other, learn to like each other, influence one another, build trust, and learn more about themselves and how people perceive them. People who communicate effectively know how to interact with others flexibly, skillfully, and responsibly, but without sacrificing their own needs and integrity.

Communication is a significant part of a manager's job. In today's team-oriented workplace, the development of good interpersonal communication skills is an important key to success. To build the competence and commitment of employees, a manager has to communicate effectively. Through effective communication, a manager can mobilize the employees behind an organization's vision and inspire a conscious and concerted team effort to attain the vision. The pay-off of effective communication are:

- A more professional image
- Improved self-confidence
- Improved relationships
- Less stress
- Greater acceptance by others

Communication is Transactional

Each person is both sending and receiving simultaneously.

Parties communicating have an impact on each other

Communication is a Process

Changes in events and relationships are part of a continuous flow. Every

Communication experience is the result of the accumulation of experiences

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WORKPLACE COMMUNICATION RELATIONSHIPS

Effective communication demands that the parties involved in communication have a shared and clear appreciation of the various definitions and parameters about which information is being exchanged. According to Stefano Baldi and Ed Gelbstein ("Jargon, Protocols and Uniforms as barriers to effective communication"): Workplaces are witness to generally five types of communication relationships: Collaborative, Negotiative, Competitive, Conflictive and Non-recognition.

The diagram below illustrates how these are connected to each other and how these relationships are potentially unstable and as a result of which a relationship can develop from one type to another either to improve the effectiveness of communication (the positive development path) or slide into a complete collapse of communication (the negative development path).
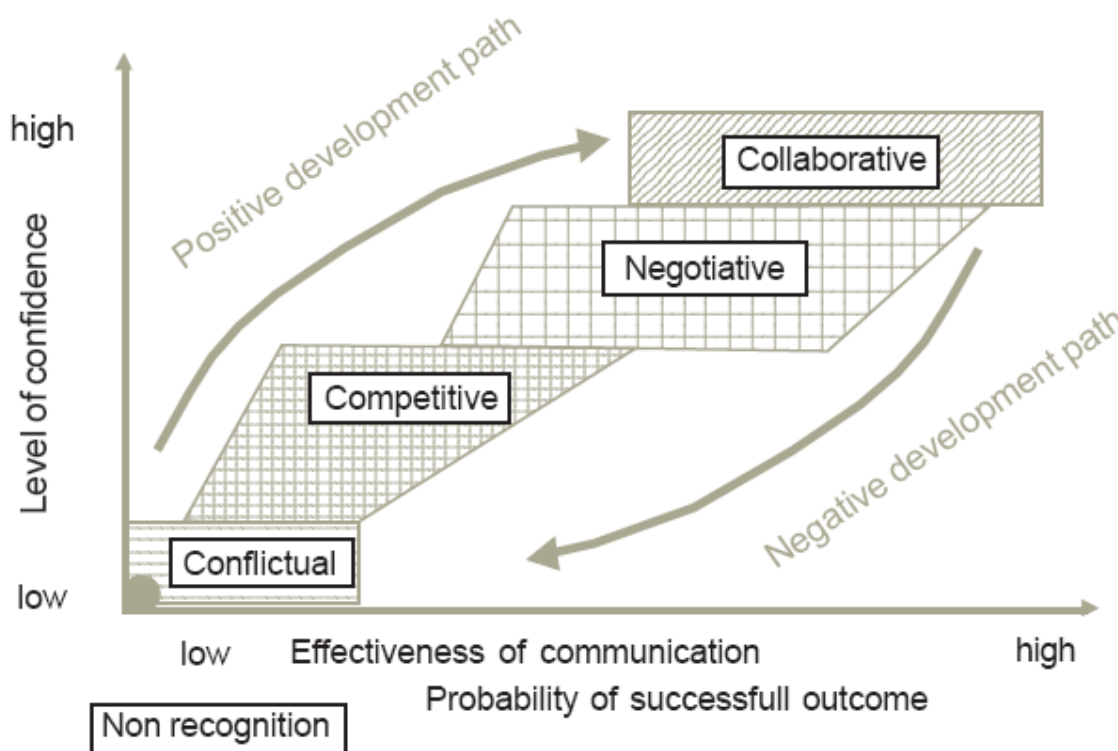
Non-recognition relationship blocks any meaningful exchange by refusing to acknowledge that one or more of the players in the desired exchange has no rights whatsoever.

Conflictual relationship is a situation in which the parties recognize each other but are no longer able to work towards a win-win result and resort to verbal abuse and physical violence instead.

These types of relationships present a fundamental obstacle to effective communication. The other three relationships are often of an unstable nature, in the sense that a change in the relationship can be triggered by a relatively minor event–even just one word that is inappropriate at the time - and this can happen very quickly.

In the collaborative relationship the needs and positions of all the parties are clearly defined and understood and everyone involved shares the will to succeed, as well as information, equipment, accommodation and logistic arrangements, for example.

The negotiative relationship has much in common with the collaborative scenario except that some needs and positions may not have been defined clearly enough and require discussion and trading to reach a mutually acceptable outcome.

Collaborative and negotiative relationships can quickly become competitive relationships when one of the players needs to (or decides to) play a role different from that which was originally agreed upon. This new role could also result in some form of overlap with the responsibilities of others. Another kind of competitive relationship occurs when a "new

player" joins an established effort and expects to obtain rights, privileges and concessions from other players. Competitive relationships can, if not properly managed, quickly deteriorate into non-recognition, conflict and exclusion.

At this point, the concepts of credibility and trust become important. Without either of these, effective communication is simply not possible. Neither credibility nor trust is automatically and instantly given – they need to be earned.

Four responses or roles that often cause difficulty in communications, as well as in relationships and task activities, are the:

1. Placater: The Placater always talks in an ingratiating way, trying to please, apologizing and never disagreeing, no matter what.

- WITH WORDS the placater always agrees. For example: "Whatever you want is okay. I am just here to make you happy."
- WITH BODY the placater indicates a sense of helplessness.
- WHILE ON THE INSIDE the placater feels: "I feel like nothing: without him or her, I am dead. I am worthless."

2. Blamer: The Blamer is a fault-finder, a dictator, a boss and always acts superior.

- WITH WORDS the blamer always disagrees, and says (or seems to say): "You never do anything right. What is the matter with you?" Or, "If it weren't for you, everything would be all right."
- WITH BODY the blamer indicates: "I am the boss around here."
- WHILE INSIDE the feeling is: "I am lonely and unsuccessful."

3. Computer: The Computer is very correct, very reasonable with no semblance of any feeling showing. He or she is calm, cool and collected, and is almost totally disinterested and tries to sound intellectual. The computer uses big words.

- WITH WORDS the computer is ultra-reasonable. For example: "If one were to observe carefully, one might notice the work-worn hands of someone present here."
- WITH BODY the computer is stoic like a machine and seems to be saying: "I'm calm, cool and collected."
- WHILE ON THE INSIDE the computer may really be saying: "I feel vulnerable."

4. Distracter: The Distracter never makes a direct response to anything. Anything he or she says is totally irrelevant to what anyone else is saying or doing.

- WITH WORDS the distracter makes no sense and is totally irrelevant.
- WITH BODY the distracter is angular and off somewhere else.
- WHILE ON THE INSIDE the distracter may be saying: "Nobody cares. There is no place for me."

Mutual trust and respect are the foundation for effective communications. When both of

these exist, goals can be developed to which all individuals and groups are committed. Communication systems and procedures based on shared goals and developed cooperatively are those most supported, most adhered to, and consequently most efficient.

TYPES OF COMMUNICATION

People in managerial roles have many opportunities to communicate with others. Communication can be classified in the following different ways.

- **Intrapersonal Communication:** When people talk to themselves, communication takes place within the brain. It embraces their thoughts, experiences and perceptions during a communication event. Behavior responses on all other levels of communication essentially begin on intrapersonal level. On this level, the individual forms personal rules and patterns of communication. Intrapersonal communication encompasses:
    o Sense-making e.g. interpreting maps, texts, signs, and symbols
    o Interpreting non-verbal communication e.g. gestures, eye contact
    o Communication between body parts; e.g. "My stomach is telling me it's time for lunch."
    o Day-dreaming
    o Nocturnal dreaming and
    o Many others...
- **Interpersonal Communication:** Interpersonal communication is also referred to as dyadic communication, or communication between two individuals. This type of communication can occur in both a one-on-one and a group setting. This also means being able to handle different people in different situations and making people feel at ease. Gestures such as eye contact, body movement, and hand gestures are also part of interpersonal communication. The most common functions of interpersonal communication are listening, talking and conflict resolution. Types of interpersonal communication vary from verbal to non-verbal and from situation to situation. Interpersonal communication involves face-to-face communication in a way that accomplishes the purpose and is appropriate.
- **Small Group Communication:** Small group communication is an interaction process that occurs among three or more people interacting in an attempt to achieve Soft Skills for Public Managers commonly recognized goals either face-to-face or through mediated forms. This is sometimes included in the interpersonal level — the most obvious difference is the number of persons involved in the process. The small group may be a family of three talking at supper, or a meeting of an organization with just a few members.
- **Public Communication or Public Speaking:** The speaker sends messages to an audience, which is not identified as individuals. Unlike the previous levels, the speaker is doing most, if not all, of the talking.
- **Mass Communication:** Mass communication occurs when a small number of people send messages to a large anonymous and usually heterogeneous audience using specialized communication media. It represents the creation and sending of a homogeneous message to a large heterogeneous audience through the media.

- **Non-Verbal Communication:** In non-verbal communication, people send messages to each other without talking. They communicate through facial expressions, head positions, arm and hand movements, body posture, and positioning of legs and feet. How people use "space" also transmits a message. By being aware of non-verbal communication, one can interpret the signals of others, or send signals to others. Awareness of non-verbal communication helps people:
  - o Project an image of confidence and knowledge.
  - o Demonstrate power or influence
  - o Express sincerity, interest and cooperativeness.
  - o Create trust.
  - o Recognize personal tension in self and others.
  - o Identify discrepancies between what people are saying and what they are actually thinking.
  - o Change behavior and environment to encourage productive discussion.

Three Myths about Communication
- Myth One: Communication is the magical cure for all our woes - a Panacea
- Myth Two: Communication Can Break Down (here can be a difference of opinion but communication cannot break down, machines break down)
- Myth Three: Communication is Merely Skill Building. Communication is a complex process that must be taken and understood as a whole

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METHODS OF COMMUNICATION

Communication occurs in an organization in the context of people trying to fulfill one or several of the following six needs:

- To feel respected
- To give or get information
- To be empathically understood and respected
- To cause change of action
- To create excitement and reduce boredom
- To avoid something unpleasant, like silence or confrontation

The methods used by them to fulfill those needs include listening, speaking, reading and writing.

1. **Listening:** Various studies stress the importance of listening as a communication skill. They point out that many of us spend 70 to 80 percent of our waking hours in some form of communication. Of that time, we spend about 9 percent writing, 16 percent reading, 30 percent speaking, and 45 percent listening. Studies also confirm that most of us are poor and inefficient listeners. Most people listen at an efficiency level

of less than about 25 percent. Studies also show that, immediately after listening to a 10-minute oral presentation, the average listener has heard, understood, properly evaluated, and retained only half of what was said.

People generally remember
- 10 % of what they read
- 20 % of what they hear
- 30 % of what they see
- 50 % of what they hear and see
- 70 % of what they say and write
- 90 % of what they say as they do something

Management guru Stephen Covey differentiates listeners as those listening with the intent to reply, and those listening with the intent to understand. Because listening is so vital to work place success, it is important to take note of the seven "sins" that get in the way of good verbal communication (Dan Bobinski: The Seven Deadly Sins of (Not) Listening):

Sin #1: Filtering

- This is when a person's mind is sifting through another's words and tuning in only when he or she hears agreement. Commonly, a Filterer replies to someone else's statements with "yeah, but…."

Sin #2: Second Guessing

- Someone who is second-guessing usually misses important details because they are too busy (a) imagining someone has hidden motives for saying what they're saying, and (b) trying to figure out what those hidden motives might be.

Sin #3: Discounting

- This sin occurs when a listener lacks respect for a speaker. What the speaker is saying could be 100% dead on correct, but a Discounter will either internally or publicly scoff at what's being said, for any number of reasons. The sad thing about Discounters is that they often miss the solutions to the problems before them, simply because they don't like the source. A milder form of discounting occurs when content is brushed off just because the person speaking is not a good speaker.

Sin #4: Relating

- A Relater is someone who continually finds references from his or her own background and compares them to what the speaker is saying. Relaters often appear self-centered, as everything they hear is publicly compared or contrasted to his or her own experiences.

Sin #5: Rehearsing

- This sin blocks much listening as it is simply waiting for the other speaker to finish what he or she is saying so the rehearser can start talking again. While someone else is talking, the rehearser is thinking about how to say the next sentence.

Sin #6: Forecasting

- Someone who takes an idea from the speaker and runs light years ahead of the topic at hand is forecasting. Forecasting can stem from being bored with the subject matter, or simply because one's mind automatically thinks ahead.

Sin #7: Placating

- Worst of all listening sins, placating agrees with everything anyone else says, just to avoid conflict.

There are a few but effective techniques used in being an active listener. These include verbal and non-verbal techniques. These techniques show others that people are paying attention to them and are interested in what they are saying.

Non-verbal techniques include:

- good eye contact
- facial expressions
- body language
- silence
- touching

Verbal techniques include:

- I'm "listening" cues
- disclosures
- validating statements
- statements of support
- reflection/ mirroring statements

It is very important to use "I-Messages" in a support group to convey one's feelings to the entire group. If feelings are not expressed, they are often disguised behind the group. "I-Messages" also provide a preventative focus in that they keep undesirable behaviors in check or they can insure that some things don't happen or get carried away. The use of "I-Messages" may also provide a soft mechanism for confrontation and correction in that "I" is perceived as being softer than "you".

Most of the messages sent to people about their behavior are "you" messages — messages that are directed at the person. These have a high probability of putting people down, making them feel guilty, and making them resistant to change. An "I Message" allows a person who is affected by another's behavior to express the impact it is having on him or her. This leaves the responsibility for modifying the behavior with the person who

demonstrated the behavior.

Active Listening

1. Setting the stage
   - Choose an appropriate physical environment
   - Remove distractions
   - Be open and accessible
   - Listen with empathy

2. Insuring mutual understanding
   - Reflect feelings
   - Paraphrase main ideas
   - Interrupt to clarify
   - Confirm next steps

3. Understanding body language
   - Observe position and posturing
   - Make eye contact
   - Consider expression and gestures

4. Suspending judgment
   - Concentrate
   - Keep an open mind
   - Hear the person out

"I-Messages" build relationships and do not place the sender in the position of enforcing a new behavior. Many people have been taught to avoid "I" (as in I want or I would like), so it is often difficult to use this method.

2. Speaking: By age sixteen, Washington had copied out by hand, 110 Rules of Civility & Decent Behavior in Company and Conversation. The relevant rules of civility that can be drawn from Washington's book are:

- Be considerate of others. Do not embarrass others.
- Don't draw attention to yourself.
- When you speak, be concise.
- When a person tries his/ her best and fails, do not criticize him/ her.
- When you must give advice or criticism, consider the timing, whether it should be given in public or private, the manner and above all be gentle.
- Do not make fun of anything important to others.
- If you criticize someone else of something, make sure you are not guilty of it yourself.

- Actions speak louder than words.
- Do not detract from others nor be overbearing in giving orders.
- Do not go where you are not wanted. Do not give unasked-for advice.
- Do not be quick to talk about something when you don't have all the facts.
- Do not speak badly of those who are not present.
- Show interest in others conversation, but don't talk with your mouth full.

While manners of speech matters a great deal in defining the workplace relationships, it is also essential that managers keep in mind that the following ground rules while speaking to their colleagues or subordinates.

- Keep the message clear
- Be prepared
- Keep the message simple
- Be vivid when delivering the message
- Be natural
- Keep the message concise

3. Reading: Good reading habits and strategies help managers handle their tasks more efficiently. Following six reading strategies to managers for optimal results:

- Knowing what is needed to be known, and reading appropriately
- Knowing how deeply to read the document: skimming, scanning or studying
- Using active reading techniques to pick out key points and keeping the mind focused on the material
- Using the table of contents for reading magazines and newspapers, and clipping useful articles
- Understanding how to extract information from different article types
- Creating a table of contents for reviewing material
- Using indexes, tables of contents and glossaries to help assimilate technical information

4. Writing: Crisp and correct writing is essential to successful leadership communication. When a letter, report, or program handout includes an error, readers are likely to remember the error rather than the message. The following are some of the principles managers must bear in mind while setting out to write.

- Proof-read aloud everything. By reading aloud, your ear will catch mistakes your eye misses.
- Make no assumptions. The ideas you are presenting must be explained in full to be understood. People read only what is on the page.
- Do not lecture. Write only what must be understood to make the proper decision or choice.
- Rough draft all important letters and reports. Check them for content, sequential development of ideas, and conciseness.
- Always put yourself in the "other person's shoes" and ask yourself, "Would I want to

read this letter or report? Why? Does it say something of value and real importance to me?"

- Many people are too busy to read carefully. Be sure your ideas are clear and easy to follow. As a general rule, the most effective manner in which to develop an idea is:
- Define all "terms" and eliminate vague pronouns. These two traps cause more problems in writing than any other set of conditions.
- Grammar, punctuation, and spelling should be perfect. Use a dictionary - either a good unabridged volume or the "spelling checker" version on your computer.
- Plan your time to allow for proofreading and correcting.

COMMUNICATION STYLES

Every time a manager speaks, s/he chooses and uses one of four basic communication styles: assertive, aggressive, passive and passive-aggressive. .

1. **Passive Style**: Passive communication is based on compliance and hopes to avoid confrontation at all costs. In this mode, people do not talk much, question even less, and actually do very little. They usually have a low sense of self-esteem, and have a difficult time recognizing their own needs and knowing how to meet them more appropriately. They internalize discomfort rather than risk, upsetting others. This style tends to result in a lose-win situation, and results in feelings of victimization, resentment, and a loss of a sense of control.

2. **Aggressive Style**: Aggressive communication always involves manipulation. Managers adopting the aggressive style create a win-lose situation. They use intimidation and control to get their needs met, and they are disrespectful and hurtful to others in communications. They have the underlying beliefs that power and control are the only way to get needs met. They operate from a real sense of inadequacy and may have a lack of empathy for others.

3. **Passive-aggressive Style**: Aggressive communication always involves manipulation. A combination of styles, passive-aggressive avoids direct confrontation (passive), but attempts to get even through manipulation (aggressive). The passive-aggressive people incorporate elements of both of the previous styles. They try to use procrastination, forgetfulness, and intentional inefficiency rather that being direct in their communications with others. This style of communication often leads to office politics and rumour-mongering.

4. **Assertive Style**: The most effective and healthiest form of communication is the assertive style. It's how people naturally express themselves when their self-esteem is intact, giving them the confidence to communicate without games and manipulation.

The assertive people are direct with the goal of creating a win-win situation. They operate from the belief that each person is responsible for solving his or her own problems, and neither party in communication has to justify themselves to each other. They take responsibility for their own decisions and actions.

Understanding the four basic types of communication will help managers learn how to react most effectively when confronted with a difficult person. It will also help them recognize

when they are using manipulative behavior to get their own needs met. They should remember that they always have a choice as to which communication style to use. If they are serious about taking control of their life, they should practice being more assertive. It will help them diffuse anger, reduce guilt and build relationships - both personally and professionally.

STRATEGIES FOR DEVELOPING ASSERTIVE COMMUNICATION

- Watch your body posture – practice using an open, assertive body language and voice.
- Think before you speak. Take a few seconds to make sure you are conveying the right message, and in the way you want to convey it.
- Don't apologize if it's not warranted.
- Remember it is ok to say "no".
- Remember everyone is entitled to an opinion, and don't try to convince others that

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COMMON ROADBLOCKS TO COMMUNICATION

Communication roadblocks are an inevitable aspect of every workplace. These roadblocks distort the normal flow of communication. The factors distorting the clarity of a communication are called 'noise'. Noise can occur at any stage in the communication process. Managers should realize the importance of understanding the interpersonal communication process at the workplace, focusing on:

- Communication Roadblocks
    - The way minds work
    - Sender's behavior
    - Receiver's behavior

1. THE WAYS MINDS WORK

- **Perceptions of the reality**

Perceptions are the way we interpret and understand reality. Perceptions form one's reality through the following steps:

People collect information, But:

- They collect only a small amount – they cannot register all the data that their senses can bring them
- They collect selectively – they see what they want to see, they look for data to support their initial assumptions and neglect or do not notice contradictory evidence
- They collect in a certain order

People arrange the information into categories, but:

Categorizing is dangerous, for with categories go a certain set of assumptions or

predictions: "Brown-skinned men are violent" "Old people are less ready to change".

These are the stereotypes.

People from our reality, but:

Each of them may have their own reality, very different perceptions and very different realities. These differences often cause misunderstandings and conflicts.

- Stereotypes and Prejudices

Stereotyping is a natural function of the human mind, aimed to simplify the complex reality and make our body and mind develop automatic responses to similar stimuli. Stereo means "set image". When applied to people, stereotyping refers to forming an instant or fixed picture of a group of people, usually based on limited or incomplete information. Stereotypes frequently result from or lead to prejudices, negative opinions about others. Stereotypes and prejudices are sources of communication failures, and more than that, of bad actions and ugly emotions. Prejudices based on oversimplification of people into narrow, negative stereotypes can have tragic consequences such as discrimination and violence.

Often, people are stereotyped around characteristics of:

- Age: all teenagers love rock and roll and do not respect elders
- Sex: men want just one thing from a woman
- Race: all Chinese people look alike
- Religion: all those belonging to Islam are terrorists
- Vocation: all lawyers are greedy
- Nationality: all Somaliland are poverty-stricken
- Places: all people living in a certain city are lazy
- Things: all Swiss watches are perfect

Stereotypes have four main characteristics:

- They are simpler than the reality
- They are acquired from "cultural mediators" rather than own experience
- They are erroneous by their very nature
- They are resistant to change when absorbed in childhood, stubbornly colouring our perceptions and behavior.

PERCEPTIONS OF RELATIONSHIPS

People can perceive relationships with others based on three metaphorical roles: parent, adult, and child.
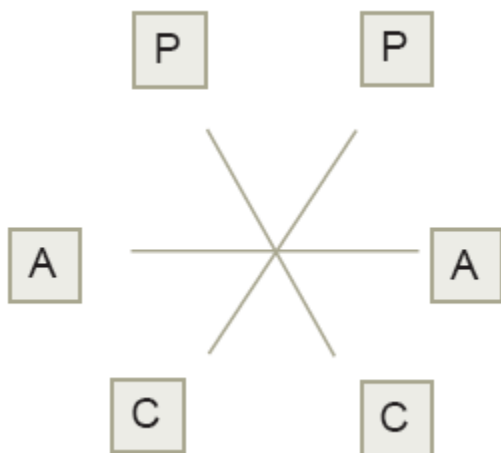
If one individual intends to relate to another as Adult to Adult, but is heard as Parent speaking to a Child, the interaction will result in misunderstanding and resentment.

- **Perspective and meta-perspective two are mentioned here**

There are three levels of thinking that complicate Interpersonal Communication:

Direct Perspective

John does not like Mary   Mary does not like John

Meta perspective

John thinks Mary likes him   Mary thinks John likes her

Metametaperspective

John thinks that Mary thinks he likes her Mary thinks that John thinks he likes her neither wants to hurt the other; rather than communicate openly and resolve the misunderstanding.

2. SENDER'S BEHAVIOUR

- **Different meanings of the words**

Often people are not able to choose the right word to say precisely what they mean. The same word may have different meanings to different people

- **Hiding Thoughts and Feelings**

Just as military code messages for national security purposes, people may choose to code their messages for personal security purposes; Or because they have been trained from early childhood to express themselves indirectly on many topics and feelings.

One of the basic reasons for miscommunication is that decoding is always guesswork.

One can easily observe a person's behavior, hear words and see actions, but:

One can only imagine what the words and actions mean.
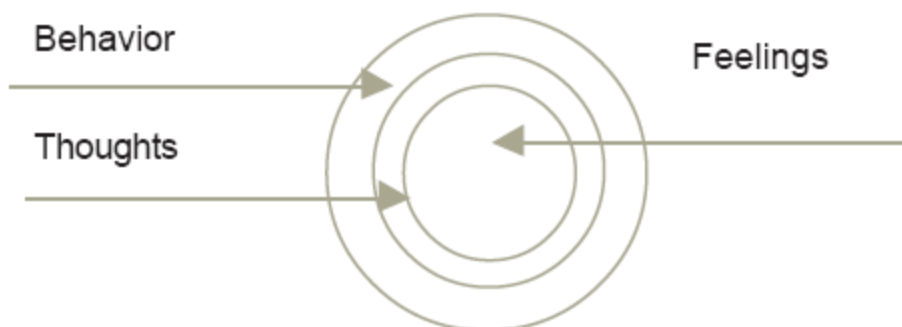
A person's thoughts and feelings (emotions) are often concealed very carefully and are not directly observable as behaviors are.

- **The Sender may be blind to other's emotions or blinded by them**

Emotions help shape values. They are a fundamental part of one's motivation and help to determine one's direction and purpose in life. Emotions provide one with needed clues to solve problems.

It is important not be blind and to be able to recognize one's feelings, to be aware of one's rich inner world of emotions. This skill may overcome many communication failures.

3. RECEIVER'S BEHAVIOR

- **Hearing through own filters**
    (a) People have many filters that distort what they hear.
    (b) People have attention filters that keep them from being overwhelmed by the increasing amount of sounds and information.
    (c) People have emotional filters that block or distort their understanding.
    (d) People have their expectations of others that distort their behavior
- **Receivers are easily distracted**

Many receivers are easily distracted and slip off dreaming while the sender is talking. One of the reasons for poor listening is that people can think much faster than they can talk. While people listen, they have a lot of spare time for thinking. The average rate for speech is 125-150 words per minute. This rate is slow for the ear and the brain, which can process about four times more and faster.

- **Reactions that block communication**

Often receivers have ways of responding that are considered by researchers as high– risk responses that are likely to block communication, increase the emotional distance between

people and decrease the other person's problem-solving efficiency.

These responses have been divided into three major categories:

- **Criticizing**

Many people feel that they ought to be critical or the other person will never improve. They feel that it is their responsibility to make a negative evaluation of the other person's actions or attitudes.

- **Name Calling**

Labeling, putting down the other person, prevents people from getting to really know the other

- **Diagnosing**

One person informs the other that he is being defensive, or he is acting out of guilt or fear or some other unconscious motives. "I can read you like a book….." Communication is blocked.

Sending Solutions

- **Ordering**

An order is a solution sent coercively and backed by force. People become defensive and resentful. Ordering might eventually lead to sabotage. Orders imply that the other's judgment is unsound and thus tend to undermine self-esteem.

- **Threatening**

A threat is a solution sent with an emphasis on punishment that will be forthcoming if the solution is not implemented. Threats produce the same kind of negative feelings to the results produced by orders 'You will do it or else...'

- **Moralizing**

Many people like to back their solutions with the force of moral or theological authority. "It's the right thing to do" "You ought to tell him you are sorry" Moralizing fosters anxiety, arouses resentment and blocks honest self-expression.

- **Advising**

The advice-giving trap is a constant temptation when someone talks to you about her problems. What's wrong with the advice? Often it is seen by the other as a basic insult to his/ her intelligence. It implies a lack of confidence in the capacity of the other person to cope with her problems. And the advisor seldom understands the full implications of the problem. The advisor may be unaware of the complexities, feelings, and many other factors that lie hidden beneath the surface.

Avoiding the other's concerns

- **Diverting**

One of the most frequent ways of switching a conversation from the other person's concern to one's own topic is called "diverting". Diverting appears when people lack the awareness and skills to listen effectively. At other times diversion appears when people are uncomfortable with the emotions stimulated by the conversation.

- **Logical argument**

When persons are under stress or when there is conflict between people, providing logical solutions can be frustrating. Logic focuses on facts and typically avoids feelings. However, feelings may be the main issues. Using logic, even if really needed, may be a high-risk response-blocking communication.

Overcoming Roadblocks

1. Listening

Since people have two ears and only one mouth, listening might be the most important communication skill. Unfortunately few people are good listeners. Listening is more than merely hearing with our ears. Listening is a combination of what another person says and involvement with the other person who is talking.

Active listening is a way of listening and responding to another person that improves mutual understanding, overcoming communication roadblocks. There are five levels of active listening:

Basic Acknowledgments: Basic acknowledgements include verbal, visual - nonverbal signs and vocal sounds that let the speaker know how the audience is listening with interest and respect, such as: head-nodding, leaning forward or backward, making eye contacts, "uh-huh", "oh really", "no-kidding", 'tell me more", "I hear you", "so..", "I see", "yes".

Questions: The idea of asking questions may seem contradictory to the idea of listening. But an active listener is asking questions in order to show the speaker his/ her interest (a) in what is being said (b) in knowing more to gain a better understanding of the speaker's point of view. Open-ended questions are preferable to close-ended questions, because they are providing opportunities for the speaker to open up, to explore his/ her thoughts and feelings. It is also important to ask one question at a time.

Paraphrasing: Paraphrasing focuses on the speaker's content, and summarizing what was said in order to clarify and confirm correct understanding. The steps of the paraphrasing process are:

(a) Let the speaker finish what he/she wanted to say.
(b) Restate with your own words what you think the speaker has said
(c) If the speaker confirms your understanding continue the conversation
(d) If the speaker indicates you misunderstood ask the speaker to repeat. "I do not

understand. Could you say it again?"

Mirroring feelings

Mirroring involves reflecting back to the speaker the emotions s/he is communicating. Do not miss the emotional dimension of a conversation, by focusing exclusively on the content. Encourage the speaker to disclose feelings – may be joy, sorrow, frustration, anger or grief. The reflection of feelings will help the speaker understand his/ her own emotions and move toward a solution of the problem. In order to understand and mirror feelings:

(a) Observe the feeling words the speaker uses.
(b) The speaker may not use feeling words at all because suppression of feelings is so widespread in our culture. Then, focus on the content and ask yourself: If I were having that experience, if I were saying and doing those things what would I be feeling?
(c) Observe the body language, facial expressions, the tone of the voice, gestures and posture.

Reflecting meanings

Once a person knows how to reflect feeling and content separately it is relatively easy to put the two together into a reflection of meaning. It would be useful to use the formula: "You feel (insert the feeling word) because (insert the event or other content associated with the feeling)"

- **Summative Reflections**

A summative reflection is a brief restatement of the main themes and feelings the speaker expressed over a longer period of discussions.A good summarization may help the speaker have a greater coherence, a better understanding of the situation and draw conclusions.

Effective Listening

Behaviors that support effective listening

- Maintaining relaxed body posture
- Leaning slightly forward if sitting
- Facing person squarely at eye level
- Maintaining an open posture
- Maintaining appropriate distance
- Offering simple acknowledgements
- Reflecting meaning (paraphrase)
- Reflecting emotions
- Using eye contact
- Providing non-distracting environment

Behaviors that hinder effective listening

- Acting distracted
- Telling your own story without acknowledging their first
- No response
- Invalidating response, put downs
- Interrupting
- Criticizing
- Judging
- Diagnosing
- Giving advice/solutions
- Changing the subject
- Reassuring without acknowledgment

2. Reading, Body Language

From the very beginning of the human race, non-verbal communication, e.g., body language, has been a means of interpersonal communication and was used long before language appeared. But only in the recent past behavioral scientists started to make systematic observations of what non-verbal signs mean.

In a message, words are effective carriers of factual information. The content of the conversation can be important. But when emotions are engaged they should receive primary attention and they are mostly carried by non-verbal elements. Understanding, being able to read body language is one of the most important skills for effective communication. In order to do it:

Focus attention on the important clues

The facial expression – especially eyes and vocal expression are eloquent

The tone of the voice gives information about speaker's feelings, anger, boredom, depression, enthusiasm or disbelief

The posture and gestures – movements of the head, legs, and hands reveal the levels of self-esteem and inner energy

The clothing and environment style give clues about personal characteristics

Note discrepancies

When there is a discrepancy between words and body language, both messages are important. Search for the meanings.

Be aware of own feelings and bodily reactions

Non-verbal communications can by-pass the conscious mind and trigger responses. By becoming aware of what ones body is experiencing one becomes more sensitive to what other people are feeling.

CRITERIA FOR ASSESSING COMMUNICATION COMPETENCE

Communication competence is the ability to relate to others with accuracy, clarity, comprehensibility, coherence, expertise, effectiveness and appropriateness. It is a measure of determining to what extent the goals of interaction are achieved. However, communicative competence is contingent upon the context in which the interaction takes place. Communication which is successful with one group in one situation may not be perceived as competent with a different group in another situation.

six criteria for assessing competence. The criteria include - adaptability, conversational-involvement, conversational-management, empathy, effectiveness, and appropriateness. They are explained in greater detail below:

1. Adaptability: Adaptability is the ability to assess situations and when necessary change behaviors and goals to meet the needs of interaction. It signals awareness of the other person's perspectives, interests, goals, and communication approach, plus the willingness to modify ones own behaviors and goals to adapt to the interaction situation. By mindfully tracking what is going on in the intercultural situation, both parties may modify their nonverbal and verbal behavior to achieve a more synchronized communication process. In modifying their behavioral styles, polarized views on the problem may also be depolarized or "softened." It consists of six factors:

1. Social experience - participation in various social interactions

2. Social composure - refers to keeping calm through accurate perception

3. Social confirmation - refers to acknowledgment of partner's goals

4. Appropriate disclosure - being sensitive to amount and type of info

5. Articulation - ability to express ideas through language

6. Wit - ability to use hum our in adapting to social situations; ease tensions

2. Conversational Involvement: Conversational interaction is a factor that determines the degree to which individuals participate in conversation with others. Specifically, receivers of communication differ in terms of their attentiveness and perceptiveness. These parameters influence how information and cues are received from others.

Approximately 48% of individuals are not generally highly involved in their conversations.

Highly involved persons are predicted to be more issue-oriented and attentive to the underlying message in the conversation. On the other hand, less involved persons are expected to concentrate on events or surface of the conversation.

3. Conversational Management: Conversation-management is essentially the way the communicators regulate their interactions. It is a matter of knowing the rules of interpersonal communication exchanges and following them. Communication rules are just like other socially conditioned behaviors and are acquired in the same way. What are the rules that an astute and observant communicator knows about to manage interaction?

Five most common communicative competencies

1. First, one cannot interrupt the speaker.
2. Second, only one person may talk at a time.
3. Third, speakers' turns must alternate or interchange.
4. Fourth, frequent or long pauses are inappropriate.
5. Fifth, both parties should be assured that the other is devoting his or her undivided attention.

4. Empathy: Empathy, in its broadest usage, is considered a fundamental dimension of interpersonal and communication competence. Empathy is the ability to demonstrate understanding and sharing reactions in any given situation. It is an innate human capacity that gives the ability to understand the unique experiences of another person.

- It connects people with one another on a meaningful and fulfilling level.
- It demonstrates a person's caring attitude toward others
- It helps understand the people better.
- It usually leads conversation towards emotional issues.
- It lets one build a personal rapport with others
- It helps reduce ones irritation with others attitude or behavior.
- It helps reduce ones prejudice or negative assumptions about others
- It fosters more meaningful, more helpful, closer friendships.

5. Effectiveness: Effectiveness refers to the degree to which communicators achieve mutually shared meaning and integrative goal-related outcomes. Effective encoding and decoding processes lead to mutually shared meanings. Mutually shared meanings lead to perceived intercultural understanding. Interaction effectiveness has been achieved when multiple meanings are attended to with accuracy and when mutually desired interaction goals have been reached. Interaction ineffectiveness occurs when content or relational meanings are mismatched and intercultural noises and clashes jam the communication

channels. Communication effectiveness can improve task productivity.

6. Appropriateness: A fundamental criterion for determining communication competence, appropriateness is the ability to uphold the expectations of a given situation. Individuals typically use their own expectations and scripts to approach an interaction scene.

SEVEN ACTIONS FOR EFFECTIVE COMMUNICATION

Seven following actions are essential for effective interpersonal skills.

Action 1. Listen more carefully and responsively. Listen first and acknowledge what you hear, even if you don't agree with it, before expressing your experience or point of view. Acknowledging another person's thoughts and feelings does not have to mean that you approve of or agree with that person's actions or way of experiencing, or that you will do whatever someone asks.

Action 2. Explain your conversational intent and invite consent. You can help your conversation partners cooperate with you and reduce possible misunderstandings by starting important conversations with a stated invitation to join you in the specific kind of conversation you want to have.

When you need to have a long, complex, or emotion-laden conversation with someone, it can make a GIANT difference if you briefly explain your conversational intention first and then invite their consent. Many successful communicators begin special conversations with a preface that goes something like: "I would like to talk with you for a few minutes about [subject matter]. When would it be a good time?"

Action 3. Express yourself more clearly and completely. Slow down and give your listeners more information about what you are experiencing by using a wide range of "I-statements."

At any time when one person sincerely listens to another, a very creative process starts on in which the listener mentally reconstructs the speaker's experience. The more facets or dimensions of your experience you share with easy-to-grasp "I statements," the easier it will be for your conversation partner to reconstruct your experience accurately and understand what you are feeling. This is equally worthwhile whether you are trying to solve a problem with someone or trying to express appreciation for him/ her. Expressing yourself this carefully might appear to take longer than your usual quick style of communication. But if you include all the time it takes to unscramble everyday misunderstandings, and to work through the feelings that usually accompany not being understood, expressing yourself more completely can actually take a lot less time.

Action 4. Translate your (and other people's) complaints and criticisms into specific requests, and explain your requests. In order to get more cooperation from others, whenever possible ask for what you want by using specific, action-oriented, positive language rather than by using generalizations, "why's," "don'ts" or "somebody should's."

Action 5. Ask more "open-ended" questions and more creatively. "Open-endedly...": In order to coordinate our life and work with the lives and work of other people, we all need to

know more of what other people are feeling and thinking, wanting and planning. But our usual "yes/ no" questions actually tend to shut people up rather than opening them up. In order to encourage your conversation partners to share more of their thoughts and feelings, ask "open-ended" rather than "yes/ no" questions. Open-ended questions allow for a wide range of responses. For example, asking "How did you like that food/ movie/ speech/ doctor etc.?" will evoke a more detailed response than "Did you like it?" which could be answered with a simple "yes" or "no".

Action 6. Express more appreciation. To build more satisfying relationships with the people around you, express more appreciation, delight, affirmation, encouragement and gratitude. Because life continually requires us to attend to problems and breakdowns, it gets very easy to see in life only what is broken and needs fixing. But satisfying relationships (and a happy life) require us to notice and respond to what is delightful, excellent, and enjoyable, to work well done, to food well cooked, etc.

Action 7. Make better communication an important part of your everyday life. In order to have your new communication skills available in a wide variety of situations, you will need to practice them in as wide a variety of situations as possible, until, like driving or bicycling, they become "second nature."

SOME DO'S OF EFFECTIVE COMMUNICATION

1. Analyze the issue at hand thoroughly before developing a plan:

2. Identify the role of communication in an early stage:

3. Know the target groups and stakeholders: Find out the target groups and stakeholders and study their knowledge, attitude, behavior and interests in the issue at hand.

4. Define communication targets: Targets should make clear which results one wants to achieve. It is essential that communication targets are SMART: Specific, Measurable, Acceptable, Realistic and Time related. Communication targets can range from involvement in problem-solving, to attention, knowledge, awareness, motivation, behavior and skills. In most cases, communication will be used in combination with other instruments to achieve the desired results.

5. Identify partners and intermediaries:

6. Always pre-test: Ensure that the target group understands the messages and detect unexpected interpretations of your message by pre-testing it. If there is no time, personnel or budget available for a pre-test, conduct at least a 'disaster-check':

7. Evaluate results: Evaluation is aimed at assessing the effects of your communication efforts.

8. Define the medium for the message: Since each medium has its own advantages and disadvantages, one should define which medium can most effectively relay messages. For example, the Internet may reach a worldwide audience and therefore may seem to be the perfect medium to reach audience around the world, but the Internet penetration in some

countries is low.

9. Establish a budget:

10. Think creatively:

SOME DONT'S OF EFFECTIVE COMMUNICATION

1. Don't only send, listen!

2. Don't jump to means

A potential pitfall - which happens frequently - is starting to invest in means before essential questions concerning the strategy have been answered.

3. But don't over focus on strategies either

Another potential pitfall is the opposite of all that has been just mentioned above, that is, to spend much energy and time on developing a communication strategy, then quickly producing the communication means.

4. Do not disregard communication barriers

The following barriers should be considered when one wants to communicate:

- Said is not necessarily heard
- Heard is not necessarily understood
- Understood is not necessarily agreed upon
- Agreed is not necessarily acted upon
- Action is not necessarily repeated

5. Do not overestimate the potential of communication

6. Do not underestimate the potential of communication

It is impossible to 'not communicate'. If for instance a new industrial plant is installed without communication with people living in the area, the message they will get might be: 'we are ignored, they don't value our opinions, they just do as they like'.

QUESTIONS AND ANSWERS

1. **You have been asked to give an explanation for not attending an important official meeting. Your immediate boss who has not informed you about the meeting is now putting pressure on you not to place an allegation against him/her. You would:**
   (a) send a written reply explaining the fact.
   (b) seek an appointment with the top boss to explain the situation.
   (c) admit your fault to save the situation.
   (d) put the responsibility on the coordinator of that meeting for not informing.

2. **A local thug has started illegal construction on your vacant plot has refused your request to vacate and threatened you of dire consequences in case you do not sell the property at a cheap price to him. You would:**
   (a) sell the property at a cheap price to him.
   (b) go to the police for necessary action.
   (c) ask for help from your neighbours.
   (d) negotiate with the goon to get a higher price.

3. **You have to accomplish a very important task for your office within the next two days. But you meet with an accident. Your office insists that you complete the task. You would:**
   (a) Ask for an extension of deadline.
   (b) Inform office of your inability to finish on time.
   (c) Suggest alternate person to headquarters who may do the needful.
   (d) Stay away till you recover.

4. **You are an officer-in-charge for providing basic medical facilities to the survivors of an earthquake affected area. Despite your best possible effort, people put allegations against you for making money out of the funds given for relief. You would:**
   (a) let an enquiry be set up to look into that matter.
   (b) ask your senior to appoint some other person in your place.
   (c) not pay attention to allegations.
   (d) stop undertaking any initiative till that matter is resolved.

5. **You have been made responsible to hire boats at a short notice to be user area under flood. On seeing the price mentioned by the boat owners you found that the lowest price was approximately three times more than the approved rat Government. You would:**
   (a) Reject the proposal and call for a fresh price.
   (b) Accept the lowest price.
   (c) refer the matter to the Government and wait.
   (d) threaten the boat owners about a possible cancellation of the license.

6. **You are the officer-in charge of a village administering distribution of vaccine in an isolated epidemic hit village, and you are left with only one vaccine. There is a requirement of that vaccine from the Sarpanch and also a poor villager. You are being pressurized by the Sarpanch to issue the vaccine to him. You would:**
   (a) Initiate the procedure to expedite the next supply without issuing the vaccine to either.
   (b) Arrange vaccine for the poor villager from the distributer of another area.
   (c) Ask both to approach a doctor and get an input about the urgency
   (d) Arrange vaccine for the Sarpanch from the distributer of another area.

7. **You have taken up a project to create night-shelters for homeless people during the winter season. Within a week of establishing the shelters, you have received complaints from the residents of the area about the increase in theft cases with a demand to remove the shelters. You would:**
   (a) Ask them to lodge a written complaint in the police station.

(b) Assure residents of an enquiry into the matter.
(c) Ask residents to consider the humanitarian effort made.
(d) Continue with the project and ignore their complaint.

8. **You, as an administrative authority, have been approached, by the daughter-in- law of an influential person regarding harassment by her in-laws on account of insufficient dowry. Her parents are not able to approach you because of social pressures. You would:**
   (a) Call the in-laws for an explanation.
   (b) Counsel the lady to adjust, given such a circumstance.
   (c) Take an action after her parents approach you.
   (d) Ask her to lodge a complaint with the police.

9. **You are on an airplane that suddenly hits extremely bad turbulence and begins rocking from side to side. What would you do?**
   (a) Continue to read your book or magazine, or watch the movie, trying to pay little attention to the turbulence.
   (b) Become vigilant for an emergency, carefully monitoring the airhostess/cabin crew and reading the emergency instructions card.
   (c) Start shouting and alerting other fellow passengers.
   (d) Start praying to God for a safe landing.

10. **Anger is a complex emotion that occasionally surfaces in the workplace. How do you normally deal with it?**
    (a) Training yourself to deal with anger by not expressing it during working hours
    (b) Speaking your mind regularly so it does not pent up inside you
    (c) Finding outlets for your anger such as a walk during lunch, listening to music, counting to ten, walking out to an open place etc.
    (d) Venting it out on people-family members or friends and relatives, out of your workplace

11. **One of your friends suddenly starts distancing himself/herself from you without letting you know the reason. You will:**
    (a) Confront him/her before your other friends and ask for the reason
    (b) Also start distancing yourself from him/her
    (c) Tell all your other friends about his/her peculiar behaviour
    (d) Talk to him/her in private and try to find out the reason of this changed behavior

12. **You have been given the task of managing a team that has been unable to come up with a creative solution to a work problem. What will be first thing that you do?**
    (a) Draw up an agenda, call a meeting and allot a specific period of time to discuss each item.
    (b) Organize an off-site meeting aimed specifically at encouraging the team to get to know each other better.
    (c) Begin by asking each person individually for ideas about how to solve the problem.
    (d) Start out with a brainstorming session, encouraging each person to say what- ever comes to mind, no matter how wired.

13. **Your younger brother/sister, whom you love very much, has of late started taking you for granted and openly makes fun of you in front of friends and relatives. You would be most likely to:**
    (a) Sulk inside but keep a smiling appearance because you do not want to hurt him/her
    (b) Warn him/her that such behaviour would not be tolerated
    (c) seek your parents' help
    (d) Tell him/her that you are concerned that people should not label him/her as a reckless and undisciplined person due to such behaviour

14. **Your spouse is very possessive about you and does not like you're talking to your colleagues on work related issues after working hours. So he/she tries to create a misunderstanding between you and your colleagues. You will:**
    (a) Start hiding things from him/her and give false excuses to stay away from him! her as much as possible
    (b) Make him/her realize that your job calls for such 'beyond the working hours' commitment
    (c) Tell him/her to mind his/her own business
    (d) Break your relationship with him/her as your freedom is of utmost importance to you

15. **You are not given your due promotion inspite of meeting the criteria and your 'clean service record'. You will:**
    (a) Barge into your boss's cabin and confront him
    (b) Tell everyone in the office that the boss is the culprit who is hindering your promotion
    (c) Look for an appropriate time to talk to your boss and ask what holds you back from that much-awaited promotion
    (d) Accept a lucrative job offer from a private sector company

16. **A discussion between you and your colleague has escalated into a shouting match. You both are upset and in the heat of the argument, start making personal attacks which neither of you really mean. What is the best thing to do?**
    (a) Agree to take a 20-minute break before continuing the discussion
    (b) Go silent, regardless of what your colleague says
    (c) Say you are sorry, and ask your colleague to apologize too
    (d) Stop for a moment, collect your thoughts, then restate your side of the case as precisely as possible

17. **One of your colleagues always looks for a chance to point out your work-related flaws in front of your other colleagues. You will:**
    (a) Hit back and point out his/her own flaws
    (b) Tell him/her to mind his/her own business
    (c) Start distancing yourself from him/her
    (d) Make him/her realize such behaviour is not acceptable by a professional like him/her

18. **You are a Customer Relationship Manager in your organization and have just received a call from an extremely angry client. You will:**
    (a) Disconnect the phone as you are not paid to take abuse from anyone

(b) Listen to the client and rephrase what you gather he is feeling

(c) Explain to the client that he is being unfair, that you are only trying to do your job, and you would appreciate it if he would not get in the way of this

(d) Tell the client you understand how frustrating this must be for him, and offer a specific thing that you can do to help him to get his problem resolved

19. **You want to make a good impression on a senior officer of the head office of your organization when you meet them for the first time, you will:**
    (a) Appear to be the most busy person in the office
    (b) Greet him/her and tell him/her about the project you're working on so he/she gets to know what you are doing for the company
    (c) Appear genuinely sincere and ask him/her questions about the company and how he/she made to that coveted position
    (d) Appear pleasant and make brief short sentences that focus on him/her and wait for his/her reply

20. **While working on a project, one of your team members continually gives a cold shoulder and you fear that this may cause the deadline to shift, you will:**
    (a) Give a written complaint about it to your supervisor
    (b) Request the supervisor to replace that team member with someone who is more mature and efficient
    (c) Take it as an opportunity to prove your own worth in the eyes of the management
    (d) Talk to him/her along with your other team members and try to sort out things for the timely accomplishment of the task

21. **You are talking with a group of four people. Who do you make eye contact with?**
    (a) Just the person to whom you're speaking at the moment
    (b) Each of the four, moving your eye contact from one to another
    (c) Not look directly into anyone's eyes
    (d) None of the above

22. **Your subordinate's performance is much below your expectations. You will:**
    (a) Observe and find out his/her weak areas and recommend his/her name for training in those areas
    (b) Call him/her and compare his/her performance with other staff members
    (c) Give him/her an ultimatum that such poor performance will not be tolerated
    (d) Fire him/her from the job as there is no lack of talent pool

23. **Do you think you are having a good communication when the other person does most of the speaking?**
    (a) Yes, because listening is also a part of communication
    (b) Yes, because not speaking allows me to hide my incompetency
    (c) No, because in good communication speaking and listening should be balanced
    (d) No, because not speaking would mean that I am not a knowledgeable person

24. **Suppose you are away from home on your business trip and your flight/train is delayed by eight hours due to some technical problem. What would be your order of preference: (a) choose to doze off in the lounge/waiting room (b) read a novel (c)**

spend that time with a fellow passenger talking about almost every- thing under the sun?
(a) c-b-a
(b) b-e-a
(c) a-b-e
(d) None of the above

25. **If you are running late for an appointment with a client because your boss has called a last minute internal meeting, it's best to:**
    (a) Call immediately to your client and reschedule the meeting for a later time or another day
    (b) Try and go to both meetings even if you leave one early and arrive late for the other one
    (c) Call and let your client's administrative assistant know you'll be an hour late for your scheduled meeting
    (d) Tell your boss that you will not attend the internal meeting as the client meeting is more important

26. **You are traveling in a crowded bus and you see that an old lady is standing, and some young boys sitting on the seats reserved for the ladies. What would you suggest to them**
    (a) Go and ask them to leave the seat for old lady
    (b) Request them to leave the seat for old lady.
    (c) Tell them that it is a reserved seat so they should leave it.
    (d) Ask someone else to vacate the seat for lady.

27. **Many people die every year in the stampede during the various fairs and festivals at different religious places. What steps should be taken by the government?**
    (a) Make proper arrangements to control the crowd at these places.
    (b) Give compensation to those who injured and died.
    (c) Put ban on the celebration of these fairs and festivals.
    (d) Only allowed a certain number of people to take part in these programmes which are manageable.

28. **There are many cases of corruption and fraud found against the various microfinance companies that are charging very high interest rates from the poor people becoming cause for the suicide of these people. What steps should be taken ?**
    (a) Ban all the micro finance enterprises.
    (b) Enact a law to regulate and nationalize them.
    (c) Ask them to pay compensation to those who charged more interest rate from the poor people.
    (d) Appoint a committee to see the issue.

29. **You are driving your car on a road suddenly a child come from the wrong side and he injured by your car. You know that, it was not your mistake. The parents of child and some other people came there.**
    (a) You start shouting on them for their carelessness.
    (b) Start telling them law , that it was wrong side and the fault was of child.

(c) Run away from the accident site.

(d) Tell people to take the child to hospital first.

30. **One morning when you are going for your morning walk, you see that an aircraft crashed and fell down in the outskirts of your village. What would be your response?**

(a) You start shouting.

(b) Go there and yourself try to rescue those who injured.

(c) Go to police to tell them about the accident.

(d) Go back to village to call other people for help.

31. **With the increase in the growth rate of the Indian economy, the problems of unemployment, inflation, poverty are not decreasing at that speed as the growth of economy. What do you think?**

(a) Government is not concentrating on these problems of country.

(b) The factors responsible for both-increasing growth rate, and these problems are different.

(c) It will take time to remove these problems.

(d) Government should concentrate more on these problems and should make plans and also implement them strictly.

32. **You are posted in a remote area where you face many problems in personal and professional lives both. While your other batch mates are enjoying in the urban areas,**

(a) you think that it's your fate and always curse yourself for joining this job.

(b) leave that job.

(c) feel jealous with your batch mates and try for your transfer.

(d) compromise with the situation and start enjoying your job.

33. **If you are on the official inspection and you found that there are three lady employees amongst all employees and they are late due to some reasons. What will you do in situation?**

(a) You suspend the lady employees.

(b) Give them warning.

(c) Analyses the problem, and find out the real cause and then take the decision.

(d) Forgive them because they are female

34. **You are travelling in your official car and during the journey someone is hit by your car and dies on the spot, what you will do?**

(a) Ask the driver to drive fast.

(b) Ask the driver to stop car and move out to take the person to the hospital.

(c) Ask the driver to reach the nearby police station and surrender there.

(d) Put all the blame on your driver to save yourself.

35. **You have come across a case wherein an old poorman is unable to submit his ration card and claim ration to meet his basic necessity of life. Knowing your superior's procedural approach in handling issues, you...**

(a) go strictly as per the procedures

(b) take initiative to help the poor man arranging for alternative ration card

(c) assist the poor man with some money on your own but do not compromise on

procedures
    (d) Avoid some procedural steps since you understand the necessity of the poor man.

36. Effective decision makers do not rely on careful analysis alone. Instead they also use their intuition which is/are often based on:
    (a) Stored in information that is reorganized.
    (b) Help from others on the decision making team.
    (c) Rational model for decision making.
    (d) Logic model.

37. The purpose of decision making is to
    (a) Analyze a problem.
    (b) Solve a problem.
    (c) Collaborate..
    (d) Involve people in the decisions.

38. A major reason that decision making is often not such a rational process is that there are
    (a) Too many stages in decision making for most people to cope with.
    (b) Natural biases against diagnosing problems.
    (c) Few bounds to human decision-making capability.
    (d) Limits to how much information people can process and recall.

39. Emotional intelligence generally deals with the ability to
    (a) Connect with people and understand their emotions.
    (b) Stay in control while taking tests.
    (c) Knowing how to throw a tantrum for effect.
    (d) Using common sense to earn a living.

40. Gaurav is usually heavily influenced by the first information he receives on a topic. He is under the influence of a process called
    (a) Anchoring.
    (b) rationalizing.
    (c) trial and error
    (d) emotional intelligence.

41. Ranjan was going to recommend a new billing system for the hospital where he works. However, he does not want to upset the executive who installed the system, so he does not make the recommendation. Julio has fallen into the
    (a) Overconfidence trap.
    (b) Status quo trap.
    (c) Anchoring trap.
    (d) Creativity rut.

42 .A frequent decision-making errors during a crisis is to
    (a) methodically search for alternatives
    (b) become less rational and more emotional.
    (c) become more rational and less emotional.

(d) welcome differences of opinion.

43. Marketing executive Akanksha likes to make a decision quickly as soon as enough information is available, and she also likes to generate lots of options. Her decision-making style is therefore characterized as,

(a) Decisive.
(b) Flexible.
(c) Hierarchic.
(d) Integrative.

44. Information technology executive Darryl likes to pour over a lot of information before making a decision and he also likes to commit to one course of action. His decision-making style is therefore characterized as

(a) Decisive.
(b) Flexible.
(c) Hierarchic.
(d) Integrative.

45. A major advantage of group decision making is that

(a) It makes efficient use of time.
(b) It results in low risk taking.
(c) Members are likely to be committed to a decision.
(d) It eliminates passing the blame onto others

46. A distinguishing feature of the nominal group technique is that

(a) Criticism and discussion are disallowed.
(b) A small group of people is assembled.
(c) Alternatives are rated and the best-rated one is chosen.
(d) The group is placed on a tight time limit.

47. Mr. Ramanujan has been transferred recently to handle a new task. There were initial problems with the productivity of the new team. But, with his skill of interpersonal engagements. Mr. Ramanujan has brought about observable increase in the performance of the team. He is successfully in making all members aware of their roles and standards. What should Mr. Ramanujan do to keep increasing the productivity?

(a) Should now leave the team free to handle its own work.
(b) Should now emphasize the importance of deadlines and tasks.
(c) Should do everything to make, the group feel important and involved.
(d) Should carry humane interaction while making them identify their roles.

48. Mrs. Romilla is a successful and able worker. She carries hope and positive energy. But she has an opponent in Mr. Tripathi who cannot see eye-to-eye with her in the office. Mr. Sarvanarayan (Mrs. Pathak's Boss) is very fond of Mrs. Romilla because of her past record of successes and sense of optimism. Mrs. Romilla came up with a proposal having complete confidence in its success. But, as usual Mr. Tripathi opposed it. What should Mr. Sarvanarayan do?

(a) Should ask Mrs. Romilla to go ahead and warn Mr. Tripathi not to oppose as a

matter of fact for personal reasons.

(b) Should ask Mrs. Romilla to go ahead but give a patient hearing to Mr. Tripathi.

(c) Should encourage Mr. Tripathi to criticize in private as well as in front of Mrs. Romilla.

(d) Should ask Mrs. Romilla to consider the view of Mr. Tipathi.

49. **The Union Home Ministry is facing a serious challenge from Naxlites. The Naxalites are getting training and high tech weapons and gadgets from foreign countries. Home ministry is not able to decide a concrete future strategy because it is not able to understand properly the nature of weapon and gadget requirements to engage with the Naxalites. What should be the strategy of Home Ministry with regard to the production of weapons and gadgets in the government ordinance factory?**

(a) Should collect additional information before taking a final call.

(b) Should take long-term view based on the existing information

(c) Should take shot-term view based on the existing information

(d) Should go for producing most advance and sophisticated weapons & gadgets.

50. **You are a District Magistrate of a place famous for adventure -tourism. It is a tourist season and large numbers of tourists are there in your district. On a fine day your office received a message that cloud burst is expected in the region where almost 20,000 tourists have gathered. The flash flood is going to hit the tourist place and the only approach road at the same time. The only means to evacuate the tourists is by sending at least 50 disaster management personnel to the place, so that they can evacuate them-faster. But, that involves real threat to the life of disaster management personnel. As a District Magistrate what should you do?**

(a) Send the team

(b) Will not send the team

(c) Will send less number of personnel

(d) Will not send but be ready in advance to mitigate the disaster

51. **Income Tax raiding party while raiding a premise of a wealthy and influential man found that he and his entire party has been surrounded by a huge armed gang which carries a decisive motive of violence. There is no way in which his men along with few policemen could face them. His intimation for police reinforcement has uncertain future, i.e., within what time period the additional police will reach for help is not known. What should be the decision of the officer - in charge of the raiding party?**

(a) Should leave the premise with his raiding party.

(b) Should warn for a stern consequence and continue raiding.

(c) Should politely talk to them to allow them to continue with their work, and inform them of possible consequences of their actions and if that does not materialise, should leave the premise.

(d) Should wait for the police to come and continue conducting the raid. Should not concede to the demands of these unscrupulous elements.

52. **You are handling a sensitive project that is required to be completed on time. Though you and your team work hard on finding solution to a particular issue involved in the project, there are many missing points. In this context, what should be your best and**

worst response respectively of the following?

1. You will follow the best course of action established based on the existing information.
2. You will what till adequate information is available to decide.
3. You will make a temporary decision to be revised later on. on the availability of further information.
4. You will follow your gut feeling.

Codes:

(a) 4 and 2
(b) 1 and 4
(c) 3 and 4
(d) 2 and 4

53. **You participated in a 100 mts race. You have been a very good athlete but in that very day you are not in your best of physical state. Your friends had great expectations from you. Because of your bad physical condition you lost (about your physical condition your friends are not aware). What should be your response?**
(a) You will say sorry to your friends and promise not to disappoint them next time.
(b) You will explain the reason for your failure and promise not to disappoint them next time.
(c) You will ask them not to bet on you next time.
(d) You will thank them for having bestowed faith in you.

54. **You have a friend whom many feel is in a habit of causing trouble to others. He deliberately creates trouble for others. What should be your response to his behavior?**
(a) You will stop interacting with him.
(b) You will mobilize people to socially ostracize him and give him a taste of his own medicine.
(c) You will try to list, and intimate him his behaviors.
(d) You will preach him the values of being good to others.

55. **In a particular cricket match Indian team while playing against a strong opponent is in a critical juncture. Every run that is conceded counts. One of the bowler is not only giving more runs but also bowling no balls and wide balls. What should be the response of the Indian team captain in order to ensure that bowler bowls nicely?**
(a) Should give a strong signal that if the same continues then he will not get a chance in the next match.
(b) Will keep quiet and allow the bowler to automatically take control.
(c) Will try to crack a joke and ask him to be at his natural self.
(d) Will go to the bowler and ask him to bowl in a particular manner which the captain thinks to work well.

56. **You while being in a party found yourself to be isolated. There are very little number of people whom you know in the party. Which of the following is the best and worst**

response respectively?

1. You will go and strike conversations with those people who also seem to be isolated — even though they are unknown to you.
2. You will cling to your known people
3. You will meet everybody in the party and try to strike a conversation
4. You will interact with those who will come to you.

Codes:

(a) 4and2
(b) 3and2
(c) 1 and 2
(d) 3 and 4

57. **Rajnarayan is a manager with exceptional practical skills. He is imaginative and his strength is his uncanny ability to predict and plan. But he lashes out at the people who fail to perform and at times belittles his co-workers. What should be done?**
(a) Rajnarayan should be encouraged for his work - intelligence and ability.
(b) Rajnarayan will be unsuccessful as a manager. should be introduced into a counselling programme on employee management
(c) Rajnarayan will be successful though there might be some problem with few unworthy workers.
(d) Rajnarayan will get frustrated, since there will be more antagonism towards him than support and cooperation.

58. **Your friend is critical of your conduct but you do not think he is right. What should you do?**
(a) Challenge the validity of his views
(b) Rationalize your action
(c) Seek all his ideas and clarify
(d) Argue it out with your friend.

59. **In a work situation, a co-worker is giving you feedback on some job related issues, what should you do?**
(a) Read non-verbal messages.
(b) Ask Clarificatory questions when in confusion.
(c) Should hear but do what you think as correct
(d) Should include the feedback into your work immediately

60. **A friend of yours is always late to report on important events and occasions. What should you tell him/her?**
(a) Please come on time
(b) Why cannot you ever be on time
(c) You should be on time
(d) It is better to be in time

61. **You are busy in your office. One of your assistant came to you and wanted to share**

some important information of urgent nature. How should you respond?

(a) You will ask him to share the details of his information while you continue working. So that you can maximize your time.

(b) You will ask him to share his information and you will postpone your work.

(c) Your will attend to your work and ask him to come later.

(d) You will ask him to wait, if he can't then attend to him

62. **You are sitting in a public park and trying to relax; one of your close friend came to you and wanted to share some information. You are not in a mood to strike a conversation but at the same time you do not want to discourage him/her. What would you do if the information is not of your use?**

(a) Allow him to speak but at the same time keep your eye closed and relax

(b) Allow him to speak but in order not to discourage him manipulate your expressions and questions

(c) Allow him to speak and keep paraphrasing

(d) Ask him to sit by your side and be relaxed

63. **You are on a foreign soil. A foreigner came to you and started talking to you at a louder pitch. What would be your reactions?**

(a) Will become cautious

(b) Will be afraid and try to find out what wrong you have committed

(c) Will tender apology immediately

(d) Will try to understand what she/he is saying and carry on with confident and assistive gesture

64. **Your son is into social networking through the web based services. He has not been performing well in his previous exams. What will you advice?**

(a) Stop social networking

(b) Allow him to continue with his social networking as usual

(c) Stop him from social networking till he scores well in exam

(d) None of the above

65. **You are new to an organization and recently you have joined the organization at a lower managerial position like any other managers start their career. You noticed that your subordinate is coming late and frequently displaying rude- behaviour with his/her colleagues. What would you do?**

(a) You will call him and say that he/she is rude and ask him/her to mend the behavior

(b) Your will ask the fellow workers to respond with rudeness towards him/her-so that he/she gets to know how one feels when responded with rudeness.

(c) You will punish him/her

(d) None of the above

66. **You noticed that two of your neighbour is engaged in a quarrel over the sharing of the parking space. Both of them have fought over the issue a couple of time before. The same has not been the case with others. What should be your response?**

(a) You will ignore

(b) You will act as a negotiator

(c) You will act as a negotiator while also u4sting other neighbours to negotiate

(d) You will ask them to stop bickering and reach a conclusion

67. **Mr. Anjani and Mr. Ramgopal is two of your subordinates. Both of them are assigned with different types of job. Mr. Anjani seems to finish his work comfortably and enjoys free time which is not the case with Mr. Ramgopal. You are overburdened with work and wanted to delegate some of your work. What would you do to delegate?**

1. Delegate it to Mr. Anjani
2. Call Mr. Anjani and Mr. Ramgopal to discuss in general their work related issues.
3. Call Mr. Anjani and discuss your wish to delegate some work to him.
4. Delegate work to both but a bigger share of work to Mr. Anjani.

Arrange the above actions in order of priority as your preferred course of actions.

Codes:

(a) 3, 4, 1, 2
(b) 3, 1, 4, 2
(c) 2, 3, 4, 1
(d) 1, 3, 4, 2

68. **You have recently visited your friend's place that belongs to a coastal region. You have never seen sea since you belonged to desert area. The people there used to go to their work late in the morning. While giving an account about the trip to your mother, you will say.**
(a) They are lazy
(b) They go to work late in the morning
(c) They are relaxed towards their work
(d) They are unenthusiastic towards their work

69. **Mr. Ramsagar, subordinate of Mrs. Rachna Rajan was making a presentation to her on a very serious issue. Mrs. Rachna Rajan instead of allowing the presentation to be completed, is repeatedly asking questions to Mr. Ramsagar during the presentation. Which of the following is/are correct?**
1. She should ask question only after listening to the entire presentation
2. She could be justified in asking questions
3. She should have asked question only after seeking Mr. Ramsagar's agreement for the same.

Which of the above statements are correct?

Codes:

(a) 1 Only
(b) 2 Only
(c) 3 Only

(d) 1 and 3

70. Mr. Jameel was expressing. his, observations to Mr. Dheeraj on an ongoing project. Before Mr. Jameel could complete his ideas, Mr. Dheeraj who has been also involved in the project shared his views. Which of the following is/are correctly explaining-Mr. Dheeraj?

1. Mr. Dheeraj is insensitive
2. Mr. Dheeraj is attentive
3. Mr. Dheeraj is participative in his approach
4. Mr. Dheeraj is responsive

Codes:

(a) 1 only
(b) 2, 3 and 4
(c) 3 and 4
(d) 3 only

71. Mr. Rameshwar joined as manager in a material supply department. The said department was suffering from very low productivity in recent years. He tried to find the possible causes. He found that works are nicely defined and has also been very clearly allocated to various employees. The workers do not have any problem in understanding their job since they have been handing the same job for a long period of time. What should Mr. Rameshwar do?

(a) He should direct them to do a good job without fail. He should come across as hard task master.
(b) He should, along with the workers decide how to do the work and allow the workers to do accordingly.
(c) He should persuade and encourage the workers to increase their productivity.
(d) He should leave the job to be dealt by the workers while explicitly displaying faith in them.

72. You are assigned a job to supervise the work of a group of teachers at a primary school. While observing these teachers, you found that the teachers are highly qualified and doing excellent job. What should be your reaction?

(a) You will keep encouraging the teachers.
(b) You will give them some suggestions to perform even better.
(c) You will ask them to follow a strategy which you have prepared to make them even more efficient.
(d) You, while appreciating their job will leave the work to be handled by the teachers.

73. Your subordinates are asset to any organization because of their critical understanding of a work. They have been regular by doing the age old work under your leadership, with great success. What should you do to ensure the same motivation of your group?

(a) Should leave the work to your subordinations
(b) Should act friendly

(c) Should make yourself available for discussion when required, otherwise

(d) Should talk with subordinates and then direct their actions.

74. **Early in the morning you are driving towards the Airport. You are already late. There is hardly any traffic on the road. There is no traffic personnel on the road as well. What will be your accepted course of action?**
(a) Speed up
(b) (b)Speed up provided it is safe
(c) Speed up but within control
(d) Will not speed up

75. **Mr. Rajendra Sinha has not been well. On reporting back to the office he presented to you a medical bill of Rs, 10000/-. But on scrutiny you found that the actual expense that he has incurred is Rs 9000/-. Mr. Rajendra Sinha has been a good employee and because of his illness he is under financial problems. What will you do?**
1. will disallow
2. will disallow and initiate forgery proceedings
3. will allow
4. will allow but with a warning

Arrange in order of priority as your preferred course of actions—

Codes:-

(a) 1, 4, 2, 3
(b) 1, 2, 4, 3
(c) 4, 2, 1, 3
(d) 4, 3, 1, 2

76. **You are occupying a public office. There is a report by CAG indicating towards a scam in which there is reference towards your involvement. But, you are sure that you are legally and ethically have been right. You reached out to your friend for an impartial advice. What should be the advice of the friend?**
(a) Should resign
(b) Should not resign
(c) Should resign-moment concrete proofs are presented
(d) Should resign but ensure that independent investigation is taken up

77. **Mr. Reejvan is a secretary in the External Affairs ministry. He has been very much stressed with regard to an issue confronting, the country vis-a-vis a neighboring country. His problem solving team is not being able to reach conclusion on how to move through the issue, though they have been given the freedom to decide the same for a considerable period of time. What should be the best and worst action respectively of Mr. Reejvan under this circumstance?**
1. Will give more time to discuss after narrowing down on the relevant areas of the issue.
2. Will take a decision on this own.

3. Will give a deadline for decision.
4. Will divide the problem solving group into two creative group for decisional interactions.
5. Will take the decision according to the prevailing predominant viewpoint.

Codes:-

(a) 2 and 4
(b) 1 and 4
(c) 3 and 5
(d) 4 and 4

78. The organization in which you are working considers you as a valued employee. On a particular issue you are asked to go to a field office in order to conduct a meeting with field officials along with some foreign delegates on 31st of the month. But, you found that the organization mistakenly has purchased a non-refundable air ticket for you on 29th of the month. Your boss has no problem relieving you from 29th for the assigned job of 31st. What will be your reactions?
(a) You will go on 29th
(b) Reschedule it to 31st
(c) Would have rescheduled had the ticket been refundable
(d) You will go on 29th but after giving a warning to the travel department.

79. Your organization is going to purchase a product for technology up gradation. In order to be aware about the technology, you asked for a help from another organization which already has this technology. The other organization was pleased to share the details. For you the technology is bit costly. Which of the following statement explains your stand?
(a) You will purchase if you can pay the amount without taking the loan.
(b) You will take loan and purchase the technology if your resources are less.
(c) You will purchase it but first you will try to bargain for whatever discount you can get on the defined or mentioned amount. Resource is not a constraint.
(d) You will try to purchase it by quoting your own price. Resource is not a constraint

80. Mr. Anshuman has a subordinate who used to be his boss previously(when Mr. Anshuman joined the office). His subordinate used to be a very high performer but recently he has developed moodiness and problematic attitude after Mr. Anshuman's appointment to the current position. Consider the following actions of Mr. Anshuman.
(a) Should offer support and assistance.
(b) Should sternly warn of consequences
(c) Should clearly define targets and link it to the incentives and benefits
(d) Should give a new and challenging assignment to him.

81. In a group, based problem solving approach, groupthink results into.
(a) Convergence of viewpoints an a premature decision
(b) Acceptance of viewpoint based on discussion.

(c) Creative group thinking

(d) Respect for predominant as well as minority view point.

82. **While evaluating an alternative in a decision-making process which of the following is/are Included.**
    1. Effectiveness
    2. Identification of the problem
    3. Selection of alternatives
    4. Collateral effects

    Codes:-

    (a) 1, 2 and 4
    (b) 2 and 4
    (c) 1, 2 and 3
    (d) 1 and 4

83. **In an organization where there is more of unskilled workers, which of the following communication is best suited?**
    (a) Authoritarian
    (b) Persuasive
    (c) Consultative
    (d) Participative

84. **Which of the following is not true about decision - making and problem solving?**
    1. Decision making is the choice and problem solving is the process
    2. Problem solving includes decision – making
    3. Decision making is the process and problem solving is the choice
    4. Decision making includes problem solving

    Codes:

    (a) 1 and 2
    (b) 1 and 4
    (c) 3 and 4
    (d) 2 and 3

85. **Recently Delhi Police has decided to impose penalties upon those who write. "Government of India" in their private vehicles or those display "Delhi Police" or "Delhi Polices Logo" on the vehicle registration number. In the light of this decision which or the following statement is correct?**
    1. Government of India in order to get the best of talents into the civilian and armed services should provide best of pay, incentive and privileges.
    2. The above practice is a part of certain privileges which should not be removed. This suggestion gains in importance in the background of very high salary and fringe benefits that is provided to the employees of private sector companies.
    3. Government cannot afford to compete with private sector companies in terms of

providing best pay and privileges. Thus, while providing a decent level of satisfaction government should rely on the higher sense of ethics and morality of its employees. Thereby it should work towards the same.

(a) 3 only
(b) 1 and 2
(c) 1 only
(d) 2 and 3

86. **A crematorium in-charge found strangulation marks on the neck of a body which was brought to the facility. He disclosed these facts to the family members. They answered that the mark was the byproduct of the tightening of a rope around the neck of the dead body which accidentally happened while shifting the body out of the house. Which action the crematorium in-charge should take?**
(a) Should enquire with the friends and relatives about any possible foul — play. If nothing is found, he should allow the cremation to go on.
(b) Should ask for a police report on the same, if the same is not there, then he should call the police immediately.
(c) He should restrict himself strictly to his duty of managing smoothly the activities of crematorium. Thereby considering the issue as non of his affairs, should allow the cremation to proceed.
(d) He should allow the cremation but should take the photographs for record, which could be used for the purpose of investigation, later on if at all it is required.

87. **More than 160 Mumbai - bound passengers of a private airlines flight were stranded for almost 10 hrs. without food and water at the Delhi airport. The flight was scheduled to take- off at 11-25 A.M. It was initially delayed for- six hrs and later, when it finally took off at 5.30 PM, it returned to Delhi due to "technical fault". The passengers' were not informed about the delay till the time they checked in at the Delhi—airport. Further, the airport staff were not providing any information to the passengers. The irate passenger staged a dharna at the runway itself. When the passengers refused to respond to the instruction of the airline staffs to move away from the runway, the airport security was called. What should the airport security do?**
(a) Should immediately remove the passengers from the runway, even if that requires the use of force.
(b) Should remove the passengers: from the runway but at the same time should take up the issue of passenger harassment and consequential incident with the airlines official.
(c) Should understand the agony of the passengers and thereby delay the removal of the passengers from the run way. This will give some satisfaction to the passengers and at the same time it will embarrass the airline which could be a punishment for their wrong doing.
(d) Should not interfere since it is a matter between the airline and its passengers.

88. **Few kids regularly play cricket is a community park. But, there used to be resistance from some of the members of resident welfare association who live near to the**

community park because of loud noises and at times because of the ball going inside the house. One day while playing cricket, kids in the park damaged window panes in the locality. The RWA members complained the police. What should the police do?

(a) Police should take immediate action by taking kids to the police station and release them only after the assurance that the event will not be repeated.

(b) Police should arrest the kids and take necessary action as per law.

(c) Should not act since the community park is meant for playing and moreover the complaint against the small kids.

(d) Should assist in bringing about a mutual and harmonious solution of the issue by

involving the RWA members, parents of kids and the kids.

89. A resident was duped of Rs, 18,000/- by a fake maid—supplying agency. A maid sent by the agency went missing within hours of joining service when the resident called the agency, the agency did not respond properly. Rather it started king the stand that its responsibility is over, the moment maid reached the house and started working. What should be the logical stand of the resident in this case?

(a) Resident should leave the matter without pursuing it further since placement agency's argument is logical

(b) Resident should take the help of the resident welfare association and pressurize the placement agency to do the needful. Should not file a police complaint because that results into unnecessary headache and the placement agency enjoys unhealthy relation with the police. All the more, the money involved is very less.

(c) Should try to put sense into the minds of the placement agency through personal and group effort.

(d) Should vandalize the placement agency office if the resident can manage to do so.

90. In a incident where the chief ministers shoe has become dirty, chief minister asked one of her/his personal security officer to clean the same. The chief minister has asked for the same while he/she was busy dealing with his/her officials. What should the PSO do?

(a) Readily clean the shoe without thinking that it is beneath the dignity of a public servant.

(b) Should be willing to do this in this occasion because the chief minister is busy and do not have the time to do the above mentioned work. Moreover, disobedience has its own consequence.

(c) Should refuse because a personal security officer being a government employee is a public servant and not the personal servant of the chief minister. He should do this even if the PSO knows that disobedience might result into negative fallouts in the form of transfer or other form of harassments.

(d) Should refuse because the act will make the PSO being seen from a bad angle. This will also bring about a personal association and the fear of being politically identified with a particular party and leader. This breaks the cherished principle of civil service neutrality.

91. The teachers were allegedly caught drinking alcohol during duty hours. They were caught in a surprise inspection of the school by the district education officer. What

should the DEO do in this case?

(a) Should immediately take action against the teacher and also take appropriate action against the school principal.

(b) Should immediately take action against the teachers but should not act against the principal because the school principal has lot of other works to do. So it not possible on his part to take cognizance of all the activities that goes on within the school.

(c) Should find out whether the act has been committed for the first time. If so, should allow the teacher to escape punishment with a stern warning.

(d) Should immediately take action against the teachers but only after being publicly humiliated before the students. This can act as a strong deterrent against such inappropriate acts in the future.

92. A chemist was caught by a health department officer for stocking, packaging and selling counterfeit-"One Touch Ultra Band" blood glucose monitoring strips In the mean time the case came to the knowledge of the general public and they started gathering. The crowd gradually started to become restless and started showing the sign of going violent. What should the officer do?

(a) Should allow the chemist to escape so as to save his life.

(b) Should immediately inform police and simultaneously try to put sense into the mind of the crowd by choosing few seemingly influential members of the crowd who are more vocal and apparently acting as leader. At the same time should not allow the chemist to leave.

(c) Should immediately call the police but should not interfere with the mob reaction.

(d) Should not try to confront the mob. Moreover, the crime is a serious one since such duplication amounts to the loss of life of innocent common men and women. But should inform the police. Simultaneously. Should inform the police.

93. A sex scandal rocked a university. Three students were involved in an act of recording a sexual act in the university hostel room. The same came to the office of the hostel and university authorities. The video has come to the notice of other students. What should be the decision of the authority?

(a) They should take serious note of the incident and, should immediately take action against the student and inform the police to investigate for possible involvement of a sex racket.

(b) They should take action against the students involved only, should not involve police because the matter appears to be that of consensual sex and apparently no commercial interest is involved.

(c) Should warn sternly the students. Should not take any of those actions which night jeopardize their career and future. Moreover, consensual sex among the adults are becoming common and out of excitement and inquisitiveness at times the adults might commit mistake.

(d) Should call the parents and take a decision after a consultation with them keeping in view the future of the students.

94. 12 days before the inaugural ceremony, Commonwealth Games Organizing committee (OC), discovered that it was running on terribly low ticket sales, the committee came up with 42 categories of people to whom it decided to distribute 30

percent of the CWG tickets. Those included were politicians, government officials judiciary, diplomats. Delhi police etc which of the following decision of the OC would be acceptable?

1. The decision of the OC is appropriate. This is so because these categories of people are critical in conducting the event successfully/Thus, their satisfaction is critical.
2. OC should move out of the colonial and feudal mindset. Instead of giving tickets to VVIPs of all kinds beyond those required for national pride, rest of tickets could have been given to school children.
3. OC should have decided to restructure the ticket price by lowering the cost of the tickets and effort should have been taken to widely publicize the same. Based on the response to this OC should have decided on the question of free distribution of tickets after few days.

Codes:

(a) 1 only
(b) 2 only
(c) 1 and 3
(d) 2 and 3

95. Skilled cross - cultural communication in case of interpersonal engagement require.
1. Mutuality
2. Cultural neutrality
3. Overcoming differing perception
4. Consistent verbal and non-verbal communication

Codes:

(a) 1, 2 and 3
(b) 2, 3 and 4
(c) 1, 2, 3 and 4
(d) 3 and 4

96. MCD is high in drive but low on cleanliness. It rightly came up with a very widely publicized campaign against open loo or urinating in the open. But this was not carried on along with the construction of extra public utilities. In this context, an individual out of compulsion turning a boundary wall into a public loo in the lack of public utilities is-
(a) Justified provided there is a compelling natural situation
(b) Unjustified unless there a nearby loo or somebody is objecting.
(c) Justified
(d) Unjustified

97. In a murder case like that of Hemraj-Arushi murder case, even after a long time the police is clueless about the case. Initially, the police has tried to get witnesses but in vain. Finally, based on inadequate material accuses an individual with murder. You have been in possession of some facts relating to the case which not be crucial or

even may not be required. All the more, if you disclose the same now to the prosecution, there might seem to be a motive attached and the claim may not be sustainable in the court of law. What should be your action?
(a) Disclose the fact to the police.
(b) Disclose to the police only after ascertaining the utility or fact leading to the possible conviction of the accused. Since, in case of uselessness or the fact there might be unnecessary hassle for you and for the police.
(c) Will not disclose
(d) Consult a lawyer and accordingly take the initiative.

98. In a case where powerful persons including politicians and wealthy businessman are involved, you are asked to investigate. Your superior made it very clear that you should find ways to save them otherwise there can be dire consequences. If you become righteous then you will be transferred in no time to an insignificant post and in your place there are many willing officer to fit in what should be your "most appropriate" response?
(a) Should be tactful in dealing the case. Should go slow and when the opportunity comes you should follow the legal procedure and nail them.
(b) Should not oblige but for larger interest you should expose them by going to media.
(c) Should oblige because refusal to obey has no tangible benefit. Thereby remaining in critical position can enable you to work on other good cases where there will be no such pressures. Thus, your continuation in that position will be meaningful to the organization.
(d) Should decline and be ready for consequences.

99. You are managing an event in which there are few major sponsors and you, are still searching for more sponsors since the expenditure involved is huge. In the mean time you came to know that one of existing sponsor is involved in a major scam involving public money. What will be you decision in this case?
(a) You will drop the sponsorship of that scam-tainted firm because it is involving ethical issues.
(b) You will drop the sponsorship of the scam-tainted firm because continuing with the same might attract trouble from investigating agencies.
(c) You will continue with the sponsorship because your primary responsibility is to ensure success of the event.
(d) You will continue with the sponsorship because the charge is yet to be established in a court of law. Moreover, sponsorship of event has nothing to do with the scam.

100. Your mother is authoritative and she wants you to study for 15-16 hours daily while you are studying, she keeps peeping into your room just to ensure that you are studying. with regard to this you are depressed and anxious. What should you do?
(a) You should ignore her behavior since her behavior is highly irrational and overbearing.
(b) You should strongly warn her not to do this and communicate decisively that you being adult can take care of your studies.
(c) Try to avoid your mother's interfering attitude and study in and freer atmosphere. This is possible only when you secure good marks and you can do that only when you

focus on your study.

   (d) Even if you do not concentrate on your studies, in order to please your mother, sit on your study table looking towards the books for 15— 16 hours.

101. You are a class 10 student and passing through very hard times. Your family environment is not conducive for studying. Your father is alcoholic. He gets drunk everyday and fights with your mother and brother. You want to study and get good marks. What should you do?

   (a) Get out of the house and try to get help of some philanthropist so that you can study in peace.

   (b) Make use of those hours when he stays outside to study well.

   (c) Since the atmosphere is hopeless. So, stop studying and take up some productive job for your future.

   (d) Warn your father of his wrongful act and if that does not work, inform the police.

102.   There is some objectionable content on the Facebook regarding a very famous and respected personality of freedom struggle. You and many others are agitated with the same. What should be your course of action?

   (a) Should go on rampage along with others since the language of peace and lawful protest do not work.

   (b) Will lodge a police complaint and pursue the case.

   (c) Mobilize support in favour of the matter and put pressure on the concerned officials to take quick and necessary action.

   (d) Will ignore it since, these are common occurrence and moreover, in face book these things are taken up by private persons interacting with each other on the social network.

103. A small kid while taking part in a competition failed to perform and started profusely crying. What should you do?

   (a) Try to console him that he/she tried her/his best and should not be worried if he/she has lost.

   (b) He/she being a kid, you will try to relate her/his failure to some external factor so that she/he can be consoled.

   (c) You will empathetically say her/him to accept the fact and try next time.

   (d) You will let the kid to cry and automatically calm down.

104.   A group of boys are walking in the middle of a used road and one boy is walking on an unused road adjacent to the used road but separated by a pond. On the other side of the road there is a trench. You are the driver of a bus and suddenly you noticed this when you came too close to them. You realized that you cannot stop the bus without hitting these boys but at the same time you noticed that there is a link road linked to the disused road where only one boy is walking. What would you do?

   (a) Divert to the disused road.

   (b) Keep the bus on the used road.

   (c) Take the bus into the pond.

   (d) Divert the bus towards the trench.

Book -2

105. You can show the speaker that you have been listening to his speech by…
(a) allowing him to complete what he is saying
(b) focusing your attention on the speaker
(c) learning more about the speaker
(d) asking the right question or giving the most appropriate response at the right time

106. Effective listening happens when the listener…
(a) encourage the speaker
(b) gives little feedback
(c) has a prior knowledge of the topic
(d) is objective and receptive

107. Establishing eye contact with the speaker helps in…
(a) boosting the speaker's confidence
(b) making conversations interesting
(c) building a permanent relationship
(d) making the speaker feel relaxed and comfortable

108. You are the officer-in-charge of conducting a public meeting of villagers to spread awareness about an imminent contagious and deadly disease which has many myths and superstitions attached to it. The meeting is scheduled to take place on Sunday in the village hall. Before going to the meeting you will

(1) try to learn about the different languages or the local language spoken in the village so that you can decide the medium of your speech.
(2) study the religious and cultural background of the villagers.
(3) prepare your speech in English thoroughly.
(4) not unnecessarily bother to study about the disease and how it spreads.

(a) Only 1 and 2
(b) Only 3 and 4
(c) Only 1 and 3
(d) All are correct

109. Mr. Manilal got a call from his boss asking him to make a report on the status of the latest assignment, the number of finished classes and the conveyance amount paid to employees. When he received the call, a lot of people were talking and shouting about his workstation, the base phone was constantly ringing, the photocopier was in continuous use and the table fan nearby was whirring. He tried his best to listen. At the end of the day, Mr Manilal submitted the report but the status of assignments was completely missing in the report. Manilal had actually heard only about the number of classes and the conveyance amounts and thus skipped the status of assignments. The boss fired Mr Manilal

Who or what is to blame for Mr Manilal's sacking?

From among the given, identify the main cause that you can infer from the given

situation.

(a) Avoidable distractions which acted as barriers in communication.
(b) The disinterest shown by Mr Manilal in handling the communication.
(c) The irresponsibility shown by both Mr Manilal and his boss.
(d) Only the photocopier and the fan which acted as barriers.

110. **My boss Mr Manish approached me after I'd submitted the final quotation to a client. I had done a thorough study of the costs involved and arrived at the final figure. However, the boss was very upset. He felt that the cost was too low and that we were not going to make enough money. He grew more agitated as I explained to him the costs that I had calculated. He wouldn't listen to anything I'd say. We both grew extremely angry and neither of us was ready to accept the other's message. The communication was a total failure. The boss left in a huff.**
The above situation could have been avoided if

(a) I had given my boss the entire information and had consulted him before sending the quotation.
(b) The boss had asked for the basis of my final conclusion before jumping to conclusions.
(c) Either of us could empathise with the other.
(d) All the above

111. **Samir has taken up a new job in the corporate office of a big MNC. The dress code of the company, requires that all employees dress formally and wear ties. As Samir is not habituated to wearing ties and as his previous employee didn't insist on that, he feels uncomfortable about it. He thinks it is a silly rule as there is no interaction with clients. It is not cool anymore! Added to that, Rahul, the team leader does not sport a tie although all the team members do. Samir really likes his new job, but there is this rule making him very anxious.**

What should Samir do?

Which of the following should Samir do in order to demonstrate team spirit?

(a) Refuse to wear a tie because it looks 'uncool'.
(b) Talk to friends who are working in other MNCs.
(c) Wear a tie as it is the company's rule.
(d) Complain to the higher authorities about the rule.

112. **Mr Pran has worked very hard and spent a long time writing a report that is due for submission to the Senior Manager. He is efficient and qualified and this is reflected in his work. However, a more experienced and well respected member of his team, Mrs Prasanna, tells him that she thinks that his project could be better and that it could be improved with only a few significant changes in the important sections.**
As a team member, what should Pran do to handle the situation in the best possible manner?

(a) Make some of the changes the colleague suggested, but mostly retain the elements of the report that he thinks work best.

(b) Have blind trust in the team member's greater experience and make all the changes she suggested.
(c) Thank the colleague for her suggestions, but trust his own judgment and not make any changes to the report.

(d) Discuss with his colleague the changes she has suggested and clarify reasons for the changes proposed, and based on that incorporate changes.

113. **As a member of a management team, Sunil is working on a number of projects with tight deadlines. To be able to finish his job on time and in an efficient manner, he needs a lot of basic information. His colleagues have all the information and so he has asked them for help. However, he is not sure of their interest and commitment to help him gather the information.**

How should Sunil handle the situation without disturbing the team dynamics?

(a) Spend time on his work such that he has plenty of time in case his colleagues don't deliver on time.
(b) Outline the help that he needs from his colleagues and explain to them why this is important and inform them the dates by which he needs their individual contributions.
(c) Reduce the risk by getting the information that he needs himself rather than relying upon other people.

(d) Carry on with the tasks that he needs to complete and if others do not contribute their parts, report them to the management.

114. **Mr Singh has recently been appointed to a position in a new project team. He is very experienced in so far as the technical aspects of the job are concerned. However, there are many other aspects of the job he needs to understand. Also, his job necessitates collaboration with some other team members. The company arranges for an induction and training programme for new recruits and it is due to be held next month. However, many of the issues that Mr Singh is responsible for require urgent attention.**

As a responsible member of a team, how should Mr Singh handle the situation?

(a) Immediately arrange for meetings with all those individuals he feels he will need to work with and try to learn about the unknown aspects of the job.
(b) Quickly try to establish how his objective will relate to his project manager's objective.
(c) In the initial stages, make sure that he is doing his job as he understood it from the job description.

(d) Spend time building his understanding of the team's objectives for the future.

115. **Analyse the following situation and answer the question that follows.**
Ninad, a team leader of a large team, arrives at his office and finds everything in

chaos. Some of the women members of his team are crying while some others were huddled together. The men from the team were arguing among themselves. Ninad is totally at a loss.
How should Ninad deal with the issue?

(a) Gather complete information about the problem and decide on the course of action to be taken based on it.
(b) Reassign all the tasks the team members were handling.
(c) Talk to his superiors about the potentially explosive situation.
(d) Identify the culprit and sack him.

116. **It has just been a couple of days since you've been assigned a project. While examining it you come to understand that you need more resources-both human and financial-for the project to be completed on time. You wish to have an interview with the finance manager and a quick call to his assistant reveals that he is leaving for a week-long trip the very next day. You've made only a tentative work plan.**

In such a condition, it would be best for you to

(a) schedule an interview once he comes back as you will have enough time to plan thoroughly.
(b) set up an interview with him at the earliest. Admit that your plan is not well prepared but insist that you think the interview will still be beneficial.
(c) do anything in haste and wait for further inputs from your superiors.
(d) discuss it with your team mates and try to get their opinion.

117. **You are one of the team mates who has been assigned a task. You cannot proceed further without getting some information from your superior. Your team mate Renuka is also facing the same situation. At this point, what should you do to get the information you need?**
(a) Request the superior if you could go through his files and get the information required.
(b) Make up a story that there is a team review meeting the next day and that you need some important information.
(c) Invite the superior to attend your team meeting, and impress upon him the need for that information.

(d) Admit to the superior that the work will not be completed on time as they lack some important information.

118. **Santosh is a manager in a company. When there was a workers' strike he expressed his sympathy for the workers. When this was reported to the chairman, he considered Santosh's act as being anti-management and punished him by denying him the increment that was due to him that year...**

In this case, one can say that

(a) Santosh is compromising on his position.
(b) the chairman has not acted in a professional manner.

(c) the chairman has taken this as a chance to prove his authority.

(d) Santosh has been unwise in expressing his sympathy for the workers.

119. **Raghavan has been assigned some work, which he is not familiar with. Even after a week he has not submitted his work plan or discussed it with the team head, Asha. As a result, Asha's weekly report as a team head to her superiors gets delayed. Asha is asked by her superiors to explain the reason for the delay. Which of the following responses from Asha would be apt and logical in such a situation?**

(a) I am busy at present. The moment I get some time. I'll discuss it with Raghavan and get back to you.

(b) Raghavan doesn't seem to know what his role is. It's better I take up his job too, and complete it so that I can give you a detailed and timely report.

(c) I accept that the report has not been submitted on time. Please give me a couple of days more to discuss things with my teammates. I'll report back in two days.

(d) Raghavan is not fit to complete this job. Please allow me to replace him with a person who is more competent so that I can complete the job within the given deadline.

120. **You are a team leader of a large team and your team is already completely overwhelmed with a lot of work. However, disregarding your team's workload, your boss has just assigned another task to your team.**

How do you handle the situation now?
(a) I will stay awake for as many nights as possible and try to get it all done.
(b) I will put aside the stuff that can be postponed and ask my team members to deal with only the most important tasks.
(c) I will hand over a few incidental tasks to someone else but keep the bulk of the work to myself.
(d) I will hand over all the important tasks to someone else and simply take care of the things only I can do.

121. **You are a manager of a big team. One of your team members is struggling to complete an assignment on time. He is efficient and qualified. As a manager you would**

(a) assign the project to someone more capable.
(b) contribute to the work to ensure that it gets done properly.
(c) advise the member on some general time-saving tips and on ways to improve the quality of assignments, and then monitor his performance carefully.
(d) ask him what he needs help with, and then advise him on ways to improve in that area.

122. **You are the leader of a team. One of your team members, Mrs Nidhi, does not do her work on time. You have told her a number of times to finish her task on time so that others can complete theirs. Each time you spoke to her, you ensured that it was done privately and not in the presence of other team members. And, each time you told her, she replied that she was too busy. This would be acceptable; however, Nidhi spends most of her time telling others her personal stories.**

What would you do?
(a) Ask another team member to do Nidhi's work.
(b) Go immediately to the Team Manager and complain that Nidhi is talking too much and not doing her job properly.
(c) Keep on nagging Nidhi till she finishes her job.
(d) Request a meeting with Nidhi and the Team Manager to discuss a solution.

123. **To make your communication more effective:**
(a) Don't send unnecessary messages'
(b) Include as much information as possible, even if you're not sure it's necessary
(c) Send the same messages by multiple channels
(d) Do all of the above

124. **Which of the following is an example of an ethical dilemma?**
(a) Deciding whether or not to inform employees that layoffs are coming as they work on finishing a big project.
(b) Deciding whether or not to sell company stock when you've received inside information on a coming downturn.
(c) Deciding whether or not to use the copy machine for personal papers.
(d) Deciding whether or not to declare the costs of your vacation travel as a deductible business expense.

125. **An example of being open to and accepting of other culture include:**
(a) Expecting punctuality, honesty, and directness from everyone regardless of cultural background.
(b) Maintaining your networks with colleagues and having only limited contact with person from cultures different from yours
(c) Feeling offended when small groups of people at the conference speak to each other in their native language problems with background differences

(d) Understanding that cultures differ in what they do and believe and respecting those differences

126. **You have differences of opinion regarding the final report prepared by your subordinate that is to be submitted urgently. The subordinate is justifying the information given in the report. You would...**
(a) Convince the subordinate that he is wrong.
(b) Tell him to reconsider the results.
(c) Revise the report on your own.
(d) Tell him not to justify the mistake.

127. **You are competing with your batch-mate for a prestigious award to be decided based on an oral presentation. Ten minutes are allowed for each presentation. You have been asked by the committee to finish on time. Your friend, however, is allowed more than the stipulated time period. You would...**
(a) Lodge a complaint to the chairperson against the discrimination.
(b) Not listen to any justification from the committee.
(c) Ask for withdrawal of your name.

(d) Protest and leave the place.

128. **You are handling a time-bound project. During the project review meeting, you find that the project is likely to get delayed due to lack of cooperation of the team members. You would..**
(a) warn the team members for their non-cooperation.
(b) Look into reasons for non-cooperation.
(c) Ask for the replacement of team members.
(d) Ask for extension of time citing reasons.

129. **You are the chairperson of a state sports committee. You have received a complaint and later it was found that an athlete in the junior age category who has won a medal has crossed the age criteria by 5 days. You would...**
(a) Ask the screening committee for a clarification.
(b) Ask the athlete to return the medal.
(c) Ask the athlete to get an affidavit from the court declaring his/her age.
(d) Ask the members of the sports committee for their views.

130. **You are handling a priority project and have been meeting all the deadlines and are therefore planning your leave during the project. Your immediate boss does not grant your leave citing the urgency of the project. You would...**
(a) Proceed on leave without waiting for the sanction.
(b) Pretend to be sick and take leave.
(c) Approach higher authority to reconsider the leave application.
(d) Tell the boss that it is not justified.

131. **You are involved in setting up a water supply project in a remote area. Full recovery of cost is impossible in any case. The income levels in the area are low and 25% of the population is below poverty line (BPL). When a decision has to be taken on pricing you would...**
(a) Recommend that the supply of water be free of charge in all respects.
(b) Recommend that the users pay n one time fixed sum for the installation of taps and the usage of water be free.
(c) Recommend that a fixed monthly charge be levied only on the non.BPL families and for BPL families water should be free.
(d) Recommend that the users pay a charge based on the consumption of water with differentiated charge8 for non-BPL and BPL families.

132. **As a citizen you have some work with a government department. The official calls you again and again; and without directly asking you, sends out feelers for a bribe. You want to get your work done. You would...**
(a) Give a bribe.
(b) Behave as if you have not understood the feelers and persist with your application.
(c) Go to the higher officer for help verbally complaining about feelers.
(d) Send in a formal complaint.

133. **Read the following situations and choose the best possible alternative:**

A database software manufacturing company found out that a product it has launched recently had a few bugs. The product has already been bought by more than a million customers. The company realized that bugs could cost its customers significantly. However if it informs the customers about the bug, it feared losing credibility. What would be the most ethical option for the company?

(a) Apologize and fix up the bug for all customers even if it has to incur losses.
(b) Do not tell customers about bugs and remove only when customers face problems, even if it means losses for the customers.
(c) Keep silent and do nothing.
(d) Keep silent but introduce an improved product that is bug free at the earliest.

134.   **Read the following situations and choose the best possible alternative:**
You, a recruitment manager, are interviewing Mayank, a hard-working young man, who has problem in speaking fluent English. He has studied in vernacular medium school and colleges. Amongst the following options, what would you choose to do, if your company has vacancies?

(a) I would hire him at all costs.
(b) I would hire him for production or finance job but not for marketing job, which requires good communication skills.
(c) I would ask him to improve his communication skills and come back again.
(d) I would hire him for the job he is good at, and provide training in other areas.

135. **You are appointed the Vice Chairman in an authority that is responsible for fulfilling the housing needs in the area. The area has a substantial number of weaker sections and low-income groups, which cannot afford to buy expensive houses. You have been asked by the state housing minister to sell the land that is meant for building houses for the poor to private builders at throw away prices so that they can build plush apartments and sell them at an exorbitant premium. You will:**

(a) do as the minister says as he is your political boss and obeying him is your professional duty.
(b) ban privately built apartments in that area and stop the sale of land so that private builders cannot do as they please.
(c) put your foot down and tell the minister that the authority will go ahead with the project for which the land has been allocated.
(d) tell the builders that the land can be sold to them on the condition that they will sell a set percentage of apartments poor at a subsidised price set by the authority.

136. **You are newly appointed as secretary in the telecom commission. The commission is ready to sell the radio wave spectrum to private companies. After the scrutiny of the documents you have come to know that the price at which the spectrum is being sold is substantially lower than the current market valuation. You think that this may cause a huge loss You will.**

(a) immediately cancel the sale and redo all the documents as per your own specifications.
(b) encourage this development as you think it may lead to a low price for services that come radio wave spectrum.
(c) Advice the telecom minister that the current prices are unacceptable and the sale

should not happen unless the prices are revised to match the market valuation.
    (d) change the process by auctioning the spectrum instead of going for an outright sale.

137. **You are the head of the foreign diplomacy department of your country. The country's economy is ailing and it needs fresh infusion of capital. You have been asked by the foreign minister to do something about the problem. You will:**
    (a) meet the private business houses and ask them to devise ways to bring in capital from the foreign investors.
    (b) contact the foreign offices of the countries where you see financial potential and formally invite them to invest in your country.
    (c) talk to some foreign businessmen friends of yours and informally ask them to set up business in your country.
    (d) tell the minister that the situation is quite grim and not much can be done on this front.

138. **You have been appointed the head of a committee, which has been created to look into the demands of various groups to create smaller states states based on ethnicities and language difference in existing states as they think that development in all areas is not even and some areas are extremely backward. These groups are highly vocal in their demand for creation of new states but the government thinks that creating new states will hamper the unity of the country. You belong to one of these states. You will:**
    (a) Immediately recommend the bifurcation of the states as you have a first hand experience of the plight of these groups.
    (b) Discuss the matter with other members in the committee and try to come to a conclusion through a consensus.
    (c) Ask the government to amend the laws in a way that these kind of demands do not affect the unity of the country in the future.
    (d) Try to convince the government on your own prerogative that these are genuine demands and must be considered.

139. **The district where you are working as a collector has been affected by a severe drought. The majority of the population, which was already impoverished has been hit hard by the non-availability of the staple food grain. However, the government storage are full of grains and some of it is on the verge of decay. In this situation you will:**
    (a) Open the coffers for the general public and distribute the grain openheartedly.
    (b) Sell the grain to the local dealers at below market rate and ask them to sell it to the public at nominal rate.
    (c) Survey the affected population immediately and identify target beneficiaries to distribute grains to them on preferential basis.
    (d) Tell the people that until the government orders you cannot provide them grain from government storages.

140. **You are a senior leader in a political party, which faced bitter defeat to its rival with a big margin in the previous election. From that time your patty has seen many internal defectors who went on to create their own party. Several other party leaders**

who are locally influential want high posts for their own benefit. The party is in shambles and needs to be revived if the party has to do well in the coming elections. You will:

(a) Issue a diktat and make it clear to the party members that any unreasonable demand from them will not be paid any attention.

(b) Expel all the party members who are making unreasonable demands.

(c) Quit the party yourself and create a new party as you think that the damage caused to the party is irreparable.

(d) Call all party members for an urgent meeting and devise a roadmap for the future elections taking everyone in confidence.

141. **You live in gated colony and while returning home one day you found that the organizers of an event have barricaded the usual route that you take to reach home. The personnel at the barricade asks you to take another way but you insist that this is a public road and cannot be barricaded on account of a private event. The personnel calls his senior who is a big and strong man and he threatens to beat you up even when you are being cordial with them. You will:**

(a) Confront the man and insist that no matter what happens you will not let them block the road.

(b) Quietly move from the place without making a fuss anymore but later on lodge a complaint in the local police station.

(c) Call your friends and family to threaten the person who threatened to beat you up.

(d) Engage in a fight to show the man that you are no less stronger than your opponent.

142. **You are the chief engineer in the Highway authority and are responsible to construct roads and highways. The authority is building new road and the project has hit a roadblock because there is a temple in the way where the road is to be built. It is a religiously sensitive area and the people in this area are protesting that they will not let the temple be broken as it would be a religious sacrilege to them. It is not technically feasible for you to take the road around the temple as there is a high probability that this turn would result in frequent accidents. You will:**

(a) By pass the temple and put major speed breakers on both ends of the turn so that the possibility of accidents is brought to the minimum.

(b) Talk and convince the people that they should let the temple be broken and make it elsewhere as the road is for their own benefit.

(c) Recommend to your higher authorities to scrap the project as you do not want to hurt people's sentiments.

(d) Not listen to the people and go ahead with the project as human life means more to you than the religion.

143. **A colleague from a different team is asking you to help him as he is unable to complete a project in time. His superior is unwilling to spare him any more manpower and he hopes you'll help him as a personal favor. You will:**

(a) Do the work required to help your colleague this one time.

(b) Divert some of your manpower to his work.

(c) Advise him to discuss his problems with his superior.

(d) Speak to his superior on his behalf.

144. **You are the in charge of an examination which will be conducted to recruit Officers in the State Farms Corporation. A promising young man has approached you and wants to know from you if a recommendation from an influential politician would be helpful for the recruitment. And if yes, he would like you to consider him for the post as the Minister of agriculture backs him. You will:**

(a) Refer the candidate to a professional acquaintance of your who can help him with the preparation of this examination.

(b) Call up the minister and confirm if the man is telling the truth; if yes, then assure him that he will get the job.

(c) Advise the man to take the exam in a competitive spirit and not bother about recommendations.

(d) Ask the man to meet you at some other place and time appropriate for this kind of conversation.

145. **You are a sessions judge at a district court where corruption is rampant. You have come across case where an influential person has been accused of murder of a dalit. This has fired up the sentiments of the general public. However, a close relative of the accused has approached you and offered you a bribe in order to exonerate the accused. You will:**

(a) Pass a judgement punishing the accused for the murder.

(b) Let the course of inquiry go ahead but lodge a complaint against the person who offered you bribe.

(c) Approach a higher judge and apprise him/her of the situation so that they can tell you how to deal with the situation.

(d) Expedite the inquiry so that the family of the deceased gets speedy justice.

146. **A contagion has gripped the state where you are posted a the Health secretary. People die of this contagion as soon they catch it. Every one's life is in peril. You have been asked by the Chief Minister of the state to bring the situation under control. You will:**

(a) Ask the higher authorities to send teams for help as the state does not have enough resources.

(b) Not caring much about your own safety, you will visit the affected areas along with your team and start helping out people on your own.

(c) Get in touch with your scientist friend overseas and ask him if he can find a cure for this contagion.

(d) Will gather all resources within your purview to alleviate the contagion and prevent people from dying.

147. **You have been appointed as the Chief secretary in a state where a new. Nuclear Plant has been proposed. People vehemently oppose this project because Nuclear Plants are generally considered unsafe and looking at previous records of the government not much has been done for the victims of nuclear accidents in the past. Now, the Onus lies on you to smoothly set up the Nuclear Plant as it will help fulfill the urgent energy needs of the country. You will:**

(a) Ask the security forces in the state to clampdown the protests by the local people using force.

(b) Talk to the representatives of the local protestors and assure them that all the safety measures will be put in place

(c) Educate all the people in the area about the misconceptions that they have regarding the nuclear plants.

(d) Ask the government to scrap the project as it is potentially dangerous for the local people.

148. **You are the head of the Broadcasting Corporation, which is reeling under a serious financial crunch and is the government's sole broadcast organisation. The organisation hasn't recruited any employee for last 20 years because of a policy. that the government implemented 20 years ago. Now, it is becoming increasingly difficult to perform the operations as there is not enough manpower to run the organisation even though the national unemployment is at an all-time high. You will:**

(a) Let the things go as they are going at present but alongside try to mechanise the system so that the organisation does not need manpower.

(b) Hire people on daily wage basis even though it will temporarily result in dilution of the quality of skills required to properly operate the organisation.

(c) Tell the government that you are unable to run the organisation and it should be closed down.

(d) Formally ask the government to amend the policy telling them that it is outdated under the current circumstances and fresh recruitment is needed.

149. **You head the commercial aviation arm of the government, which is not doing well financially. The reason for this is the laid back attitude of the employees of the company. The employees hardly bother about providing the services to the customer. You have been asked to turn around the organization and make it profitable. You will:**

(a) Issue a diktat making it mandatory for every employee to be reviewed each month and if their performance found unsatisfactory harsh action will be taken against errant employees.

(b) Fire the bottom 10 percent of the worst performing employees to send across the message to other employees that they better perform.

(c) Ask for an interest free loan from the government to turn around the organisation as it is facing a financial problem.

(d) Ask the government to cancel license of other aviation companies so that the organization has no competition.

150. **You area Director in the Land Revenue department and responsible for probing illegal land deals. It has come to your notice through media reports that a influential politician's relative is connected with such an illegal deal. This has created widespread furan among the general public. You will:**

(a) Arrest the politician's relative and question him about the deal on your own prerogative even I no complaint has been mad.

(b) Direct Your subordinate officers to raid the home and office of the person connected with the deal immediately so that the related documents are not tampered with.

(c) Direct your subordinate officers to initiate an inquiry into the matter.

(d) Apply for a transfer from the current post as you would not want to be in the bad books of the said politician.

ANSWERS

1	a		21	b		41	b		61	d		81	a
2	b		22	a		42	b		62	c		82	d
3	c		23	a		43	b		63	d		83	a
4	a		24	a		44	c		64	d		84	c
5	b		25	a		45	c		65	d		85	c
6	c		26	b		46	c		66	b		86	b
7	a		27	a		47	d		67	c		87	d
8	d		28	d		48	d		68	b		88	d
9	b		29	d		49	c		69	b		89	c
10	c		30	d		50	a		70	a		90	d
11	d		31	d		51	c		71	c		91	a
12	b		32	b		52	a		72	d		92	b
13	d		33	c		53	a		73	b		93	a
14	b		34	b		54	c		74	d		94	b
15	c		35	b		55	c		75	a		95	d
16	a		36	d		56	c		76	a		96	d
17	d		37	b		57	b		77	d		97	a
18	d		38	d		58	c		78	b		98	d
19	d		39	a		59	b		79	d		99	a
20	d		40	a		60	d		80	a		100	c

101	b		121	d		141	b
102	c		122	d		142	b
103	a		123	d		143	c
104	b		124	c		144	c
105	d		125	d		145	b
106	d		126	c		146	d
107	d		127	a		147	b
108	a		128	b		148	d
109	a		129	b		149	a
110	d		130	c		150	c
111	c		131	d			
112	d		132	d			
113	b		133	a			
114	a		134	b			
115	a		135	c			
116	b		136	c			
117	c		137	b			
118	b		138	b			
119	c		139	c			
120	b		140	d			

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CHAPTER 2: COMPREHENSION AND ENGLISH COMPREHENSION PASSAGES

The Comprehension passage section in CSAT examination holds a great significance as it covers around 7-8 passages which can be solved easily if dealt with understanding.

Comprehension is all about the aptitude of reading and understanding unusual text topic, to answer questions based on that.

In CSAT examination you will be given the passages derived from a variety of subject areas, which include humanities, science and latest happenings in social arena.

The questions will ask you to examine what is stated in the passage and you will have to identify underlying presumptions and entailments.

The length of the passage in CSAT can vary from 250-750 words. The passage is generally followed by 3-6 questions to check the methodical understanding of the content. The questions are always of objective type with each question followed by four options out of which the most appropriate one should be chosen on the basis of the information given in the passage.

The idea to solve reading comprehension effectively can be evolved only by enriching reading habits.

It is heavily instructed for a candidate appearing for CSAT examinations to develop a speed reading habit as it is one of the key factor of scoring well.

Reading comprehension passage and answering the questions will test the ability of the candidate to simultaneously understand the passage and answering the questions consequently.

It happens that sometimes candidate avoid reading passage completely and hurriedly starts answering the question, In that case there are huge chances for him/her to end up with wrong answers.

Some key facts on improving reading skills on comprehension passage section

Here we are providing you with some key points through which you can enrich your reading skills and some tips to efficiently answer the questions asked in a passage section of CSAT Paper.

- ➢ First and the foremost thing you should do is to categorize the main parts of the passage.
- ➢ Secondly, you should focus on the main words in a sentence and mark it or write it somewhere.
- ➢ The next best idea is to constantly practice it at home and check how much time it is taking and Try to reduce the time difference.
- ➢ A simple tip which can increase your reading speed is that while reading, you should

move from left to right fast and focus on most important words on the passage.

➢ You can also check your retaining power by practicing comprehension passage at home with writing a brief summary to know how much you remember about that passage.

➢ Brush up your vocabulary by reading two or three national newspaper and practice completing articles or rewriting it in your own words.

➢ You have to be attentive while reading a passage on a first go thus saving the time to read it again.

➢ Do not hurriedly jump into giving vague or uncertain answer to any question. The answer always is itself given in the passage you just have to present it in an arranged manner.

Before start solving Passages based on CSAT, You should have a clear idea of the General Studies Paper II of the Preliminary examination as the introduction of the Civil Services Aptitude Test in the form of General Studies Paper II of the Preliminary examination has given rise to several doubts and fearful anticipation regarding the process of preparation for the exam.

The new syllabus as per the changes introduced in Pattern:

I. 200 marks for the General Studies Paper II - also known as the CSAT, mainly consists of aptitude test under the following question categories:

(a) Comprehension
(b) Interpersonal Skills including Communication Skills
(c) Logical Reasoning and Analytical Ability
(d) Decision Making and Problem Solving
(e) General Mental Ability
(f) Basic Numeracy (numbers and their relations, orders of magnitude etc.-Class X level), Data interpretation (charts, graphs, tables, data sufficiency etc.-Class X level)
(g) English Language Comprehension Skills (Class X level).

The idea to provide you with comprehension E-Book is just to enable you to deal effectively with the different comprehensions asked in the CSAT Examinations.

In this E-Book our focus will be on two most important and elementary parts of the examination syllabus namely:

(a) Comprehension
(b) English Language Comprehension Skills (Class X level)

Key Features of this E-Book

✓ It is complete and comprehensive book which covers all the aspects Comprehension [both General and English comprehension]

✓ The E-Book will provide you a broad variety of practice material to enrich your skills.

✓ The Passages are formed keeping in mind the analytical nature of the exam which directly helps the aspirant focus on the key areas of problem solving and the approach to it.

✓ Reading and comprehending has been thoroughly explained using wide variety of

topics used in different comprehensions.
- ✓ The special attention is given on vocabulary to help the student improve his/her language ability.
- ✓ Different levels of difficulty of questions in all the areas to give the student a pitch in the preparation process is made available in the passages providing a mechanism to test himself/herself on a degree of difficulty.

This E-Book is going to help the student graduate from an average level of preparation to a highly ordered and meticulous level of preparation, an important aspect which differentiates the winners from the non-winners.

We wish you All the Best in your endeavour and may you come out with flying colours.

PART-I: COMPREHENSION

EXERCISE – A

Passage 1

The world's oceans are faced with an unprecedented loss of species comparable to the great mass extinctions of prehistory, a major report suggests today. The seas are degenerating far faster than anyone has predicted, the report says, because of the cumulative impact of a number of severe individual stresses, ranging from climate warming and sea-water acidification, to widespread chemical pollution and gross overfishing.

The coming together of these factors is now threatening the marine environment with a catastrophe "unprecedented in human history", according to the report, from a panel of leading marine scientists brought together in Oxford earlier this year by the International Programme on the State of the Ocean (IPSO) and the International Union for the Conservation of Nature (IUCN).

The stark suggestion made by the panel is that the potential extinction of species, from large fish at one end of the scale to tiny corals at the other, is directly comparable to the five great mass extinctions in the geological record, during each of which much of the world's life died out. They range from the Ordovician-Silurian "event" of 450 million years ago, to the Cretaceous-Tertiary extinction of 65 million years ago, which is believed to have wiped out the dinosaurs. The worst of them, the event at the end of the Permian period, 251 million years ago, is thought to have eliminated 70 per cent of species on land and 96 per cent of all species in the sea.

The panel of 27 scientists, who considered the latest research from all areas of marine science, concluded that a "combination of stressors is creating the conditions associated with every previous major extinction of species in Earth's history". They also concluded:

The speed and rate of degeneration of the oceans is far faster than anyone has predicted;

Many of the negative impacts identified are greater than the worst predictions;

The first steps to globally significant extinction may have already begun.

Not only are there severe declines in many fish species, to the point of commercial extinction in some cases, and an "unparalleled" rate of regional extinction of some habitat types, such as mangrove and seagrass meadows, but some whole marine ecosystems, such as coral reefs, may be gone within a generation.

The report says: "Increasing hypoxia [low oxygen levels] and anoxia [absence of oxygen, known as ocean dead zones], combined with warming of the ocean and acidification, are the three factors which have been present in every mass extinction event in Earth's history.

It disclosed that new scientific research suggests that pollutants, including flame-retardant chemicals and synthetic musks found in detergents, are being traced in the polar seas, and that these chemicals can be absorbed by tiny plastic particles in the ocean which are in turn ingested by marine creatures such as bottom-feeding fish.

Plastic particles also assist the transport of algae from place to place, increasing the occurrence of toxic algal blooms – which are also caused by the influx of nutrient-rich pollution from agricultural land.

The experts agreed that when these and other threats are added together, the ocean and the ecosystems within it are unable to recover, being constantly bombarded with multiple attacks.

The report sets out a series of recommendations and calls on states, regional bodies and the United Nations to enact measures that would better conserve ocean ecosystems, and in particular demands the urgent adoption of better governance of the largely unprotected high seas.

1. **With reference to the passage consider the following statement:**

(a) Marine Environment is not under risk as it is out of the cumulative impact of a number of severe individual stresses, ranging from climate warming and sea-water acidification, to widespread chemical pollution and gross overfishing.
(b) The speed and rate of degeneration of the oceans is very slow than anyone has predicted.
(c) Plastic particles assist the transport of algae from place to place, decreasing the occurrence of toxic algal blooms
(d) As per the scientist combination of stressors is creating the conditions associated with previous major extinction of species in Earth's history.

Which of the above statement/s stands true with the passage?

(i)   a and c
(ii)   a and d

(iii)   b and c
(iv)   d only

2. **What according to the passage, the panel of 27 scientists, who considered the latest research from all areas of marine science, concluded?**

(a) They concluded that a combination of stressors is creating the conditions associated with every previous major extinction of species in Earth's history.
(b) The speed and rate of degeneration of the oceans is relatively very slower than anyone has predicted.
(c) The speed and rate of degeneration of the oceans is far faster than anyone has predicted
(d) They concluded that a combination of stressors is harming the conditions associated with every previous major extinction of species in Earth's history

(i)   a only
(ii)   a and b
(iii)   a and c
(iv)   a and d

3. **What was the stark suggestion made by panel of leading marine scientist?**

(a) The potential extinction of species, from tiny corals at one end to large fish at other is inversely proportional to the five great mass extinctions in the geological history.
(b) The possible extinction of species, from large fish at one end of the scale to tiny corals at the other, is directly comparable to the five great mass extinctions in the geological record.
(c) There is not any sign of extinction found between large fish and tiny corals.
(d) The species of tiny coral and large fish share a interlinking dated back to Cretaceous-Tertiary period.

4. **The author in the above passage used a word synonymic to anoxia which is known by absence of oxygen. What was that word?**

(a) Ocean Dead Zone
(b) Hypoxic zone
(c) Low Oxygen zone
(d) Anoxia zone

5. **What is the after effect of transportation of algae by Plastic particle from place to place?**

(a) It increases the occurrence of toxic algal blooms.
(b) It decreases the occurrence and influx of toxic algal blooms.
(c) It increases the influx of nutrient-rich pollution from agricultural land.

(d) It doesn't have any effect on influx and outflow of toxic algal blooms.

Passage 2

Climate change has negative impact on forests from many different angles. The increased temperatures are not only causing heat stress and drought but they are also opening the door for wide-spread insect infestation.

In many parts of the world researchers are already talking about rapidly growing forest mortality. Not all tree species are affected the same with some species of trees being more resistant than other, with other likely to be hit particularly hard, depending on factors such as age or sizes of trees.

Some researchers fear that in business as usual scenario many forest areas will cease to exist and will turn into grasslands or some other ecosystems. This could further increase climate change impact because forests are large carbon sinkers, absorbing plenty of CO_2 from the atmosphere. Also, the decomposition of dead trees releases CO_2 in the atmosphere, therefore increasing global warming effect and debris from dead trees could also increase a forest's fire risk and result in even more CO_2 emissions.

They are also important for water and nutrient cycle, not to mention that they also provide homes for thousands of different animal and plant species.

In United States, last summer's severe drought has taken heavy toll on forests, and authorities are yet to receive official data about the total damage done to U.S. forests. One thing is sure though, there will be plenty dead trees in the final report.

Many researchers believe that one-dimensional approach may not be enough to save our forests and are calling for joint action that would not only include climate change scientists and ecologists but also, **biogeochemists,** hydrologists, economists, social scientists, etc.

Current forest management practices won't be enough to save many of our forests from climate change impact and this is why this issue needs to involve more scientists, from different scientific fields.

6. **Which of the following statement is not true in context of Insect Infestation?**

(a) The Increase in temperature is directly leading to increase in insect infestation
(b) The variation or change in climate is also paving the way for wide spread Insect infestation.
(c) The decrease in temperature is also one of the causes of Insect Infestation.
(d) Neither increase nor decrease in temperature is responsible for insect infestation.

(i) A only
(ii) B and C
(iii) C and D
(iv) D only

7. **Which of the following sentence is not correct as per the passage given above?**

(a) Forests play vital role absorbing CO2 from the atmosphere
(b) Forests also helps in regulating climate and water purification
(c) The decomposition of dead trees releases O2 in the atmosphere, therefore increasing global warming effect
(d) The debris from dead trees could also increase a forest's fire risk and result in even more CO2 emissions.

(i)   Only A
(ii)   Only B
(iii)   Only C
(iv)   Both C and D

8. **The author in the above passage used a word biogeochemists with reference to the biogeochemistry. Which of the following statement best explains the meaning of the word?**

(a) The scientific study of biological, geological and chemical processes in the natural environment and especially of their mutual relationships
(b) Science that studies the structure of the earth (or other planets), together with its origin and development, especially by examination of its rocks
(c) The branch of chemistry that deals with the chemical composition of the Earth and other planets and with the chemical processes that occur in the formation of rocks and minerals.
(d) The science of the measurement of the age of rocks etc. based on the radioactive decay of naturally occurring isotopes

9. **The author has ended this passage on note of**

(a) Criticism
(b) Optimism
(c) Scepticism
(d) Euphemism

10. **According to the passage decomposition of dead trees releases CO2 in the atmosphere, therefore increasing global warming effect and debris from dead trees could also increase Forest's fire risks which in result increases_____?**

(a) More CO2 emissions.
(b) More O2 Emissions
(c) More Co2 Consumption
(d) Less O2 Release.

Passage 3

Whether it's water or power lines, global warming and its consequences are increasing the push to put vital infrastructure underground, but it still can be vulnerable to the effects of human activities.

In a posting on Columbia University's Earth Institute blog Roger Anderson, a senior research scientist with the Institute argued that, as a matter of priority all coastal electrical infrastructures in the US should be moved underground.

If more infrastructures do disappear beneath the surface it will be even more important to keep track of it and monitor any human activity that can damage it.

In Australia - the driest continent - there is a push to build underground reservoirs as a buffer against what are expected to be more frequent and more prolonged droughts.

Writing on **The Conversation** - a web site for analysis and commentary from academics - Andrew Ross, a Research Fellow at Australian National University, said: Historically Australians rely on large surface reservoirs to provide water for agriculture and cities, and encourage farmers to harvest and store water in farm dams.

This strategy is not sufficient to cope with drought and increasing climate variability as demand for food and water grows. Underground water banking can help ensure that there is enough water for both irrigation and the environment when drought hits.

As with the case for undergrounding power, Ross claimed there were hidden costs in surface storage that were not factored into cost comparisons. Surface storages lose a third or more per year due to evaporation, and this cost is rarely acknowledged. If we choose not to make water users pay the full cost of surface storage, including evaporative losses, there is a case for public intervention to reduce the cost of aquifer storage for users.

11. Which of the following Statements is /are true supporting the passage?

(a) If more infrastructures do disappear beneath the surface thereafter it will be less important to keep track of it and monitor any human activity that can damage it.
(b) There is a push in Australia to destroy underground reservoirs as a buffer against what are expected to be more frequent and more prolonged droughts.
(c) Surface storages lose a third or more per year due to condensation, and this cost is rarely acknowledged.
(d) Underground water banking can help ensure that there is enough water for both irrigation and the environment when drought hits.

(i)   Only A
(ii)   (ii) A and B
(iii)   C and D
(iv)   (iv) Only D

12. What should be an apt title for the passage?

(a) Global warming puts the heat on above-ground infrastructure
(b) Global Warming- A highly neglected issue.
(c) Where are the glaciers going?
(d) Global warming and its effect on climate change

13. According to the passage, In Australia - the driest continent - there is a push to build

underground reservoirs as a *buffer* **against what are expected to be more frequent and more prolonged droughts. What does the word** *buffer* **signify here in Passage?**

(a) an ionic compound that resists changes in its PH
(b) A neutral zone between two rival powers that is created in order to diminish the danger of conflict
(c) An inclined metal frame at the front of a locomotive to clear the track
(d) A cushion-like device that reduces shock due to an impact

14. Which of the following Statement about Underground water banking is true?

(a) Underground water banking is basically a process of capturing and storing water.
(b) Underground water banking can help ensure that there is enough water for both irrigation and the environment when drought hits.
(c) Underground water banking is like storing of money, when you have a lot, you put it where you have access when you're short money. The general philosophy is that we can deposit water in times of plenty.
(d) An advantage of Underground water banking is that we can deliver large quantities in a short period of time. It's harder to take water from the groundwater reservoir; it takes more energy and management.

(i) A and b
(ii) Both A and C
(iii) B only
(iv) All of the above

15. As per the author, what will be the resultant effect if more infrastructures do disappear beneath the surface?
(a) Now, it will be even more important to keep track of it and monitor any human activity that can damage it.
(b) It will be now become easy to keep track of it and monitor any human activity that can damage it.
(c) There will be not any harm or damage to the aquatic species.
(d) It will be now quite difficult to keep track of it and monitor any human activity that can damage it.

Passage 4

Earth has experienced climate change in the past without help from humanity. We know about past climates because of evidence left in tree rings, layers of ice in glaciers, ocean sediments, coral reefs, and layers of sedimentary rocks. For example, bubbles of air in glacial ice trap tiny samples of Earth's atmosphere, giving scientists a history of greenhouse gases that stretches back more than 800,000 years. The chemical make-up of the ice provides clues to the average global temperature.

Using this ancient evidence, scientists have built a record of Earth's past climates, or "paleoclimates." The paleoclimate record combined with global models shows past ice ages as well as periods even warmer than today. But the **paleoclimate** record also reveals that

the current climatic warming is occurring MUCH MORE RAPIDLY than past warming events.

As the Earth moved out of ice ages over the past million years, the global temperature rose to a total of 4 to 7 degrees Celsius over about 5,000 years. In the past century alone, the temperature has climbed 0.7 degrees Celsius, roughly ten times faster than the average rate of ice-age-recovery warming.

Models predict that Earth will warm between 2 and 6 degrees Celsius in the next century. When global warming has happened at various times in the past two million years, it has taken the planet about 5,000 years to warm 5 degrees. The predicted rate of warming for the next century is at least 20 times faster. This rate of change is extremely unusual.

16. With reference to the passage, consider the following statements:

(a) When global warming has happened at various times in the past two million years, it has taken the planet about 5,000 years to warm 5 degrees.
(b) The predicted rate of warming for the next century is at least 10 times faster. This rate of change is extremely unusual.

Which of the statements given above is/are correct?

(a) Only A
(b) Only B
(c) Both A and B
(d) Neither A nor B

17. Which of the following evidence as per the passage is not counted among the method used for knowing about past climates?

(a) Tree Rings
(b) Layers of Ice in glaciers
(c) Ocean Sediments
(d) Ocean Ridge

18. The author in the above passage used a word Palaeoclimate with reference to the word Paleoclimatology. What does the word Paleoclimatology signify here?

(a) Detailed study on climatic condition
(b) Study of the atmospheric condition.
(c) Study of ancient temperatures.
(d) The study of past climates

19. Which of the following statement did not stands true with the passage?

(a) The chemical make-up of the ice provides clues to the average global temperature.
(b) As the Earth moved out of ice ages over the past million years, the global temperature

rose to a total of 4 to 7 degrees Celsius over about 500 years

(c) **Paleoclimate** record also reveals that the current climatic warming is occurring QUITE SLOWLY than past warming events.

(d) The predicted rate of warming for the next century is at least 20 times faster. This rate of change is extremely unusual.

(i) Only A
(ii) Both A and B
(iii) Both B and C
(iv) Only D

20. The author in the above passage talks about Green House Gases. Which of the following about Green House Gases is not true?

(a) A greenhouse gas is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range.

(b) The primary greenhouse gases in the Earth's atmosphere are water vapour, carbon dioxide, methane, nitrous oxide, and ozone.

(c) In the Solar System, the atmospheres of Venus, Mars, and Titan also contain gases that cause greenhouse effects.

(d) Greenhouse gases don't effect on the temperature of the Earth by any means.

(i) Only A
(ii) Both A and B
(iii) Only C
(iv) Only D

EXERCISE- B

Passage 1

The soil, as the major medium for plant growth, is the basic resource for all land use and development. Ecologically sustainable development is not feasible unless it includes, as a basic concept, the conservation and sustainable use of soils.

The National Soil Conservation Program (NSCP), which was established to 'develop and implement national activities for the rehabilitation and sustainable use of the nation's soil and land resources', is broadly speaking physically and chemically based. Some of the major study areas include erosion, soil structural decline, acidification and salinisation, invasion of productive land by native woody plants, mass movement and water repellency. Originally the NSCP did not have biodiversity objectives in mind.

In 1993 the CSIRO started a multi-divisional program (MDP) 'to produce a national framework for conserving biological diversity and maximising its economic benefits, through a national collaborative venture involving all appropriate agencies'. The program uses the

'methods for characterising, sampling and quantifying biodiversity in soil and litter and on the soil surface' and 'effect of land-use practices on the biodiversity of functional groups of soil organisms'.

Soils are products of interactions between abiotic processes, including physical and chemical weathering, temperature regimes, hydrology etc., and biotic processes, including the production of organic matter (plants) by photosynthesis, uptake of water and nutrients by plants and the eventual return of this organic matter to the soil through decomposition.

The soil biotas are extremely important in the regulation of plant nutrient uptake and release and organic matter decomposition. They are also important contributors to the formation of stable soil aggregates, and larger ones (especially earthworms, termites and ants) to soil porosity and the infiltration of water. These biotic processes, together with the abiotic physical and chemical processes, are prime regulators of soil fertility. If we are to protect our soil, arguably our most important resource, we must know more about the biota it contains.

1. **As per the passage what was the purpose behind establishing National Soil Conservation Program (NSCP)?**

(a) To implement and exercise national activities for the remedy analysis and sustainable use of the nation's soil and land resources.
(b) To develop and implement national activities for the rehabilitation and sustainable use of the nation's soil and land resources.
(c) To develop a process to make unsustainable use of the nation's soil and land resources.
(d) To establish and maintain an environment for soil conservation.

2. **What was the name given to program started by CSIRO (Commonwealth Scientific and Industrial Research organisation to produce a national framework for conserving biological diversity and maximising its economic benefits?**

(a) Cross Structural Program(CSP)
(b) Multi Analysis Program(MAP)
(c) Multi Development Program (MDM)
(d) Multi-divisional program (MDP)

3. **According to the passage which of the following is not included in abiotic process of Soil Production?**

(a) physical and chemical weathering,
(b) temperature regimes,
(c) hydrology
(d) Strength of Light

4. **What is the role played by soil biotas or why soil biotas are extremely important?**

(a) It helps in the regulation of plant nutrient uptake and release and organic matter decomposition.
(b) They are among the important contributors to the formation of stable soil aggregates, and larger ones (especially earthworms, termites and ants) to soil porosity and the infiltration of water.
(c) It helps in the fixation of Nitrogen particles.
(d) Regulation of soil acidification.

Which of the following statement/s did not stands true with the passage given above?

(i)   A Only
(ii)   Both A and B
(iii) C and D
(iv)   D only

5. **Which of the following is not included in the study area of NSCP (National Soil Conservation Program)?**

(a) acidification and salinisation
(b) invasion of productive land by native woody plants
(c) Erosion
(d) soil structural interaction

Passage 2

The word "biodiversity" is a contracted version of "biological diversity". The Convention on Biological Diversity defines biodiversity as:"the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems."

Thus, biodiversity includes genetic variation within species, the variety of species in an area, and the variety of habitat types within a landscape. Perhaps inevitably, such an all-encompassing definition, together with the strong emotive power of the concept, has led to somewhat **cavalier** use of the term biodiversity, in extreme cases to refer to life or biology itself. But biodiversity properly refers to the variety of living organisms.

Biological diversity is of fundamental importance to the functioning of all natural and human-engineered ecosystems, and by extension to the ecosystem services that nature provides free of charge to human society. Living organisms play central roles in the cycles of major elements (carbon, nitrogen, and so on) and water in the environment, and diversity specifically is important in that these cycles require numerous interacting species.

General interest in biodiversity has grown rapidly in recent decades, in parallel with the growing concern about nature conservation generally, largely as a consequence of accelerating rates of natural habitat loss, habitat fragmentation and degradation, and resulting extinctions of species. The IUCN Red List estimates that 12-52% of species within

well-studied higher taxa such as vertebrates and vascular plants are threatened with extinction. Based on data on recorded extinctions of known species over the past century, scientists estimate that current rates of species extinction are about 100 times higher than long-term average rates based on fossil data. Other plausuble estimates suggest that present extinction rates now may have reached 1000 to 10,000 times the average over past geologic time. These estimates are the basis of the consensus that the Earth is in the midst of the sixth mass extinction event in its history; the present extinction event is termed the Holocene Mass Extinction.

6. As per the passage what are the estimates made by IUCN red list?

(a) IUCN estimated that 12-52% of species within well-studied higher taxa such as vertebrates and vascular plants are unthreatened with extinction.
(b) As per IUCN about 12-52% of species within well-studied higher taxa such as vertebrates and vascular plants are threatened with extinction
(c) No species of higher taxa is under threatened with extinction.
(d) 12-52% Species of lower taxa is threatened for extinction.

Answer (B)

7. Which of the following statement/s does not stand true as per the above given passage?
(a) Biodiversity includes genetic variation within species, the variety of species in an area, and the variety of habitat types within a landscape
(b) Biological diversity is of fundamental importance to the functioning of all natural and human-engineered ecosystems, and by extension to the ecosystem services that nature provides free of charge to human society.
(c) Based on data on recorded extinctions of known species over the past century, scientists estimate that current rates of species extinction are about 10 times higher than long-term average rates based on fossil data.
(d) Other plausible estimates suggest that present extinction rates now may have reached 1000 to 10,000 times the average over past geologic time.

8. What is the full term abbreviation of IUCN as used by author citing the IUCN Red list?

(a) India Union for Conservation of Nature
(b) International Union For Conservation of Nature
(c) International Union for Contingency of Nature.
(d) International Union For Conservatism of Nature

9. The author in the above passage used a term Cavalier while referring to its usage with Biodiversity. What is the meaning of the word in context of the passage?

(a) A gallant or chivalrous man, especially one serving as escort to a woman of high social position; a gentleman
(b) Showing arrogant or offhand disregard; dismissive
(c) of, pertaining to, or characteristic of the work.

(d) to be haughty or domineering.

10. **What is the opposite of the word consensus used in the last paragraph of the passage?**

(a) Accord
(b) Concord
(c) Disagreement
(d) Harmony

Passage 3

Child development that occurs from birth to adulthood was largely ignored throughout much of history. Children were often viewed simply as small versions of adults and little attention was paid to the many advances in **cognitive abilities**, language usage, and physical growth that occur during childhood and adolescence.

Interest in the field of child development finally began to emerge early in the 20th-century, but it tended to focus on abnormal behavior. Eventually, researchers became increasingly interested in other topics including typical child development as well as the influences on development.

An understanding of child development is essential, allowing us to fully appreciate the cognitive, emotional, physical, social and educational growth that children go through from birth and into early adulthood. Some of the major theories of child development are known as grand theories; they attempt to describe every aspect of development, often using a stage approach. Others are known as mini-theories; they instead focus only on a fairly limited aspect of development, such as cognitive or social growth.

The following are just a few of the many child development theories that have been proposed by theorists and researchers. More recent theories outline the developmental stages of children and identify the typical ages at which these growth milestones occur.

The theories proposed by Sigmund Freud stressed the importance of childhood events and experiences, but almost exclusively focused on mental disorders rather that normal functioning.

According to Freud, child development is described as a series of 'psychosexual stages.' In "Three Essays on Sexuality" (1915), Freud outlined these stages as oral, anal, phallic, latency and genital. Each stage involves the satisfaction of a libidinal desire and can later play a role in adult personality. If a child does not successfully complete a stage, Freud suggested that he or she would develop a fixation that would later influence adult personality and behavior.

Theorist Jean Piaget suggested that children think differently than adults and proposed a stage theory of cognitive development. He was the first to note that children play an active role in gaining knowledge of the world. According to his theory, children can be thought of as "little scientists" who actively construct their knowledge and understanding of the world.

As you can see, some of psychology's best known thinkers have developed theories to help explore and explain different aspects of child development. Today, contemporary psychologists often draw on a variety of theories and perspectives in order to understand how kids grow, behave and think.

11. As per the passage which of the following statement/s regarding grand theories and mini theories of child development is correct?

(a) Grand theories uses a stage approach and focuses on limited aspect of development.
(b) Mini theories focus on every aspect of development.
(c) Grand theories is know by major theories and focus on every aspect of development using a stage approach.
(d) Examples of Mini theories are cognitive and social growth theory and they focus on fairly limited aspect of development.

(i)   Only A
(ii)   Both A and B
(iii)   Only c
(iv)   Both C and D

12. According to Freud theory of child development which is described by series of psychosexual development. Which of the following stage do not play a role in building adult personality and behavior?

(a) Oral
(b) Phallic
(c) Latency
(d) Verbal

13. Who among the following as per the passage proposed a stage theory of cognitive development?

(a) Sigmond Freud
(b) Seymous Papert
(c) Jean Piaget
(d) Charles Filmore

14. The author in above passage used word *cognitive abilities* in context of childhood. Which of the following statement/s describes the meaning of the word?

(a) Cognitive abilities are the brain-based skills we need to carry out any task from the simplest to the most complex.
(b) The mental process of knowing, including aspects such as awareness, perception, reasoning, and judgment.
(c) the basic process of thought
(d) A thought process which comes to be known, as through perception, reasoning, or intuition; knowledge.

(i)   Only A

(ii)   Both A and B
(iii)   All of the above
(iv)   Only C

15. Which of the following Statement/s did not stands true with the passage given above?

(a) Contemporary psychologists often draw on a diversity of theories and perspectives in order to understand how kids grow, behave and think.
(b) Interest in the field of child development finally began to emerge early in the 19th-century, but it tended to focus on abnormal behavior.
(c) Theorist Jean Piaget suggested that the thinking of children is similar to adults and proposed a stage theory of cognitive development
(d) Child development that occurs from birth to adulthood was largely ignored throughout much of history.

(i)   A only
(ii)   B and C
(iii)   C only
(iv)   A and D

Passage 4

Medievalism in literature denotes a recapture of the spirit and atmosphere of the Middle Ages. Among the romantics, Coleridge, Scott and Keats, dealt with medieval life, touching upon those aspects of it, which were romantic. The most important centres of influence in the Middle Ages were the Church and the Castle. The Romantics did not care much about the religion of the Church, though they felt attracted by its colourful aspects. They therefore let alone the religion and faith of the Middle Ages.

They laid stress upon the romance of chivalry and love one on the hand, and, on the other, upon superstitions and legends with supernatural background. Coleridge dealt with the supernatural in his Ancient Mariner and Christable; his suggestion of the weird mystery of supernaturalism in these two poems in unequalled in English poetry. Keats struck the note of supernaturalism in La Belle Dame Sans Merci. Medievalism with all its paraphernalia of romance and legend, love and adventure, is most prominent in The Eve of St. Agnes.

"La Belle" and "Ode to a Nightingale".

The setting of the poem, La Belle Dame Sans Merci is medieval. We have here also medieval accessories-the knight-at-arms, the cruel mysterious lady, 'a faery's child', the elfin grot, and the spell and **enchantment** and general supernatural atmosphere. La Belle is one of Keat's great achievements. It is medieval ballad. The Eve of St. Agnes, on the other hand, is overloaded with excessive details and is marked by gorgeous, high-flown style. La Belle is in the simple style of a ballad, and tells a supernatural story with a medieval atmosphere.

16. As per the passage what does the word Medievalism in literature denotes?

(a) It talks about the dark ages of the western culture and civilization.

(b) It denotes the beginnings of a rebirth in literature

(c) It denotes deadly sins and Heavenly virtues

(d) Recapture of the spirit and atmosphere of the Middle Ages

17. **What were the most important centres of influence in the middle ages?**

(a) Mosque and the shrines

(b) Church and the castles

(c) Temple and Gurudwaras

(d) Chapel and Cathedral

18. **Which of the following statement/s about La Belle is not true?**

(a) The setting of the poem, La Belle Dame Sans Merci is modern.

(b) La Belle is in the simple style of a ballad, and tells a supernatural story with ancient atmosphere.

(c) La Belle is one of Keat's great achievements.

(d) La Belle is medieval ballad.

(i)   Only A

(ii)   Both A and B

(iii)   C Only

(iv)   Both C and D

19. **The author in the above passage used a word enchantment while talking about different poems. What is the meaning of the word in context of the passage?**

(a) A feeling of great liking for something wonderful and unusual.

(b) The act or an instance of enchanting

(c) A psychological state induced by (or as if induced by) a magical incantation

(d) A magical spell

20. **The tone of the passage is**

(a) Straight, simple and humorous

(b) Informal and comical

(c) Lucid and pungent

(d) Moralistic and censorial

EXERCISE-C

Passage 1

From early contacts between Muscovy and the Holy Roman Empire through the rapid increase in contact during and following Peter the Great's reign and finally during the Soviet period, Russia has tried to be recognized by the leading European powers as their equal. This quest has taken on an importance that places it squarely at the centre of Russian

identity politics. Indeed, Russian nationalism congealed historically around this very issue. When, in the early 1990s, leading politicians wrote newspaper articles about how they did not want to live in a 'banana republic' and when Russian and European politicians point to data in a wide range of fields listing Russia on a par with smaller powers, the message lends its power from the tacit assumption that a small-power Russia is an impossibility. Russia has to be a great power, or it will be nothing. Indeed, this is an explicit, self-referential axiom in Russian identity politics, and has been so for a very long time. To quote the Russian Foreign Minister from 100 years ago, Aleksandr P. Izvol'sky, 'decline to the level of a second class power […and] become an Asiatic state […] would be a major catastrophe for Russia'.

The persistence of the theme and the intensity of its presence in Russian identity politics suggests that Russia's quest for recognition as a great power has not been a successful one. This is because, if an identity claim is successful, it forms part of the horizon of the political debate rather than its substance. Recognition of Russia as a great power can only be given by great powers that are firmly established as such. Historically, that means the European powers to the West of Russia. It follows that if we want to account for Russia's feeling of non-recognition, then we need to give an account of what the criteria for great powerhood have been, and then discuss where Russia has been found wanting. Note that the main focus must then fall on how Russian state-building was represented by contemporary great powers.

1. **Which of the following statement/s is not true with regard to the status of Russia during Soviet period?**

   (a) During the soviet period Russia has tried to be recognized by the leading European powers as their rival.
   (b) During the soviet period Russia has tried to be recognized by the leading European powers as their newly evolved contender.
   (c) During the soviet period Russia was not in existence and never tried to be recognized by the leading European powers as their newly evolved contender.
   (d) During the soviet period Russia has tried to be recognized by the leading European powers as their equal.

2. **The author in the above passage talks about banana republic while referring to different nation in early 1990's. What do you understand by the word?**

   (a) Politically unstable country whose economy is largely dependent on the export of a single limited-resource product, such as fruits or minerals
   (b) A country which includes a large, impoverished working class and a ruling plutocracy that comprises the elites of business, politics, and the military.
   (c) A country which is ruled by the king.
   (d) A country governed by the people of its nation.

   (i) Only A
   (ii) Both A and B
   (iii) C Only

(iv) D only

3. **The author in the above passage used a word congealed while talking about Russian Nationalism. What is the meaning of the word in context to the line with it is used?**

    (a) Become gelatinous
    (b) solidified by cooling
    (c) Take shape or coalesce, esp. to form a satisfying whole:
    (d) Dissolved

4. **Pick out the statement that is NOT True.**

    (a) In the early 1990s, leading politicians wrote newspaper articles about how they did not want to live in a 'banana republic'.
    (b) Recognition of Russia as a great power can only be given by great powers that are firmly established as such.
    (c) As per Russian Foreign Minister Aleksandr P. Izvol'sky, 'decline to the level of a second class power […and] become an Asiatic state […] would be a major miracle for Russia'.
    (d) The main focus must then fall on how Russian state-building was represented by contemporary great powers.

5. **How it is inferred from the passage that the Russia's quest for recognition as a great power has not been a successful one?**

    (a) Suggesting the fact of persistence of the theme and the intensity of its presence in Russian identity politics
    (b) By the assumption that a small-power Russia is an impossibility
    (c) Russian nationalism congealed historically around this very issue
    (d) Getting into the fact Russia as a great power can only be given by great powers that are firmly established as such.

Passage 2

Since the end of the Cold War, security and development concerns have been increasingly interlinked. Governments and international institutions have stated that they have become increasingly aware of the need to integrate security and development programmes in policy interventions in post-conflict situations and in their relations with the growing category of failed and potentially 'failing' states. Two previously distinct policy areas are now increasingly overlapping in terms of the actors and agencies engaged and the policy prescriptions advocated. Since the end of the 1990s, and particularly after 9/11, the framework of the 'security–development nexus' has been hailed as a way of cohering national and international policy-making interventions in non-Western states. The policy documents talk about the joining of practices and theories in these two policy areas as a way of creating 'joined-up government' or of facilitating multilateral intervention under new

'holistic', 'coherent' or 'comprehensive' approaches to non-Western states.

Over the last few years, there has been a debate between commentators and analysts who argue favorably for the merging of the concerns of security and development as potentially the best way to achieve coherent and well-managed policy with regard to the combined and complex problems facing many 'at-risk' states and societies today, and those who are more cautious, suggesting that this new agenda risks sacrificing development and poverty reduction to the security needs of the major powers, especially the United States, in its leadership of the Global War on. On the margins of this 'problem-solving' debate, some critical security theorists suggest that the development and poverty-reduction agenda is already one that has been subordinated to Western security concerns, and that the shift from macro-development approaches to 'good governance', 'pro-poor' policy-making, sustainability and poverty reduction already contains within it the desire to contain these regions of potential instability and signifies the securitization and subordination of the development agenda.

6. **The author's argument is directed against which of the following?**

    (a) The Prevailing security and development concern after the end of cold war.
    (b) The current distribution of global resource for peace and security.
    (c) The socio-economic development of the country after the end of cold war
    (d) Poor governance, ethnic or religious tensions and structural inequities—issues falling within the development arena.

    (i)   A Only
    (ii)   Both A and C
    (iii)   D only
    (iv)   Both A and D

7. **Which of the following statement/s is/are true with the reference to the passage given above?**

    (a) Since the end of the Cold War, security and development concerns have been interlinked to a lesser extent.
    (b) From the time of the end of cold war security and development concerns have been increasingly interlinked.
    (c) There were not any interlinking found between security and development concern since the dawn of cold war.

    (i)   A only
    (ii)   A and B
    (iii)   C Only
    (iv)   B only

8. **What is the topic of argument between communicator and analyst over last few**

years?

(a) The argument is for the merging concerns of security and development.
(b) The argument is for achieving coherent and well-managed policy with regard to the combined and complex problems facing many 'at-risk' states and societies today.
(c) There is not any topical argument between communicator and analyst.
(d) The argument is for the merging concerns of poverty and unemployment in the country after the cold war era.

(i)   Both A and B
(ii)   Only A
(iii)   Both C and D
(iv)   Only B

9. **What is the suggestion/s made by some critical security theorist on the margins of 'problem-solving' debate?**

(a) They suggested that the development and poverty-reduction agenda is already one that has been subordinated to Western security concerns.
(b) They suggested that the shift from macro-development approaches to 'good governance', 'pro-poor' policy-making, sustainability and poverty reduction already contains within it and the desire to contain these regions of potential instability and signifies the securitization and subordination of the development agenda.
(c) They suggested that the development and poverty-reduction agenda is already one that has been subordinated to Eastern security concerns.
(d) They have not suggested anything.

(i)   Only A
(ii)   Both A and B
(iii)   C only
(iv)   D only

10. **The author in the above passage used a word coherent while talking about the policy document. What does the word coherent here signify in the passage?**

(a) Marked by an orderly, logical, and aesthetically consistent relation of parts
(b) Capable of thinking and expressing yourself in a clear and consistent manner
(c) (physics) of waves having a constant phase relation
(d) Sticking together

Passage 3

By most accounts, deforestation in tropical rainforests adds more carbon dioxide to the atmosphere than the sum total of cars and trucks on the world's roads. According to the World Carefree Network (WCN), cars and trucks account for about 14 percent of global carbon emissions, while most analysts attribute upwards of 15 percent to deforestation.

The reason that logging is so bad for the climate is that when trees are felled they release

the carbon they are storing into the atmosphere, where it mingles with greenhouse gases from other sources and contributes to global warming accordingly. The upshot is that we should be doing as much to prevent deforestation as we are to increase fuel efficiency and reduce automobile usage.

According to the Environmental Defense Fund (EDF), a leading green group, 32 million acres of tropical rainforest were cut down each year between 2000 and 2009—and the pace of deforestation is only increasing.

Any realistic plan to reduce global warming pollution sufficiently—and in time—to avoid dangerous consequences must rely in part on preserving tropical forests," reports EDF. But it's hard to convince the poor residents of the Amazon basin and other tropical regions of the world to stop cutting down trees when the forests are still worth more dead than alive. "Conservation costs money, while profits from timber, charcoal, pasture and cropland drive people to cut down forests," adds EDF. **Exacerbating** global warming isn't the only negative impact of tropical deforestation. It also wipes out biodiversity: More than half of the world's plant and animal species live in tropical rainforests.

One way some tropical countries are reducing deforestation is through participation in the United Nations' Reducing Emissions from Deforestation and Forest Degradation (REDD) program.

Brazil is among the countries embracing REDD among other efforts to reduce carbon emissions. Thanks to the program, Brazil has slowed deforestation within its borders by 40 percent since 2008 and is on track to achieve an 80 percent reduction by 2020. Environmentalists are optimistic that the initial success of REDD in Brazil bodes well for reducing deforestation in other parts of the tropics as well.

11. **The author in the above passage used a word exacerbating while referring to the global warming. What is the meaning of the word in context to line with which it is used?**
    (a) Making worse
    (b) Make very annoyed or frustrated
    (c) to increase something's bitterness or harshness
    (d) to comfort or to soothe

12. **What was the effort adopted by country of Brazil to slow down deforestation and to reduce Carbon Emissions?**

    (a) It started cutting down of Tropical rain forest.
    (b) Developed Environmental Defense Fund (EDF) to control deforestation.
    (c) It embraced Reducing Emissions from Deforestation and Forest Degradation (REDD) program.
    (d) Reduce automobile usage.

13. **Which of the following statement/s doesn't stand true as per the passage given above?**

    (a) Brazil has slowed deforestation within its borders by 40 percent since 2008 and is on

track to achieve a 70 percent reduction by 2020.

(b) **Exacerbating** global warming wipes out biodiversity: More than half of the world's plant and animal species live in tropical rainforests.

(c) Environmentalists are pessimistic about the initial success of REDD in Brazil bodes well for reducing deforestation in other parts of the tropics as well.

(d) As per (WCN), cars and trucks account for about 14 percent of global carbon emissions, while most analysts attribute upwards of 15 percent to deforestation.

(i)   Only A
(ii)   Both A and C
(iii)   B only
(iv)   C and D

14. What is the reason behind increase in pace of deforestation as concluded by Environmental Defense Fund (EDF)?

(a) Broadening of forest-centric focus to river catchment-based conservation framework
(b) Increased mechanization and the spread of cash crops
(c) Unsustainable use of natural resources.
(d) Cutting down of 32 million acres of tropical rainforest each year between 2000 and 2009

15. What should be an apt title for the passage?

(a) Deforestation and its effect on a Global Warming
(b) Desertization of the world
(c) The plight of Earth
(d) Degradation of Environment.

Passage 4

The world of Anglo-India vanished on August 15th 1947, when a new nation was born. As India threw off the shackles of three centuries of colonial rule and its people strode proud and free into the future, the British packed their bags, their polo sticks, their regimental jackets, and their memories—and went home to "**Blighty".**

Not everyone, however, was glad to see them go. Among those left behind were over 300,000 people of mixed European and Indian descent, who traced their English, French, Dutch or Portuguese ancestry from the paternal line going back to the 17th and 18th centuries. Of all the European traders (and colonists as time went on), the British gained dominance in the guise of the East India Company. At that time, few women were up to making the arduous sea voyage (and the cultural transition) from the soft green countryside of England to the searing plains of "Hindoostan". Consequently the officers, ensigns and clerks of the Company were encouraged to marry local Indian women and their children carried no stigma of mixed blood in those far-off days.

Later, however, with the construction of the Suez Canal in the 19th century, the travel time between the two countries was greatly reduced and women no longer hesitated to sally forth from England to join husbands or seek marriage prospects among British army and the

civil service officers. They brought with them all the class snobbery and insularity of the Victorian era, and offspring of mixed descent came to be regarded with disdain.

The Anglo-Indians were more "Anglo" than "Indian". Their mother-tongue was English, and so was their religious upbringing, as were their customs and traditions. While most of them married within their own Anglo-Indian circle, there were many who continued to marry expatriate Englishmen. Very few, if any, married Indians. The same rigid social barriers that the British erected between themselves and the Anglo-Indians also existed to isolate the Anglo-Indians from the vast majority of Indians.

16. **Which of the following statement/s about Anglo Indians is/are not true as per the passage given above?**

    (a) The world of Anglo-India vanished on August 15th 1947, when a new nation was born.
    (b) The Anglo-Indians, were more "Indian" than "Anglo".
    (c) The mother-tongue of Anglo Indian was Hindi, and so was their religious upbringing, as were their customs and traditions.
    (d) Most of the Anglo Indians married within their own Anglo-Indian circle, there were many who continued to marry expatriate Englishmen.

    (i)   Only A
    (ii)   Both A and B
    (iii)   Both B and C
    (iv)   Only D

17. **The Author in the above passage used a word Blighty while referring to the British. What is the meaning of the word Blighty in context of the passage?**

    (a) It is a slang term for Britain
    (b) British Empire
    (c) A slang term used for United States of America(**USA**)
    (d) British Troops serving abroad.

    (i)   Only A
    (ii)   Both A and B
    (iii)   Only C
    (iv)   D only

18. **What did women bring along them when they sally forth from England to join husbands or seek marriage prospects among British army and the civil service officers?**

    (a) Lots of wealth and treasure
    (b) Class snobbery and insularity of the Victorian era
    (c) Several Reforms Policies
    (d) Troops of British soldiers

19. **What led to the isolation of the Anglo-Indians from the vast majority of Indians?**
    (a) Ethnic Barriers between the British and the Anglo Indians.

(b) Social barriers that the British erected between themselves and the Anglo-Indians

(c) Internal Tariff Barriers that aroused during Industrial Revolution.

(d) Legal Barriers due interracial marriage

20. What brought down the travel time between England and India in 19th century?

(a) Construction of railways

(b) Newly constructed sea ports

(c) Development of Air Transport

(d) Construction of the Suez Canal

EXERCISE –D

Passage 1

By the 19th century, the British separated themselves from the colored people but accepted fairer (and often wealthier) people of dual heritage as 'Anglo-Indian'. Darker (and usually poorer) people were given the name 'Eurasian'. Anglo-Indians were of British descent and British subjects; others claimed to be British to escape prejudice. The British did not however accept such identification. They did not see Anglo-Indians as kinsmen, socially viewing them as "half-caste" members who were morally and intellectually inferior to the sons and daughters of Britain.

The Anglo-Indians tried to counter this by trying to be more like the British; hence their campaign to be called 'Anglo-Indians' rather than 'Eurasians'. 'Anglo-Indian' would mean a closer link with the Raj while 'Eurasian' was too general.

One of the contributing factors to the growth of community identification was that marriage outside the community had become rare by 1919. It was no longer acceptable for the British to marry an Indian or Anglo-Indian. By the end of the 19th century it was taboo for all but the British men of low status to associate with Anglo-Indians or Indians.

Skin colour was another factor preventing the Anglo-Indians from being accepted by the British due to a concern with maintaining "purity of race". Which also meant a white Britisher with real English looks? If they are white with blue eyes and fair hair, they find it easier to blend in with the others but if they are dark like the Indians they find it harder to be accepted as anyone but an Indian. Amongst the Anglo-Indians themselves there is this colour prejudice. The fairer ones consider themselves superior and the real Anglo-Indians. In India the higher castes are usually the lighter skin ones whereas the darker Indians are supposedly the lower castes. According to them it was the lower castes that were converted in numbers by the missionaries during the British Raj. The Indians therefore, consider the Indian Christians as well as the darker Anglo-Indians as belonging to the lower castes.

Hence, the Anglo-Indians adopted many of the **prejudices** of the British, resulting in the rejection of the Anglo-Indians by both British and Indian communities, and they found they were caught between the European attitude of superiority towards Indian and Anglo-Indian and the Indian mistrust of them due to their **aloofness** and Western-oriented culture.

1. **According to the passage, what was the name given to darker and poorer people of Indian origin?**

   (a) Dhivehis
   (b) Dhodia
   (c) Indo-Aryan
   (d) Eurasian

2. **Why according to the author Anglo Indians were socially viewed by British as half caste members?**

   (a) Because they were morally and intellectually superior to the sons and daughters of Britain.
   (b) They were morally and intellectually inferior to the sons and daughters of Britain.
   (c) They do not stand as par with the sons and daughter of the British people.
   (d) They are literally immoral.

3. **The author in the above passage used a word** *Prejudices***, while referring to the Anglo-Indians. What does the word** *prejudices* **here signify in the passage?**

   (a) A partiality that prevents objective consideration of an issue or situation
   (b) An adverse judgment or opinion formed beforehand without good justification
   (c) Influence (somebody's) opinion in advance
   (d) Irrational suspicion or hatred of a particular group, race, or religion.

4. **Read the following statements:**
   (1) One of the contributing factors to the growth of community identification was that marriage outside the community was performed at large by 1919
   (2) One of the contributing factors to the growth of community identification was that marriage outside the community had become rare by 1919
   (3) The Anglo-Indians adopted many of the **prejudices** of the British, resulting in the rejection of the Anglo-Indians by both British and Indian communities
   (4) The Anglo-Indians adopted many of the **prejudices** of the British, resulting in accepting of the Anglo-Indians by both British and Indian communities

   Which of the following Statement given above is/are correct?

   (a) Only 1
   (b) Both 2 and 3
   (c) Both 1 and 4
   (d) Only 4

5. **Which of the following is opposite in meaning to the word aloofness?**

   (a) Emotionlessness
   (b) Withdrawnness
   (c) Remoteness
   (d) Attachment

Passage 2

The picture that conjures up in our minds, when we talk about slums, is that of a dirty, unhygienic cluster of impoverished shanties with long lines of people crowding around a solitary municipal water tap, bowling babies literally left on street corners to fend for themselves and endless cries and found voices emanating from various corners. Most of them are engaged in eking out their daily lives, always below the poverty line, by working as construction labourers, domestic helps, rag pickers and chhotus in neighbourhood dhabas. Though their living conditions are utterly unhygienic, gloomy, dismal and dehumanized, many of them still dream of improving the quality of their lives.

The majority of slum dwellers identify themselves with the city rather than with their native place and plan to settle permanently in the city. In spite of poor conditions in slums, second generation residents who are not nostalgic about their rural background - feel that life in slum is reasonably tolerable and city life is probably better than rural life.

They greatly value improving their working situation through getting a better job, yet have low aspirations and have an optimistic view of their chances of improving their socio-economic   status.
Our slums are indeed very dingy, dark and dismal. But the dark clouds are now fading. Despite the inaction of civic authorities, and despite the efforts of politicians and slum mafia to keep slum dwellers to remain docile, there are definite signs of younger slum dwellers to improve the quality of their lives. **Silver linings** are now becoming visible.

Plentiful of these was available in rural areas. They were encouraged to come to cities and work. People, who migrated to the cities and found work, brought their cousins and rest of the families to the cities. Unable to find housing and afford it, they decided to build their shelter closer to work. Thousands of shelters were built for the migrating labourers. **Conniving** governments provided electricity and drinking water. Politicians looked at the slums as vote bank. They organized these unauthorized dwellers into a political force; hence slums took a bit of a permanent shape. More slums developed as more population moved to the cities. By mid sixties Mumbai, Kolkata, Delhi, and all other large cities were dotted with   slums.

Recent years have seen a dramatic growth in the number of slums as urban populations have increased in the Third World. In a quarter of Commonwealth countries (11 African, 2 Asian and 1 Pacific), more than two out of three urban dwellers live in slums, and many of these countries are urbanizing rapidly.

6. **What perception about slums is carried by second generation residents, in spite of its poor condition?**

    (a) Second generation residents feel that life in slum is reasonably intolerable and rural life is probably better than city life.
    (b) They feel that life in slum is reasonably tolerable and city life is probably better than rural life.
    (c) Second generation residents believe in the fact that living a rural life is worse than the reasonably intolerable slum life of the city.

(d) They don't find any difference between the rural and urban life.

7. **The author in one of his line in the passage concludes that** *silver lining is now becoming visible*. **What are the instances that led him to that conclusion?**

   (a) There are signs of younger slum dwellers improving the quality of their lives.
   (b) Thousands of shelters were built for the migrating labourers.
   (c) Conniving governments provided electricity and drinking water.
   (d) More slums developed as more population moved to the cities.

   (i)   Only A
   (ii)   Both A and B
   (iii)   All of the above
   (iv)   D only

8. **The author used a word** *conniving* **in the above passage while referring it with the government. What is the meaning of the word** *conniving* **in context of the passage?**

   (a) Acting together in secret toward a fraudulent or illegal end
   (b) Serving one's own interests in an unemotional, analytical manner
   (c) Encourage or assent to illegally or criminally
   (d) Plot something harmful; scheme in an underhand manner.

9. **The phrase** *dramatic growth* **as used in last paragraph of the passage can be rephrased as:**

   (a) sudden and surprising or easy to notice
   (b) unexciting and unimpressive growth
   (c) feasible growth
   (d) Diffused growth

10. **Pick out the statement/s which does not stands true with the passage given above?**
    A. The majority of slum dwellers identify themselves with the native place rather than with their city and plan to settle permanently in the city.
    B. More slums developed as more population moved to the cities. By mid sixties Mumbai, Kolkata, Delhi, and all other large cities were dotted with slums.
    C. In a half of Commonwealth countries more than two out of three urban dwellers live in slums, and many of these countries are urbanizing rapidly
    D. Politicians looked at the slums as vote bank.

    (i)   A only
    (ii)   B only
    (iii)   A and C
    (iv)   D only

Passage 3

Corruption is an abstract term. According to a World Bank report abuse of public power for private gains is described as corruption. But this appears to be too simplistic explanation of

corruption. In fact it is a multi-faceted evil, which gradually kills a system. A basic conflict between the ethos and system has weakened the Indian polity. The feudal outlook of the ruling class polluted the people's mindset, which judge the status of an individual on his capability to flout the law to favour them. This is the reason why corruption is no more viewed by people with **abhorrence** in Indian society. Many political leaders, who are facing corruption charges, continue to have wide range of people's support.

Transparency, responsiveness, accountability, probity in public life and good governance are now only slogans. The legislature has failed to make the judiciary, executive and even media sensitive to the cause of the common people. The failure of the political leadership to take a principled stand against corruption has clouded the system to the extent that it is now difficult to understand whether the system is alive or dead.

In the present context corruption is so much linked with power that our politicians have adopted a cynical attitude toward political morality. Maneuvering the anti-defection law for electoral politics with the help of both money and muscle power and other unfair means for the sake of power have affected the political morality of all the political parties and as such none of them can claim themselves to be faithful to nation in true sense.

Politicians are fully aware of the corruption and nepotism as the main reasons behind the fall of Roman Empire, the French Revolution, October Revolution in Russia, fall of Chiang Kai-Shek Government on the mainland of China and even the defeat of the mighty Congress party in India. But they are not ready to take any lesson from the pages of history.

11. According to the author, how political morality is interlinked with the corruption?

    (a) As per the author corruption leads to power and as a result of that our politicians have adopted a cynical attitude toward political morality.
    (b) Political morality and corruption were never interlinked nor it was a part of each other
    (c) Corruption and political morality goes hand in hand
    (d) Being corrupt means politically moral

12. As per the author what is the contributing factor in the weakening of Indian polity?

    (a) Conflict between ethos and system
    (b) Decreasing fundamental value
    (c) Fading of beliefs and aspirations in the political system
    (d) Diminishing of characteristic spirit of a culture, era, or community

13. The author used word *abhorrence* in context of the Indian society. What is the significance of the word with reference to its usage in the above passage?

    (a) Corruption is seen in Indian society with hate coupled with disgust
    (b) Corruption is seen with reverence in the society
    (c) Corruption is now not any more seen in Indian society with Detestation
    (d) Corruption is like evil to the Indian society.

14. Which of the following statement stands true with the above passage?

(a) The legislature is quite successful in making the judiciary, executive and even media sensitive to the cause of the common people.

(b) Corruption is not a multi-faceted evil but is abuse of public power for private gains.

(c) A basic conflict between the ethos and system is helping in strengthening of the Indian polity.

(d) The feudal system which existed earlier had changed the mindset of people who judged the status of an individual on the basis of his capability to break the laws so that it favors them.

(i)   A and C
(ii)   B Only
(iii) B and D
(iv)   D Only

15. The author in one of his line in the passage asserted that "*It is now difficult to understand whether the system is alive or dead*". What is the reason behind it which led him conclude the same?

(a) The reason is the failure of the political leadership to take a moral stand against corruption which clouded the system to an undesired level

(b) The failure of the political leadership to take a unethical stand against corruption has clouded the system to the extent

(c) The reason is the successful execution of the political leadership to take a moral stand against corruption which clouded the system to an desired level

(d) The successful execution of the political leadership to take a unjust stand against corruption which clouded the system to an un desired level

Passage 4

The hydrographic survey is used to collect information on navigable water bodies for safe navigation of vessels. For example surveying of any navigable waters such as lakes and rivers and oceans. However, it is mostly used in marine navigation. Hydrographic surveys are essential and widely used during planning, design and construction stages of offshore oil fields and structures.

Sometimes this type of surveys can be called "Hydrography" which involves hydrographical measurements of tidal, current and wave information of oceans. It measures the depth of ocean while giving more emphasis on marine geographical features that are hazardous to navigation. For example, through such surveys, the position and magnitude of rock outcrops, **shoals,** reefs and other attributes that could pose a danger to safe ship passage. In addition, hydrography surveys will capture shore characteristics including natural and manmade features that help navigation. In essence, A hydrographic survey will provide accurate information related to the location and formation of mountains, hills, rocks and even manmade structures such as lights, towers, lighthouses that will aid safe navigation.

Hydrographic survey involves collection of large amount of data which needs to be processed, For example, a typical Hydrographic survey will generate thousands of date (several soundings per square foot). The data has to be carefully screened out depending on the purpose of the final usage such as navigational charts, Digital Terrain Modeling, volume calculation, topography or Bathymetry). Many adjustments or corrections have to be made on the recorded data owing to measurement errors due to tides, waves, water levels, and water temperature variations etc. It must also be error corrected (bad soundings,) once the appropriate correction and adjustments are made to the data, final output charts can be created using specialized software including AutoCAD package.

Data gathered through hydrographic surveys are useful to navigators. The navigators make use of the data such as shore features, depth of water and the ocean bed, so that they could plan their navigation while taking into account of the hazards present in their navigational routes. These types of surveys were traditionally performed by sea vessels using echo sounding or sonar methods. Currently, aircraft, satellite technology including advanced electronic sensor technology are being widely used in hydrographic surveying.

16. What is the use or basic purpose of Hydrographic surveying?

(a) To collect information on navigable water bodies.
(b) Used during planning, design and construction stage of off shore, oil fields and structures.
(c) Used for providing accurate information related to the location and formation of mountains, hills, rocks and even manmade structures such as lights, towers, lighthouses that will aid safe navigation.
(d) It helps in capturing shore characteristics including natural and manmade features that help navigation.

(i)   Only A
(ii)   Both A and B
(iii)   Only C
(iv)   All of the above.

17. What is the other name given to the survey which involves hydrological measurement of tidal, current and wave information of oceans?

(a) Hydrography
(b) Oceanography
(c) Coastal Geography
(d) Cartography.

18. Which of the following statement/s is/are correct in context to the passage given above?

(a) Currently, aircraft, satellite technology including advanced electronic sensor technology are being widely used in hydrographic surveying.

(b) Hydrographic Survey measures the depth of ocean while giving more emphasis on marine geographical features that are hazardous to navigation.

(c) Data gathered through hydrographic surveys are of no use to navigators.

(d) Hydrographic surveys are essential but not widely used during planning, design and construction stages of offshore oil fields and structures.

(i) A and B
(ii) Both B and C
(iii) C only
(iv) Both C and D

19. How navigators make use of data gathered through hydrographic surveys?

(a) The navigators collect gathered data and process it analytically.
(b) They do not make any use of gathered data.
(c) The navigator uses data to plan their navigation while taking into account of the hazards present in their navigational routes.
(d) The data gathered were first traditionally performed by sea vessels using echo sounding or sonar methods.

20. The Author in the above passage used a word Shoals while referring to the Hydrography. What is the meaning of the word in context to the line with it is used?

(a) A sandbank in a stretch of water that is visible at low tide
(b) A stretch of shallow water
(c) A large group of fish
(d) Become shallow

EXERCISE- E

Passage 1

Human rights refer to the "basic rights and freedoms to which all humans are entitled." Examples of rights and freedoms, which have come to be commonly thought of as human rights, include civil and political rights, such as the right to life and liberty, freedom of expression, and equality before the law; and social, cultural and economic rights, including the right to participate in culture, the right to food, the right to work, and the right to education.

The democratic system begins with the election process. Free and fair election is our motto. Unfortunately, the elections are never free and fair. Those greedy and power hungry leaders having money and muscle power, first only, make all possible efforts to prevent persons of good character from filing his/her nomination. These leaders make use of their ill-gotten money to 'buy' the aspiring candidates. If they are not cowed down by the weight of their money, then they are threatened of dire consequences. Why should a person risk his life by contesting the election? He decides not to contest the elections. A fundamental right of the

citizen of this country to contest an election has been snatched off by the brutal actions of the power hungry politicians. Mind you this has happened, and it is a part and parcel of the election process.

Are the citizens 'free' when they cast their vote to elect their representative, be it at the Panchayat, Municipality, State Assembly or at the Parliament level? No! Once again the misuse of money power, threat of muscle power and the greed on the part of the voter for temporary self-benefits, prevents him from casting his vote to a person of his/her choice. He has to succumb to the pressure of the 'mighty' political bosses who are all out to do anything in order to ensure their victory in the election. Here too, we **trample** upon the freedom of the citizen to vote freely and fearlessly.

1. **The writer speaks of** *basic rights* **in his mind. Which of the following statement is true with reference to the basic rights?**

(a) The basic rights are the right, to which all humans are entitled, often held to include the right to life and liberty, freedom of thought and expression, and equality before the law.
(b) Basic rights also include the right to participate in culture, the right to food, the right to work, and the right to education.
(c) They are rights that rules out the right of freedom of expression, and equality before the law; and social, cultural and economic rights
(d) Basic rights as per the author are the rights exercised by every Indian to raise voice against government.

    (i)   Only A
    (ii)   Both A and B
    (iii)   C Only
    (iv)   D only

2. **The democratic system begins with the election process. Free and fair election is our motto. With reference to the line and above passage, tell if we have fair election in our country.**

    (a) Yes, we do have a very transparent election system in our country.
    (b) No, the elections are never free and fair.
    (c) Fair with some loopholes
    (d) A very disappointing election system.

3. **The Author used a word trample in the above passage .What is the meaning of the word in context to the line used above?**

    (a) Walk heavily or roughly
    (b) Injure by trampling or as if by trampling
    (c) Walk on and flatten
    (d) The sound of heavy treading or stomping

4. **Pick out the Statement which is not correct as per the passage given above?**

   (a) The political leaders of our country make use of their ill-gotten money to 'buy' the aspiring candidates for election.
   (b) A fundamental right of the citizen of this country to contest an election has been snatched off by the brutal actions of the power hungry politicians.
   (c) A fundamental right of the citizen of this country to contest an election has been empowered by the actions of the power hungry politicians.
   (d) A voter has to succumb to the pressure of the 'mighty' political bosses who are all out to do anything in order to ensure their victory in the election.

   (i)   A and B
   (ii)   B Only
   (iii)   C only
   (iv)   A and D

5. **As per the passage given above which of the following doesn't restrict the citizens from casting their vote freely?**

   (a) succumbing to pressure of political bosses
   (b) temporary self benefits
   (c) threat of muscle power
   (d) Self Belief

Passage 2

There are very few people who understand the true importance of protecting the tiger. Most people feel it is only a matter of saving an animal that makes a beautiful sight to see. This reason only makes up a fraction of why we need to save this incredible animal. The tiger is at the top of the food chain in the jungles that it roams.

The following is a very basic description of the chaos that would ensue if the tiger became extinct. If this was to happen, the populations of prey species like spotted deer and Sambhar would burst at the seams. This excessive population would then totally **ravage** it's food source - vegetation. If the vegetation in the jungles was devastated, where and how would the insects survive? They may even shift to the crops in farmlands. If the plants in the jungles would be finished, what would refurbish the soil. If the soil was no longer fertile, new plants would not sprout. Over the years, this would probably mean the end of the jungles.
The end of jungles also means the end of the biggest suppliers of the oxygen filled air, which we take so much for granted. This is a very simple layman description of what the result of tiger extinction could mean to our own survival. The truly scientific description is even more alarming and drastic.

It isn't necessary for every one of us to take world-awakening steps. All we have to really do is influence those that are a part of our own lives. Obviously, anyone wanting to do more than that is another breath of fresh air for a dying tiger. There are many NGOs and other

organisations that are totally dedicated to protecting the tiger. We will try and, as soon as possible, give you a list on this site of such organisations, which you can contact and lend a hand in tiger conservation.

It is important to realise at the outset, if you are intending to help in this line that protecting the tiger does not necessarily mean working in operations dealing directly with the tiger. It could easily mean working on assignments dealing completely with villages in Park buffer zones, other animal species, welfare of staff working in reserves, villagers, issues dealing with cattle grazing, etc. The one thing that is common with all these assignments is that they are all directly or indirectly aimed at protecting the jungle and it's inhabitants, which obviously includes the tiger.

The main thing that requires a mention here is that if you care for the tiger and want to do something about it - the time is NOW. Act - before it's too late.

6. **What in the opinion of the author, the end of jungles means?**

    (a) End of the principal suppliers of the oxygen filled air
    (b) the end of wildlife
    (c) the end of human era on earth
    (d) Extinction of wildlife and loss of Natural Habitat.

7. **The author used a word a ravage while referring to the excessive population. What does the word here signify in the passage?**

    (a) Make a pillaging or destructive raid on (a place), as in wartimes
    (b) Cause extensive destruction or ruin utterly
    (c) Crushed by grief
    (d) An act of plundering and pillaging and marauding

8. **Which of the following statement/s does not stands true with reference to the above passage?**

    (a) The end of jungles can also be considered as the end of the biggest suppliers of the oxygen filled air
    (b) Most people feel it is only a matter of saving an animal that makes a beautiful sight to see.
    (c) There are not many NGOs and other organisations that are totally dedicated to protecting the tiger.
    (d) The one thing that is common with all these assignments is that they are all directly or indirectly aimed at protecting the jungle and it's inhabitants, which obviously includes the tiger.

    (i)   Only A
    (ii) Both A and B
    (iii) Only C
    (iv) Both C and D

9. **Which of the following may be inferred from the passage?**

    (a) If the soil was infertile, new plants would not sprout. Over the years, this would probably mean the end of the jungles.
    (b) If the soil was no longer fertile, new plants would sprout very rapidly. Over the years, this would probably mean the revival of Jungle Era.
    (c) If the soil was no longer fertile, new plants would die. Over the years, this would probably mean the revival of Jungle Era.
    (d) If the soil was no longer fertile, new plants would die instantaneously. Over the years, this would probably mean the end of Jungle Era.

10. **Suggest an apt title for the passage?**

    (a) Tiger Conservation: An noticed phenomenon
    (b) Protect your tiger before it is too late.
    (c) Tiger conservation: An issue unvoiced
    (d) The End of Tiger Era.

Passage 3

Karl Marx (1818-1883) is regarded as the Father of Communism. He did not separately propose any theory of population, but his surplus population theory has been deduced from his theory of communism. Marx opposed and criticized the Malthusian theory of population.

According to Marx, population increase must be interpreted in the context of the capitalistic economic system. A capitalist gives to labor as wage a small share of labor's productivity, and the capitalist himself takes the **lion's share**. The capitalist introduces more and more machinery and thus increases the surplus value of labor's productivity, which is pocketed by the capitalist. The surplus is the difference between labor's productivity and the wage level. A worker is paid less than the value of his productivity. When machinery is introduced, unemployment increases and, consequently, a reserve army of labor is created. Under these situations, the wage level goes down further, the poor parents cannot properly rear their children and a large part of the population becomes virtually surplus. Poverty, hunger and other social ills are the result of socially unjust practices associated with capitalism.

Population growth, according to Marx, is therefore not related to the alleged ignorance or moral inferiority of the poor, but is a consequence of the capitalist economic system. Marx points out that landlordism, unfavorable and high man-land ratio, uncertainty regarding land tenure system and the like are responsible for low food production in a country. Only in places where the production of food is not adequate does population growth become a problem.

11. **What According to Marx, must be interpreted in the context of the capitalistic economic system?**

(a) Increase in Population

(b) Decrease in Demographic Ratio
(c) Population Dynamics
(d) Net Migration

12. Which of the following statement/s is/are supported by the passage?

(a) The capitalist introduces less machinery which in result increases the surplus value of labor's productivity, directly pocketed by the capitalist.
(b) Poverty, hunger and other social ills are the result of socially unjust practices associated with communism.
(c) As per Karl Marx population growth is related to the alleged ignorance or moral inferiority of the poor, but is a consequence of the capitalist economic system.
(d) A capitalist gives to labor as wage a small share of labor's productivity, and the capitalist himself takes the lion's share.

13. As per Karl Marx which of the following is not counted among the reasons responsible for low food production in a country?

(a) Landlordism
(b) unfavorable and high man-land ratio
(c) uncertainty regarding land tenure system
(d) Less Feudal Reforms

14. As per the passage, the population growth become a problem only in places where_____

(a) the production of food is not adequate
(b) the production of food is in surplus
(c) there is no food production at all
(d) the production of food varies with season

15. The author used a word, *lion's share* in context of labor's productivity? What does the word signify here in the passage?

(a) the biggest or greatest part
(b) the only part
(c) the smallest part
(d) the easiest part

Passage 4

Today, around 3.5 billion people will sit down to a meal of something and rice. The "something" will depend on whether it's Jamaica, Shanghai or Kerala, but rice is one of the world's constants. It is a staple food for nearly half the globe and provides a fifth of all the calories humanity consumes. It is hard to overstate its importance. And that importance is growing: the world's population, which swept past seven billion last year, is projected to

reach nine billion by 2050. How are we going to feed all those new mouths?

People have been predicting that the global population will outrace our ability to feed it for 200 years. In the 1960s and 1970s, gloomy bestsellers like Paul Ehrlich's The Population Bomb foretold billions of deaths from starvation, and the collapse of civilization: "the battle to feed humanity is over", Ehrlich said.

But the Green Revolution, led by Norman Borlaug, won the battle that Ehrlich said was lost. Using techniques borrowed from Gregor Mendel, the father of genetics, he bred a new form of wheat. Its shorter stems broke less easily and wasted less energy in growth; it was disease-resistant and yielded more food. Suddenly, the amount of food available from a hectare of land rocketed. Borlaug's innovation is credited with saving a billion lives – and the nation of India. No wonder he won a Nobel Peace Prize for his work.

But now, half a century later, we need more. Bill Gates, in his foundation's annual newsletter, is warning that the crop yields are no longer keeping pace with population growth, and that we need to "prioritise agricultural innovation" if we are to avoid Ehrlich's predictions. Prof Sophien Kamoun of the Sainsbury Laboratory, a leading plant science research centre near Norwich, agrees: "Right now there are one billion people hungry around the world. In the last 11 years we added a billion people to the planet – that's the equivalent of China. And we're going to add two Chinas in the next 40 years. We need a new Green Revolution."

His team is one of a number worldwide who are working on precisely that. The Sainsbury Laboratory is a key collaborator on MutMap – a new technique for improving and accelerating the process of breeding which, researchers hope, will build on the Green Revolution. It uses genome sequencing and analysis to show which genes in rice have important effects – stem height, seed size and so on. It's not conventional transgenic modification, adding a new gene to the plant from another source. It relies on ordinary mutations and selective breeding, the methods used for generations, but with the added power of gene sequencing.

"I'm not saying that MutMap is going to lead to the second Green Revolution," says Prof Kamoun. "But there is a lot going on now in genomics-enabled breeding, of which MutMap is a part. And all these technologies together, as well as transgenic genetic modification, will lead to a new revolution."

The technique has already reaped results. In a paper published in Nature Biotechnology, the Sainsbury team and Japanese colleagues describe a new strain of semi-dwarf rice, similar to Borlaug's wheat. Yet even as their research was on going on, a catastrophic earthquake and tsunami hit Japan, swamping and "salt-spoiling" 20,000 hectares of arable land. "Our Japanese collaborators started screening for salt-tolerant mutants," says Prof Kamoun, "and they already have resistance – it's really promising."

It's not just the growing population that these new technologies can help with. All natural varieties of rice have been bred over hundreds of years in relatively stable climates. If, as expected, the climate starts to change rapidly, those local varieties will become less well adapted, and yields will drop. But MutMap and other genomic breeding techniques may be

able to help mitigate that. "There are all kinds of traits that can be looked at: temperature tolerance, drought tolerance. If the climate does change, the rice can be tweaked to adapt to it," says Prof Karmoun.

The advantage of rice – and the reason that the researchers have chosen it – is that it has a relatively small genome. Other crops, like maize, have larger, more complex genomes, meaning that it is hard to sequence them and find the right genes to tinker with. But the speed of progress is startling. The cost of analysing a stretch of DNA is dropping precipitously, in a way analogous to "Moore's Law" of computing, which says that the cost of a given amount of processor power halves every 18 months. In a few years' time, MutMap and its equivalents could mean that the Green Revolution becomes a permanent one.

16. **How the Green Revolution, led by Norman Borlaug, won the battle that Ehrlich said was lost?**
    (a) Norman Borlaug developed a new form of wheat which yielded more food but he did not used techniques of inheritance of traits of Gregor Mendel
    (b) Norman Borlaug did not developed any new form of wheat he just used technological innovation and scientific crop management of the Earlier developed techniques.
    (c) By developing a new form of wheat which yielded more food Using techniques borrowed from Gregor Mendel
    (d) By developing a new form of wheat using Mendel's techniques which yielded somehow less food as comparing it with past production.

17. **What according to Paul Ehrlich's** *The Population Bomb* **would lead to an end of humanity?**

    (a) Mass starvation of humans in the 1960s and 1970s due to overpopulation
    (b) Malnourishment of the human population due to deficiency of staple diet
    (c) Iron deficiency anemia in the1960s and 1970s due to undernourished food
    (d) Protein energy malnutrition due to less content of protein in the crop cultivated in 1960s and 1970s

18. **What is the reason specified by the researchers behind choosing rice for different genomic breeding techniques**?

    (a) It has a relatively small genome as comparing it with other crops like that of maize.
    (b) It is hard to sequence them and find the right genes to tinker with.
    (c) It has a relatively large genome as comparing it with other crops like that of maize.
    (d) It is a very common crop which is easily available anywhere.

19. **Which of the following statement/s did not stands true with the passage given above?**

    (a) The shorter stems of wheat broke less easily and it wastes less energy in growth; it is disease-resistant and yielded more food.
    (b) The shorter stems of wheat broke very easily and it uses enormous energy in growth; it is disease-resistant and yielded more food.
    (c) The cost of analysing a stretch of DNA is rising precipitously, in a way analogous to

Moore's Law of computing
(d) The cost of analysing a stretch of DNA is falling precipitously, in a way parallel to Moore's Law" of computing

(i)   A and D
(ii)   B and C
(iii)   B Only
(iv)   C only

20. The author in the above passage used a Technical jargon MutMap. Which of the following statement is correct with reference to the MutMap?

(a) A method based on whole-genome re sequencing of pooled DNA from a segregating population of plants that show a useful phenotype.
(b) MutMap is a new technique for improving and accelerating the process of breeding.
(c) MutMap techniques uses genome sequencing and analysis to show which genes in rice have important effects – stem height, seed size and so on.
(d) MutMap techniques rely on ordinary mutations and selective breeding, the methods used for generations, but with the added power of gene sequencing.

(i)   Only A
(ii)   only B
(iii)   All of the above
(iv)   A and B

ANSWERS

Exercise - 1		Exercise - 2		Exercise-3		Exercise-4		Exercise-5	
1	**d**	1	**b**	1	**d**	1	**d**	1	**b**
2	**c**	2	**d**	2	**b**	2	**b**	2	**b**
3	**b**	3	**d**	3	**c**	3	**d**	3	**c**
4	**a**	4	**c**	4	**c**	4	**b**	4	**c**
5	**a**	5	**d**	5	**a**	5	**d**	5	**d**
6	**c**	6	**b**	6	**a**	6	**b**	6	**a**
7	**c**	7	**c**	7	**d**	7	**d**	7	**b**
8	**a**	8	**b**	8	**a**	8	**c**	8	**c**
9	**a**	9	**c**	9	**b**	9	**a**	9	**a**
10	**a**	10	**c**	10	**a**	10	**c**	10	**c**
11	**d**	11	**d**	11	**a**	11	**a**	11	**a**
12	**d**	12	**d**	12	**c**	12	**a**	12	**d**
13	**b**	13	**c**	13	**b**	13	**c**	13	**d**
14	**d**	14	**c**	14	**d**	14	**d**	14	**a**
15	**b**	15	**b**	15	**a**	15	**a**	15	**a**
16	**a**	16	**d**	16	**c**	16	**d**	16	**c**
17	**d**	17	**b**	17	**b**	17	**a**	17	**a**
18	**d**	18	**b**	18	**b**	18	**d**	18	**a**
19	**c**	19	**a**	19	**b**	19		19	**b**
20	**d**	20	**a**	20	**d**	20	**a**	20	**c**

PART –II: ENGLISH COMPREHENSION

EXERCISE-A

Passage 1

Deforestation is the conversion of forested areas to non-forest land use such as arable land, urban use, logged area or wasteland.

Historically, this meant conversion to grassland or to its artificial counterpart, grainfields; however, the Industrial Revolution added urbanization. Generally this removal or destruction of significant areas of forest cover has resulted in a degraded environment with reduced biodiversity.

There are many causes, ranging from slow forest degradation to sudden and **catastrophic** wildfires. Deforestation alters the hydrologic cycle, altering the amount of water in the soil and groundwater and the moisture in the atmosphere. Forests support considerable biodiversity, providing valuable habitat for wildlife; moreover, forests foster medicinal conservation and the recharge of aquifers.

1. **With reference to the passage, consider the following statements:**

    (a) Deforestation is the conversion of barren areas to non-forest land use such as agricultural land, urban use, logged area or wasteland.
    (b) Deforestation is the conversion of forested areas to non-forest land use such as arable land, urban use, logged area or wasteland.

    Which of the statement given above is/are correct?

    (a) Only A
    (b) Only B
    (c) Both A and B
    (d) Neither A nor B

2. **The word** *catastrophic* **is closet in meaning to which of the following words?**

    (a) Tragic
    (b) Disastrous
    (c) Demolished
    (d) Ruined

3. **Which of the following is not counted among harm or destruction caused by deforestation?**

    (a) Alteration in the hydrologic cycle
    (b) Alteration in the moisture of atmosphere
    (c) Degraded Environment
    (d) Increase in medicinal conservation

4. **As per the passage what was the result of industrial revolution?**

    (a) It resulted into Urbanization
    (b) It led to rural Development
    (c) It resulted into Mass Unemployment
    (d) It resulted into Deurbanization

Passage 2

Civil society organizations — also known as non-governmental organizations (NGOs) — are critical factors in the advancement of universal values around human rights, the environment, labour standards and anti-corruption. As global market integration has advanced, their role has gained particular importance in **aligning** economic activities with social and environmental priorities.

Civil society organizations have been an integral part of the Global Compact since its creation. Their perspectives, expertise and partnership-building capabilities are indispensable in the evolution and impact of the Global Compact.

Civil society organizations (CSOs) are now more vocal than in the past. They are experts in economic issues and their influence expands to parliaments and governments. Whether national, regional, or international, the way CSOs do business has been profoundly affected by globalization.

5. **What is the other name given to the civil society organization?**

    (a) Non-Profit l organizations(NPOs)
    (b) Advanced Community Organization
    (c) Cross Cultural Organization
    (d) Non-governmental organizations (NGOs)

6. **Which of the following is not counted among indispensable factors in the evolution and impact of the Global Compact of Civil society Organization?**

    (a) Perspectives
    (b) Expertise
    (c) partnership-building capabilities
    (d) Discrete Judgment

7. **Consider the following statement**

    (a) Civil society organizations (CSOs) are now not any more vocal as comparing it with the past.
    (b) Civil society organizations (CSOs) are now more vocal than in the past.
    (c) The issue raised by civil society organizations (CSOs) left unheard and unvoiced.
    (d) The issue raised by civil society organizations is highly noticed.

Which of the following statement/s stands true as per the passage?

    (i)   Only A
    (ii) Both A and B
    (iii) Only B
    (iv) C and D

8. **The author in the above passage used a word aligning with reference to economic activities. Select a word opposite to the meaning of it?**

   (a) Adjusting
   (b) Coordinating
   (c) Reorienting
   (d) Positioning

Passage 3

Weather describes the condition of the atmosphere over a short period of time e.g. from day to day or week to week, while climate describes average conditions over a longer period of time. Step outside and you experience many facets of weather. Humidity, air temperature and pressure, wind speed and direction, cloud cover and type, and the amount and form of precipitation are all atmospheric characteristics of the momentary conditions we call weather.

The sun is ultimately responsible for the weather. Its rays are absorbed differently by land and water surfaces .Differential warming, in turn, causes variations in the temperature and pressure of overlying air masses.

9. **With reference to the passage, Consider the following statement:**

   A. Weather describes the condition of the atmosphere over a longer period of time
   B. Climate describes average conditions over a shorter period of time

   Which of the statement given above is/are correct?

   (a) Only A
   (b) Only B
   (c) Both A and B
   (d) Neither A nor B

10. **The word** *momentary* **is closet in meaning to which of the following words?**

    (a) Temporary
    (b) Long Lasting
    (c) Persistent
    (d) Relentless

11. **What is the effect of differential warming on temperature and pressure?**

    (a) It causes uniformity in the temperature and pressure of overlying air masses.
    (b) It causes variations in the temperature and pressure of overlying air masses.
    (c) It does not have any effect on temperature and pressure.
    (d) It maintains constant temperature and pressure.

12. **As per the passage what is ultimately responsible for the Weather?**

    (a) Climate Change

(b) Evaporation From earth surface

(c) Sun

(d) Plants

Passage 4

The India economy, the third largest economy in the world in terms of purchasing power, is going to touch new heights in coming years. As predicted by Goldman Sachs, the Global Investment Bank, by 2035 India would be the third largest economy of the world just after US and China. It will grow to 60% of size of the US economy. This **booming** economy of today has to pass through many phases before it can achieve the current milestone of 9% GDP. The history of Indian economy can be broadly divided into three phases: Pre- Colonial, Colonial and Post Colonial.

13. **Which of following cannot be counted among the phases in which India economy is broadly divided?**

    (a) Pre- Colonial
    (b) Post Colonial
    (c) Colonial
    (d) Medieval

14. **Indian Economy stands third in the world in terms of ------?**

    (a) Purchasing power
    (b) Purchasing power parity
    (c) Inflation
    (d) Cash reserve ratio

15. **Name the global investment Bank which has predicted that Indian Economy will grow to 60% of size of the US economy by 2035?**

    (a) Morgan Stanley
    (b) JP Morgan Chase
    (c) Goldman Sachs
    (d) UBS

16. **The author in above passage used a word booming while referring to the economical growth. Select a word opposite in meaning of the word**

    (a) Flourishing
    (b) Smashing
    (c) Expanding
    (d) Failing

Passage 5

The existence of street children is most often viewed as a significant problem, stripping youth of their humanity and burdening them with the everyday concern of survival. It is easy to analyze this complicated issue objectively, yet the actual experiences of the children

are just as easily lost. It is therefore necessary to approach the subject with the inclusion of contextual information regarding the problem. Statistical evidence provides only a narrow view of the problem. Poverty, the work force, substance abuse, and general homelessness in Brazil are just a few of the many influences that affect the lives of street children. In addressing these effects, this passage questions how the topic of street children is an outgrowth of its surroundings.

17. Consider the following Statements:

A. The existence of street children is most often viewed as a trivial problem.
B. Stripping youth of their humanity and burdening them with the everyday concern of survival.

Which of the following statement is true as per the above given passage?

(a) Only A
(b) Both A and B
(c) Only B
(d) Neither A nor B

18. The author in the above passage used a word contextual while referring to the problem of street Children. Select a word which is opposite to the meaning of contextual.

A. Appropriate
B. Background
C. Related
D. Irrelative

19. Pick out the wrong statement/s as per the above given passage.

(a) It is easy to analyze the complicated issue of street children objectively, yet the actual experiences of the children are just as easily lost.
(b) It is necessary to approach the subject with the inclusion of contextual information regarding the problem.
(c) Statistical evidence provides only a broad view of the problem of Street Children
(d) Poverty, the work force, substance abuse, and general homelessness in Brazil are just a few of the many influences that affect the lives of street children.

20. What should be an apt title for the above given passage?

(a) Street Children: Our Responsibility
(b) Issue raised by Street Children
(c) Street Children: Losing Innocence
(d) Plight of Street Children.

EXERCISE-B

Passage 1

School life teaches a child the happiness of being together, the worth of friendship, the classroom culture and, above all, to respect and love human race beyond caste, creed or religion. School is the only community that can form the basis of secularism and patriotism. School is the child's window to this wondrous world. Are we going to guard this ambience of harmony and protect the bonding of the teacher and her child? Or, are we going to interfere in her everyday work and allow her to get disgusted and shun her responsibility. Is it possible for a mother to teach or discipline a child without scolding or raising her hand? How is it possible for a teacher to discipline a child even without scolding? Words like lazy, noisy creature — are also construed as an offence.

1. **As per the passage which of following is not included among teachings made available to students during his/her life?**

    (a) Happiness of being together
    (b) The worth of friendship
    (c) Classroom culture
    (d) Discrimination on the basis of cast and creed

2. **Consider the following statement:**

    A. School is the only community that can form the basis of secularism and patriotism.
    B. School is the only community that can form the basis of spiritualism and religiousness.

    Which of the following statement/s is/are true as per the above given passage?

    (a)   Only A
    (b)   Only B
    (c)   Both A and B
    (d)   Neither A Nor B

3. **The author in the above passage used a word** *Harmony*. **Select a word similar to meaning of it?**

    (a) Disagreement
    (b) Noise
    (c) Variance
    (d) Accord

4. **Suggest an apt title for the above given passage?**

    (a) Importance of School life
    (b) Golden Period of child life
    (c) Memories of School
    (d) Life at school

Passage 2

Poverty is about not having enough money to meet basic needs including food, clothing and shelter. However, poverty is more, much more than just not having enough money.

In addition to a lack of money, poverty is about not being able to participate in recreational activities; not being able to send children on a day trip with their schoolmates or to a birthday party; not being able to pay for medications for an illness. These are all costs of being poor. Those people who are barely able to pay for food and shelter simply can't consider these other expenses. When people are excluded within a society, when they are not well educated and when they have a higher incidence of illness, there are negative **consequences** for society.

5. **The author in the above passage used word recreational activities while talking about poverty. What do you understand by the word?**

   A. Entertaining activities
   B. Fun filled activities
   C. Professional activities
   D. Skillfully execution of Work

   (a)   Only A
   (b)   Both A and B
   (c)   Only C
   (d)   Both C and D

6. **Pick out the word which is opposite to the meaning of word** *consequences.*

   (a) Effects
   (b) Upshots
   (c) Inconsequence
   (d) Logical

7. **As per the passages when do negative consequences for the society arises?**

   A. When people are excluded within a society
   B. when they are not well educated
   C. when they have a higher incidence of illness
   D. When they are rich

   (a) Only A
   (b) Both A and B
   (c) A, B and C
   (d) D only

8. **What should be an apt title for the passage?**

   (a) End of Poverty
   (b) Parenting and Poverty
   (c) The road to poverty

(d) Poverty and its Consequences

Passage 3

Autumn is the season when the weather begins to shift from summer time into winter time.

During the season of autumn the leaves on the trees turn into an orange, yellowish or reddish looking color, and the atmosphere becomes a little bit chilly. In autumn the leaves on the trees fall off the trees preparing the trees for winter.

Autumn also marks the time when the children in Europe and America begin to prepare to return back to school after their summer holidays. In autumn there is autumn harvest as well. The autumn **harvest** is also called the "agricultural time" of harvesting the fruits that cometh forth during autumn time. Autumn starts on or around 8 August and ends on around 7 November in traditional East Asian solar term.

9. **Consider the following statement**

    A. Autumn is the season when the weather begins to shift from winter time into summer time.
    B. In the season of Autumn the weather begin to change from monsoon to winter
    C. In the season of autumn the weather begins to change winter to monsoon.
    D. Autumn is the season when the weather begins to shift from summer time into winter time.

    Which of the following statement/s is/are true as per the above given passage?

    (a)   Only A
    (b)   Both A and B
    (c)   C Only
    (d)   D Only

10. **Which of the following is opposite to the meaning of the word** *Harvest***?**

    (a) Reap
    (b) Produce
    (c) Yield
    (d) Nurture

11. **What is the other name of autumn harvest of harvesting the fruits that cometh forth during autumn time?**

    (a) Spring Time
    (b) Agricultural Time
    (c) Irrigation time
    (d) Farming time

12. **As per the passage when does autumn starts and ends in traditional East Asian solar term?**

(a) It starts on or around 7 August and ends on around 8 November
(b) There is not any specific date of Start
(c) It starts on or around 8 November and ends on around 7 August
(d) It starts on or around 8 August and ends on around 7 November

Passage 4

Tourism is an excellent way to develop a country, but it can also cause harm. How can countries ensure that tourism benefits the development?

It is irrefutable that tourism has become the backbone of many economies of the world. In fact many countries rely on the tourist dollar for their development. This has also led to damage of the natural environment and at many places the tourist places have been so much littered that they have ceased being a tourist attraction any more. In a way tourism is killing tourism. A country should undertake sustainable tourism for its development.

13. The author in the above passage used a term *irrefutable* **while speaking about tourism. What do you understand by the term?**

(a) Indisputable
(b) Uncertain
(c) Closed
(d) Controvertible

14. Which of the following statement/s is/ are true with reference to the above given passage?

A. Many countries rely on the tourist dollar for their development
B. Very few countries rely on the tourist dollar for their development
C. Tourism has become Cause of concern for many economies of the world
D. Tourism has become the backbone of many economies of the world

(a)   A Only
(b)   B Only
(c)   A and D
(d)   C only

15. What led to the damage of the natural environment at many places of tourist Interest?

A. Littering of Tourist places
B. Self Interest of countries which relies on the tourist dollar for their development
C. Use of Sustainable Tourism
D. Less inflow of Tourist

(a)   Only A
(b)   Both A and B
(c)   Only C
(d)   Only D

16. Name the form of Tourism as per the passage which a Country should adopt for its

Development.

(a) Domestic Tourism
(b) Outbound Tourism
(c) Inbound Tourism
(d) Sustainable Tourism

Passage 5

Taxes in India are levied by the Central Government and the state governments. Some minor taxes are also levied by the local authorities such the Municipality.

The authority to levy a tax is derived from the Constitution of India which allocates the power to levy various taxes between the Centre and the State. An important restriction on this power is Article 265 of the Constitution which states that "No tax shall be levied or collected except by the authority of law." Therefore each tax levied or collected has to be backed by an accompanying law, passed either by the Parliament or the State Legislature. In 2010-11, the gross tax collection amounted to INR 7.92 trillion, with direct tax and indirect tax contributing 56% and 44% respectively.

17. Consider the Following Statement

A. Taxes in India are levied by the Central Government and the governments of United States.
B. Some minor taxes are also levied by the local authorities such the Municipality.

Which of the Following statement is/are true as per the above given passage?

(a)   Only A
(b)   Both A and B
(c)   Only B
(d)   Neither A Nor B

18. The Author in the above passage used a word *levied* while referring it with term taxes. Select a word opposite to the meaning of levied.

(a) Imposed
(b) Recruited
(c) Raised
(d) Disapproved

19. As per the passage there is restriction imposed by article 265 of constitution on the power to levy various taxes between the Centre and the State. What is that restriction?

A. No tax shall be levied or collected except by the authority of law
B. Each tax levied or collected has to be backed by an accompanying law, passed either by the Parliament or the State Legislature.
C. No tax shall be levied or collected except by the judicial authority and with consent

of Chief Justice of India.

D. Each tax levied or collected has to be backed by an accompanying law, passed either by the Municipal Authority or Civil Court.

(a)   Only A
(b)   Both A and B
(c)   Only C
(d)   Both C and D

20. Pick out the wrong statement as per the above given passage.

(a) In 2010-11, the gross tax collection amounted to INR 7.92 trillion, with direct tax and indirect tax contributing 44% and 56%respectively.
(b) Each tax levied or collected has to be backed by an accompanying law, passed either by the Parliament or the State Legislature.
(c) The authority to levy a tax is derived from the Constitution of India which allocates the power to levy various taxes between the Centre and the State
(d) Article 265 of the Constitution imposed some restriction on the tax levied

EXERCISE-C

Passage 1

The Internet has forever changed the world in both positive and negative ways. The Internet enables one to find information any time of day, as well as provides convenience with regard to such activities as paying bills. On the other hand, the accessibility of pornography and false information and the occurrence of **pop-ups** on the Internet serve as negative effects.

The Internet today is in many ways seen as an essential to life. It is used in the workplace, school and home. With the invention of the Internet the world was forever changed in both good a bad ways. Today the internet is part of our daily life and we must learn to ovoid the negatives so we can enjoy the positives to their full extent.

1.   Which of the following is similar to the meaning of word accessibility?

(a) Inconvenience
(b) Unavailability
(c) Handiness
(d) Limited

2.   Which of the following statement/s is/are not true as per the above given passage?

A.   The Internet today is in many ways seen as an essential to life
B.   It is used in the workplace, school and home.
C.   The accessibility of pornography and false information and the occurrence of pop-ups on the Internet serve as positive effects.
D.   With the invention of the Internet the world was forever changed in a bad ways.

(a)   Only A
(b)   Both A and B
(c)   Only C
(d)   Both C and D

3. **The author in this passage**

(a) Discussed only negative impact of the internet on society
(b) Discussed only positive impact of the internet on society
(c) Condemns internet for its inability to educate
(d) Discussed internet in a balanced way asserting its both positive and negative impact on the society.

4. **The author in the above passage used a term Pop-ups. What do you understand by term?**
(a) Forms of online advertising on the World Wide Web intended to attract web traffic
(b) Forms of educational articles on the World Wide Web to promote education
(c) Advertisement in the form of emails
(d) Social Networking site on Internet.

Passage 2

Madagascar lies in the Indian Ocean off the southeast coast of Africa opposite Mozambique. The world's fourth-largest island, it is twice the size of Arizona. The country's low-lying coastal area gives way to a central plateau. The once densely wooded interior has largely been cut down.

The Malagasy are of mixed Malayo-Indonesian and African-Arab ancestry. Indonesians are believed to have migrated to the island about 700. King Andrianampoinimerina (1787–1810) ruled the major kingdom on the island, and his son, Radama I (1810–1828), unified much of the island. The French made the island a **protectorate** in 1885, and then, in 1894–1895, ended the monarchy, exiling Queen Rànavàlona III to Algiers. A colonial administration was set up, to which the Comoro Islands were attached in 1908, and other territories later. In World War II, the British occupied Madagascar, which retained ties to Vichy France.

5. **As per the passage what is the geographical location of Madagascar Island?**

(a) It lies in Arabian Sea off the west coast of Africa opposite to Angola
(b) It lies in the Arabian Peninsula in the eastern region of Mozambique
(c) It Lies in the Indian Ocean off the southeast coast of Africa opposite Mozambique
(d) It Lies in the Indian Ocean off the east coast of Africa opposite Mozambique

6. **Which of the following statement/s is/are true as per the above given passage?**

A. Madagascar is the world's third largest island and is thrice the size of Arizona
B. Madagascar is the world's fourth-largest island and is twice the size of Arizona
C. The Malagasy are of mixed Malayo-Indonesian and African-Arab ancestry
D. The Malagasy are of mixed Indo-Eurasian and African-Arab ancestry

(a)   Only A
(b)   Both A and B
(c)   Both B and C
(d)   Only D

7. **The author in the above passage used a word** *protectorate* **while talking about French. What is the meaning of the word in context of the passage?**

(a) To protect
(b) Territory
(c) Kingdom
(d) alleviated

8. **Pick out the wrong Statement/s as derived from the passage.**

A. The French made the island a **protectorate** in 1895.
B. In 1894–1895, the French ended the monarchy, exiling Queen Rànavàlona III to Algiers.
C. A colonial administration was set up, to which the Comoro Islands were attached in 1908, and other territories later.
D. In World War I, the British occupied Madagascar, which retained ties to Vichy France.

(a)   Only A
(b)   Both A and B
(c)   Only C
(d)   Both A and D

Passage 3

The migration of scientists, doctors, engineers and other technically qualified persons usually from a developing or underdeveloped country to a advanced or developed country is termed "brain drain". It is a very serious problem for poor and underdeveloped countries, including India. Thousands of Indian scientists, doctors, engineers and other qualified persons have migrated to and are staying in other countries. Every year hundreds of our best brains make **frantic** efforts to leave India. The demand for passports is increasing every year, even though more and more employment opportunities are being created within the country. The **steady** outflow of our nation's talent, especially those educated, at the cost of the tax payers' money, has caused concern to the government.

9. **What according to the passage is Brain Drain?**

(a) The migration of scientists, doctors, engineers and other technically qualified persons usually from a developed country to developing country.
(b) The migration of scientists, doctors, engineers and other technically qualified persons usually from a developing or underdeveloped country to a advanced or developed country
(c) The migration of scientists, doctors, engineers and other technically qualified persons usually from an advanced country to underdeveloped country.

(d) Using a brain for advancement of One's country.

10. The author in the above passage used a word *steady*. **Which of the following word is opposite in meaning to the word?**

(a) Stabilize
(b) Unshakable
(c) Balanced
(d) Unstable

11. Pick out the statement which does not stands true as per the above given passage?

A. Every year hundreds of our best brains make frantic efforts to leave India.
B. The demand for passports is decreasing every year, even though more and more employment opportunities are being created within the country.
C. The **steady** outflow of our nation's talent, especially those educated, at the cost of the tax payers' money, has caused concern to the government.
D. Thousands of Indian scientists, doctors, engineers and other qualified persons have migrated to and are staying in other countries.

(a)   Only A
(b)   Both A and B
(c)   Only C
(d)   Only B

12. What is the meaning of the word *frantic* **as used above in the passage?**

(a) calm
(b) Composed
(c) Anxious
(d) Well behaved

Passage 4

Dolphins have been declared the world's second most intelligent creature after humans, with scientists suggesting they are so bright that they should be treated as "non-human persons". Studies into dolphin behaviour have highlighted how similar their communications are to those of humans and that they are brighter than chimpanzees. These have been backed up by anatomical research showing that dolphin brains have many key features associated with high intelligence. **The researchers argue that their work shows it is morally unacceptable to keep such intelligent animals in amusement parks or to kill them for food or by accident when fishing. Some 300,000 whales, dolphins and porpoises die in this way each year.**

13. Complete the following sentence:

Scientist declared Dolphins as the world's second most intelligent creature after_____

(a) Lion

(b) Apes
(c) Human
(d) Horse

14. Which of the following statement is not true as per the above given passage?

A. Some 300,00 whales, dolphins and porpoises die by keeping them in amusement parks.
B. Studies into dolphin behaviour have highlighted how similar their communications are to those of humans and that they are brighter than chimpanzees.
C. Evidence have been backed up by anatomical research showing that dolphin brains have many key features associated with high intelligence
D. The researchers argue that their work shows it is morally unacceptable to keep such intelligent animals in amusement parks or to kill them for food or by accident when fishing.

(a) Only A
(b) Both A and B
(c) Only C
(d) C and D

15. The author in the above passage used a word *porpoises*. **What are these porpoises?**

(a) Gregarious cetacean mammals having a blunt snout and many teeth
(b) Giant Mammal
(c) Small fish
(d) Arthropods

16. How does author came to conclude that dolphin brains have many key features associated with high intelligence?

(a) By Conducting Anatomical research on Dolphins
(b) By Conducting psychological test on Dolphins
(c) By giving no food to dolphins
(d) By keeping it into amusement park

Passage 5

Green marketing promotes the environmental benefits of products, or a company's sustainability initiatives. It is continuing to grow in popularity—in large part due to the fact that customers are increasingly integrating their environmental values into their purchasing decisions. More and more customers want to support companies that incorporate sustainability efforts into their product and service offerings.

Effective marketing provides the information customers want—and need—to make informed purchasing decisions, in a message that communicates the benefits of the product or service to the customer. If sustainability is important to customers, green marketing can be highly effective. However, green marketing isn't a smart choice for every company. If

customers aren't interested in products' green benefits, or a company's sustainability initiatives, a green marketing message isn't going to drive brand loyalty or purchasing decisions.

17. Consider the following Statement:

A. Green marketing promotes the environmental benefits of products, or a company's non-sustainability initiatives.
B. Green marketing is continuing to grow in popularity—in large part due to the fact that customers are increasingly integrating their environmental values into their purchasing decisions.

Which of the Following statement is are true as per the above given passage?

(i)   Only A
(ii)   Both A and B
(iii)   Only B
(iv)   Neither A nor B

18. What according to the passage helps the customers in making well-informed decisions?

(a) Effective marketing
(b) Window shopping
(c) Reading information on packets
(d) Focusing on Brands

19. The author in the above passage used a word *incorporate* while talking about sustainability initiative. Suggest a word opposite to the meaning of incorporate.
(a) Integrate
(b) Include
(c) Blend
(d) Separate

20. Pick out the statement which does not stands true as per the above given passage.

A. If sustainability is important to customers, green marketing can be highly ineffective.

B. More and more customers want to support companies that incorporate sustainability efforts into their product and service offerings.

C. Green marketing is a smart choice for every company
D. Green marketing promotes the environmental benefits of products

(a)   Only A
(b)   Both A and B
(c)   Only C
(d)   Both A and C

EXERCISE-D

Passage 1

The brain is the most complex organ in the human body. It produces our every thought, action, memory, feeling and experience of the world. This jelly-like mass of tissue, weighing in at around 1.4 kilograms, contains a **staggering** one hundred billion nerve cells, or neurons.

The complexity of the connectivity between these cells is mind-boggling. Each neuron can make contact with thousands or even tens of thousands of others, via tiny structures called synapses. Our brains form a million new connections for every second of our lives. The pattern and strength of the connections is constantly changing and no two brains are alike.

It is in these changing connections that memories are stored, habits learned and personalities shaped, by reinforcing certain patterns of brain activity, and losing others.

1. **Consider the following statement**

   A. The brain is the most simplest organ in the human body
   B. It produces our every thought, action, memory, feeling and experience of the world.

   Which of the following statement is/are true?

   (a)   Only A
   (b)   Both A and B
   (c)   Only
   (d)   Neither A nor B

2. **Suggest a word opposite to the meaning of the word** *Staggering.*

   (a) Astounding
   (b) Overwhelming
   (c) Distributing
   (d) Unimpressive

3. **What is the name of structures through which neuron can make contact with thousands of Neuron**

   (a) Dendrite
   (b) Axon
   (c) Synapses
   (d) Nucleus

4. **Pick out the wrong statement as per the above given passage.**

   5. Our brains form a million new connections for every second of our lives.
   6. The pattern and strength of the connections is constantly changing and no two brains are alike.
   7. Brain is a jelly-like mass of tissue, weighing in at around 2.4 kilograms.

8. Brain contains a **staggering** one hundred billion nerve cells, or neurons.

Passage 2

Modern humans have lost touch with their inner "true self". Silence and stillness are a means to recovering happiness and contentment.

In the modern world silence has practically ceased to exist. The human race has **stamped** its authority over the planet Earth not just by covering its surface with concrete and destroying its plant and animal life, but also by burying the natural sounds of the Earth beneath a cacophony of man-made noise.

We live our lives against the background of this cacophony, with the jagged mechanical sounds of urban-industrial society continually assaulting our ears: the roar of cars, aeroplanes and trains, the clanging and thudding of machinery, the noise of building and renovating, the chatter of radios and TVs in other people's cars and houses, and pop music blaring from every conceivable place.

5. **Consider the following statement**

    A. Modern humans found a way to touch with their inner "true self".
    B. Silence and stillness are a means to lose happiness and contentment.

Which of the following statement is/are true as per the above iven passage?

    (a)   Only A
    (b)   Both A and B
    (c)   B Only
    (d)   Neither A nor B

6. **The author in the above passage used a word** *stamped* **while referring it with human race. Specify the meaning of the word in context of the passage?**

    (a) Unmarked
    (b) Underpriced
    (c) Marked
    (d) Approved

7. **Suggest an apt title for the passage.**

    (a) Silence : A new way to happiness
    (b) The unconditional silence
    (c) Silence Vs Noise
    (d) The world in silence.

8. **What is the meaning of the word** *cacophony* **as per above given passage?**
    (a) harmony
    (b) concord
    (c) harsh and loud sound
    (d) resonance

Passage 3

Old-age or retirement homes are still a nascent concept in India. The concept of old-age homes is one that is still viewed with serious misgivings in much of typical Indian society. Barring some specific communities which have built-in safety nets for the elderly within their ecosystems, most other Indians would rather usually state—whether truthfully or not is another thing altogether—that the family system in India is "designed" to look after such requirements as people grow older. And increasingly of late, the elderly end up either living on their own in splendid solitude with high expenses and higher issues of life and house management, or on **sufferance** with the next generation.

9. **Consider the Following Statement**
   A. The concept of old-age homes is one that is still viewed with certainties in much of typical Indian society.
   B. The elderly end up either living on their own in unimpressive solitude with high expenses and higher issues of life and house management, or on sufferance with the next generation.

   Which of the following statement is are true with the above give passage?

   (a)   Only A
   (b)   Only B
   (c)   Both A and B
   (d)   Neither A nor B

10. **The author in the above passage used a word** *Sufferance* **while talking about next generation. What is the meaning of the word in context of the above given passage?**

    (a) Prohibition
    (b) Proscription
    (c) Interdiction
    (d) Pain or misery

11. **What should be an apt title for the passage?**

    (a) Old Age Home: A necessity
    (b) An abode for elders
    (c) Old Age Home: Safe haven for the lonely
    (d) Old Age Home: A Nascent concept in India

12. **Pick out the false statement as per the above given passage.**

    (a) The concept of old-age homes is one that is still viewed with serious misgivings in much of typical Indian society.
    (b) Family system in India is "designed" to look after old age home requirements as people grow older
    (c) The elderly end up either living on their own in splendid solitude with high expenses and higher issues of life

(d) Old-age or retirement homes are still a primitive concept in India

Passage 4

The urge to make graphic images can be traced back to prehistoric times. The cave paintings which are among the very earliest surviving traces of the pictorial instincts of mankind define the beginnings of an evolution which characterizes the human race. Man may once have existed in a state of grace and unity within the world. But he soon marked himself as different from other forms of animal life through this need to depict, to be at once **protagonist** and observer within the spectacle of his own existence. At first by daubing or incising, eventually through his mastery of optics and photochemistry, man has created a proliferation of images.

For centuries, painters served important practical purposes in giving visual definition to the structures of society. Art also provided a cathartic focus for powerful emotions and, in so doing, made evident man's existential dilemmas.

13. Consider the following statement

(a) The urge to make graphic images can be traced back to modern times.
(b) The cave paintings which are among the very earliest surviving traces of the pictorial instincts of mankind define the end of an evolution which characterizes the human race.

Which of the Statement is true as per above given passage?

(i)   Only A
(ii)   Both A and B
(iii)   B Only
(iv)   Neither A nor B

14. Suggest a word opposite to the meaning of the word protagonist.

(a) Champion
(b) Supporter
(c) Friend
(d) Opponent

15. Look at the below given statement:

"At first by daubing or incising, eventually through his mastery of optics and photochemistry, man has created a proliferation of images"

The author here used two different phrasal verbs daubing and incising while talking about creation of images. What does the both word signify?

(a) Plastering and Cutting

(b) Slaughtering and killing
(c) Utilizing and applying
(d) Employing and hiring

16. How painters for centuries, served important practical purposes?

(a) By giving visual definition to the structures of society
(b) By giving structural definition to society
(c) By giving a structural thought process
(d) By manipulating the issue.

Passage 5

The word discipline means to impart knowledge and skill – to teach. However, it is often equated with punishment and control. There is a great deal of controversy about the appropriate ways to discipline children, and parents are often confused about effective ways to set limits and instill self-control in their child.

In medical and secular literature, there is great diversity of opinion about the short-term and long-term effects of various disciplinary methods, especially the use of disciplinary spanking. This statement reviews the issues concerning childhood discipline and offers practical guidelines for physicians to use in counseling parents about effective discipline.

17. Consider the following Statement:

A. The word discipline means to impart knowledge and skill – to teach. However, it is often equated with punishment and control.
B. There is a great deal of controversy about the appropriate ways to discipline children.

Which of the following statement is true as per the above given passage?

(a)   Only A
(b)   Both A and B
(c)   Only B
(d)   Neither A nor B

18. The author in the above passage used a word *instill* while talking about self control. What is the meaning of the word?

(a) Transfuse
(b) Introduce
(c) Halt
(d) Uproot

19. As per the passage where do you find great diversity of opinion about the short-term and long-term effects of various disciplinary methods?

(a) In Ancient Vedic Literature
(b) In Modern literature
(c) In Medical Transcripts
(d) In medical and secular literature

20. What should be an apt title for the above given passage?

(a) Discipline: An overrated Issue
(b) Discipline with a Controversial Angle
(c) Discipline : A thing to be followed
(d) Discipline : A plight Unconsidered

EXERCISE-E

Passage 1

India has a long history of commercial coal mining covering nearly 220 years starting from 1774 by M/s Sumner and Heatly of East India Company in the Raniganj Coalfield along the Western bank of river Damodar. However, for about a century the growth of Indian coal mining remained sluggish for want of demand but the introduction of steam locomotives in 1853 gave a fillip to it. With the advent of Independence, the country embarked upon the 5-year development plans. At the beginning of the 1st Plan, annual production went upto 33 metric tons. During the 1st Plan period itself, the need for increasing coal production efficiently by systematic and scientific development of the coal industry was felt.

1.   What should be the word opposite to the meaning of Sluggish?

(a) Listless
(b) Lethargic
(c) Lively
(d) Torpid

2.   Pick out the statement which is not true as per the above give passage?

A.   During the 1st Plan period itself, the need for increasing coal production efficiently by systematic and scientific development of the coal industry was felt.
B.   India has a long history of commercial coal mining covering nearly 320 years starting from 1774 by M/s Sumner and Healthy of East India Company in the Raniganj Coalfield.
C.   For about a century the growth of Indian coal mining remained sluggish for want of demand but the introduction of steam locomotives in 1853 gave a fillip to it.
D.   With the advent of Independence, the country embarked upon the 5-year development plans.

(a) Only A
(b) Both A and B
(c) B only

(d) D only

3. **At the beginning of the 1ˢᵗ Plan, annual production of coal went to how many metric tons?**

(a) 66 metric tons
(b) 22 metric tons
(c) 44 metric tons
(d) 33 metric tons

4. **What was the reason behind sluggish growth of Indian Coal Mining for about a century?**

5. Less coal mines
6. Want of demand
7. High Production Cost
8. Less availability of Resources

Passage 2

The National Rural Employment Guarantee Act (NREGA) is an Indian job guarantee scheme, enacted by legislation on August 25, 2005. The NREGA provides a legal guarantee for one hundred days of employment in every financial year to adult members of any rural household willing to do public work-related unskilled manual work at the statutory minimum wage. The Central government outlay for schemes under this act is Rs. 39,100 crores   in   FY   2009-10.

This act was introduced with an aim of improving the purchasing power of the rural people, primarily semi or un-skilled work to people living in rural India, whether or not they are below the poverty line. Roughly one-third of the **stipulated** work force must be women.

5. **Consider the following statement**

A. The National Rural Employment Guarantee Act (NREGA) is an Indian job guarantee scheme, enacted by legislation on August 25, 2009.
B. The Central government outlay for schemes under this act is Rs. 39,100 crores in FY 2009-10.

Which of the following statement is true as per above given passage?

(a) Only A
(b) Both A and B
(c) Only B
(d) Neither A nor B

6. **Suggest a word opposite to the meaning of** *Stipulated?*

(a) Fixed

(b) Predetermined
(c) Qualified
(d) Unconditioned

7. **What was basic aim or motive behind introducing the National Rural Employment Guarantee Act (NREGA)?**

   (a) To improve the purchasing power of the rural people
   (b) To increase the per capita income of the nation
   (c) To develop highly skilled labour
   (d) To further increase unemployment

8. *"The Central government outlay for schemes under this act is Rs. 39,100 crores in FY 2009-10"*
   Consider the above given line. What does FY Stands For?

   A. First year
   B. Forth coming year
   C. Financial Year
   D. Fiscal Year

   (a)   A only
   (b)   Both A and B
   (c)   C Only
   (d)   Both C and D

Passage 3

To get rich is hard and to stay wealthy harder. But wealth managers are now making sure that once your name figures on the list of the uber rich, the moolah just keeps on rolling.

And since the stock markets are passé and real estate in the doldrums, wealth management companies are now thinking of new places where wealth can be parked to reap the best returns. So investing in well-known private equity firms, renowned Bollywood production houses, a few select emerging stocks, popular art galleries and placements through pre-initial public offering is now the flavour of the month.

After all, the sensex may dip a bit further, bullion may lose its sheen and commodity trading suffer from government diktats but the portfolio of ultra-HNI clients should remain impassive to such routine developments.

9. **Consider the following Statement:**

   (a) To get rich is hard and to stay wealthy easier
   (b) Wealth managers are now making sure that once your name figures on the list of the uber rich, the moolah just keeps on rolling.

Which of the following statement is/are not true as per the above given passage?

   (i)   Only A

(ii)   Both A and B
(iii)   Only B
(iv)   Neither A nor B

10. Pick out the statements which do not stands true as per the above given passage.

(a) Investing in well-known private equity firms, renowned Bollywood production houses, a few select emerging stocks, popular art galleries and placements through pre-initial public offering is now the flavour of the month.
(b) The stock markets are passé and real estate in the doldrums
(c) Wealth management companies are now thinking of new places where wealth can be parked to reap the best returns
(d) The sensex may increase a bit further, bullion may lose its sheen and commodity trading suffer from government diktats but the portfolio of ultra-HNI clients should remain impassive to such routine developments.

11. What is the meaning of the word bullion as per the above given passage?

(a) Block of Iron
(b) Gold or Silver BAR
(c) Substances made of Steel
(d) Algebraic Term

12. Why wealth management companies are now thinking of new places where wealth can be parked to reap the best returns?

(a) Because it is evident that the stock markets are passé and real estate in the doldrums.
(b) Because real state business is growing at a faster pace
(c) To increase their market value
(d) Not Evident From the above given passage.

Passage 4

The United Nations is an international organization founded in 1945 after the Second World War by 51 countries committed to maintaining international peace and security, developing friendly relations among nations and promoting social progress, better living standards and human rights.

Due to its unique international character, and the powers vested in its founding Charter, the Organization can take action on a wide range of issues, and provide a **forum** for its 193 Member States to express their views, through the General Assembly, the Security Council, the Economic and Social Council and other bodies and committees.

The main purpose of UN is to keep peace throughout the world and to develop friendly relations among nations.

13. Consider the following statement.

(a) The United Nations is an international organization founded in 1945 after the Second World War by 51 countries

(b) The UN was founded by the countries committed to maintaining international peace and security, developing friendly relations among nations and promoting social progress, better living standards and human rights.

Which of the Following statement is/are true as per the above given passage?

(a) Only A
(b) Both A and B
(c) Only B
(d) Neither A nor B

14. As per the above given passage For what Reason the Organization can take action on a wide range of issues, and provide a forum for its 193 Member States?

A. Due to its unique international character, and the powers vested in its founding Charter
B. As it can Make recommendations for the peaceful settlement of any situation that might impair friendly relations among nations
C. As it can Receive and consider reports from the Security Council and other United Nations organs
D. As it can Consider and approve the United Nations budget and establish the financial assessments of Member States

(a) Only A
(b) Both And B
(c) Only C
(d) All of the above

15. What is the main purpose of functioning of the United Nation?

A. To keep peace throughout the world
B. To develop friendly relations among nations.
C. To help in creating a new nation
D. To govern the world by imposing different laws

(a) Only A
(b) Both A and B
(c) Only C
(d) All of the Above.

16. Suggest a word opposite to the meaning of word *Forum*.

(a) Medium
(b) Opportunity
(c) Environment
(d) Disassembly

Passage 4

The consumer class--the 1.1 billion members of the global consumer society--includes all households whose income per family member is above $7,500. We dine on meat and processed, packaged foods, and imbibe soft drinks and other beverages from disposable containers.

We have refrigerators, clothes washers and dryers, abundant hot water, dishwashers, microwave ovens, and a plethora of other electric-powered gadgets. We travel in private automobiles and airplanes, and surround ourselves with a profusion of short-lived, throwaway goods. The consumer class takes home 64% of world income--32 times as much as the poor.

The consumer class counts among its members most North Americans, West Europeans, Japanese, Australians, and the citizens of Hong Kong, Singapore, and the oil sheikdoms of the Middle East.

17. The author in the above passage used a word *plethora* while referring to the electric powered gadgets. What is the meaning of the word?

(a) Rarity
(b) Scarcity
(c) Excess
(d) Shortage

18. What should be an apt title for the passage?

(a) Consumer class: Ruling the world
(b) Consumer Class: The Class Under Reform
(c) Consumer Class: Class Under Deprivation
(d) A Brief Insight of the Consumer Class

19. Select a statement which is not true as per the above given passage.

(a) The consumer class counts among its members most North Americans, West Europeans, Japanese, Australians, and the citizens of Hong Kong, Singapore, and the oil sheikdoms of the Middle East.
(b) The consumer class takes home 32% of world income—64 times as much as the poor.
(c) The consumer class--the 1.1 billion members of the global consumer society--includes all households whose income per family member is above $7,500
(d) We travel in private automobiles and airplanes, and surround ourselves with a profusion of short-lived, throwaway goods.

20. What is the meaning of *throwaway goods* as used in second last paragraph of the passage?

(a) Offhand Goods

(b) Disposed off Goods

(c) Goods thrown way to get rid off
(d) Goods Unconsidered

ANSWERS

Exercise- 1		Exercise-2		Exercise-3		Exercise-4		Exercise-5	
1	b	1	d	1	c	1	a	1	c
2	b	2	a	2	d	2	d	2	c
3	d	3	d	3	d	3	c	3	d
4	a	4	a	4	a	4	c	4	b
5	d	5	b	5	c	5	d	5	c
6	d	6	c	6	d	6	c	6	d
7	c	7	c	7	b	7	a	7	a
8	c	8	d	8	d	8	c	8	d
9	d	9	d	9	b	9	d	9	a
10	a	10	d	10	d	10	d	10	d
11	b	11	b	11	d	11	d	11	b
12	c	12	d	12	c	12	d	12	a
13	d	13	a	13	c	13	d	13	b
14	a	14	c	14	a	14	d	14	a
15	c	15	b	15	a	15	a	15	c
16	d	16	d	16	a	16	a	16	d
17	c	17	c	17	b	17	b	17	c
18	d	18	d	18	a	18	b	18	d
19	c	19	b	19	d	19	d	19	c
20	d	20	a	20	d	20	b	20	b

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Unit 2

Basic Numeracy

And General Mental Ability

CHAPTER 1: NUMBER SYSTEM

Number System is one of the most fundamental chapters of Basic Numeracy. This chapter is expected to be one of the crucial ones in the context of preparing for civil services examinations.

Various Types of Numbers

● **Natural Numbers**

All the positive numbers 1, 2, 3 ,.., etc. that are used in counting are called Natural numbers.

Types of Natural Numbers based on divisibility:

➢ Prime Number
➢ Composite Number

Prime Number: A natural number larger than unity is a prime number if it does not have other divisors except for itself and unity.

Example for Prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, etc.

Note: Unity i.e. 1 is not prime number.

Composite Numbers:

Any number other than 1, which is not a prime number, is called a composite number.

Examples for composite numbers are 4, 6, 8, 9, 10, 14, 15 etc.

● **Whole Numbers:** All counting numbers and 0 form the set of whole numbers.
   For example 0, 1, 2, 3…, etc. are whole numbers.
● **Integers:** All counting numbers, Zero and negative of counting numbers form the set of integers.
   Therefore,…-3, -2, -1, 0, 1, 2, 3,.. are all integers.
● **Rational Numbers**
   A number which can be expressed in the form p/q, where p and q are integers and $q \neq 0$ is called a rational number.

   For example 2 can be written as 2/1, therefore 2 is also a rational number.

● **Irrational Numbers**
   Numbers which are not rational but can be represented by points on the number line called irrational numbers.
   Examples for Irrational numbers are $\sqrt{2}, \sqrt{3}, \sqrt[3]{9}$, etc.
● **Even and Odd numbers**
   Numbers divisible by 2 are called even numbers whereas numbers that are not divisible by 2 are called odd numbers

For example 2, 4, 6, etc are even numbers and 3, 5, 7, etc are odd numbers.

Tests of Divisibility of Numbers

- ➢ **Divisible by 2:** if its unit digit of any of 0, 2, 4, 6, 8.
- ➢ **Divisibility by 3:** When the sum of its digits is divisible by 3.
- ➢ **Divisibility by 9:** When the sum of its digits is divisible by 9.
- ➢ **Divisibility by 4:** if the sum of its last two digits is divisible by 4.
- ➢ **Divisibility by 8:** If the number formed by hundred's ten's and unit's digit of the given number is divisible by 8.
- ➢ **Divisibility by 10:** When its unit digit is Zero.
- ➢ **Divisibility by 5:** When its unit digit is Zero or five.
- ➢ **Divisibility by 11:** if the difference between the sum of its digits at odd places and the sum of its digits at even places is either o0 or a number divisible by 11.

SOLVED EXAMPLE

Example 1. Find the unit digit in the product (684 $\times$ 459 $\times$ 213 $\times$ 276)?

Solution: Unit digit in the given product

= Unit digit in the product 4$\times$ 9 $\times$ 3 $\times$ 6 =8.

Example 2. What is the unit digit in the product $(4537)^{153} \times (151)^{78}$ = ?

Solution: Required digit = unit digit in ($7^{153} \times 1^{78}$)

We know that 7^4 gives unit digit 1 and 1^{78} = 1.

($7^{153} \times 1^{78}$) = { $(7^4)^{88}$ $\times$ 7 $\times$ 1 }

Therefore, required unit digit = (1 $\times$ 7 $\times$ 1) =7.

Example 3. Find the remainder when 2^{32} is divided by 5.

Solution: 2^{32} = (2^{10} $\times$ $2^{10} \times 2^{10}$) 2^2 =$(2^{10})^3$ 4

Unit digit in 2^{32} = 4   4 =6

Therefore, 2^{32} when divided by 5 gives remainder 1.

Example 4.How many natural numbers between 16 to 51 are divisible by 5?

Solution: These numbers are,

20,25,30,……,50

This is an A.P.

Where a=20,d=5,l=50

Suppose the number of terms is n in this A.P.

Then,

t_n=50 = a+(n-1)d

50 = 20+(n-1) 5

30 = (n-1) 5

6 = n-1

n=7

Example 5. 3251+587+369 - ? = 3007

Solution: Given that,

3251+587+369 - ? = 3007 $\Leftrightarrow$? = 3251+587+369 -3007 $\Leftrightarrow$? =1200.

Example 6. 1398   1398 = ?

Solution : $(1398)^2 = (1400 - 2)^2$

= $(1400)^2 + (2)^2$ -2 $\times$ 1400   2

= 1960000 + 4 – 5600

= 1954404

Example 7. If the number 82715*6 is completely divisible by 11,then what will be the smallest whole number in place of *?

Solution: given no = 82715*6

(6+5+7+8)-(*+1+2)=(23-   ),

This must be divisible by 11.

Therefore *=1

Example 8. The difference of two numbers is 1365. On dividing the larger number by the smaller, we get 6 as quotient and 15 as remainder. What is the smaller number?

Solution: Suppose the smaller number is x, then the larger number = (x+ 1365)

Therefore, x+1365 = 6x+ 15 $\Rightarrow$ 5x = 1350 $\Rightarrow$ x = 270.

Thus, the smaller number = 270.

Example 9.In a division sum, the remainder is 0. As student mistook the divisor by 12 instead of 21 and obtained 35 as quotient. What is the correct quotient?

Solution: Number = (12 $\times$ 35) = 420.

Correct quotient = 420 $\div$ 21 = 20.

Example 10. 217 $\times$ 217 + 183 $\times$ 183 = ?

Solution: 217 $\times$ 217 + 183 $\times$ 183 = $(200 + 17)^2$ +$(200 - 17)^2$ = 2 [$(200)^2$ +$(17)^2$ = 80578.

Example 11. 21 $\times$ 21 + 2 $\times$ 21$\times$ 25 +25 $\times$ 25 = ?

Solution: 21 $\times$ 21 + 2 $\times$ 21$\times$ 25 +25 $\times$ 25 = $(21 + 25)^2$ = 2116.

Example 12. (-83) $\times$ 22 +395 =?

Solution: (-83) $\times$ 22 +395 = (-1826) + 395 = - 1431.

Example 13. 992 $\times$ 992 = ?

Solution: 992 $\times$ 992 = $(1000 - 8)^2$ = $(1000)^2$ + $(8)^2$ - 2 $\times$ 1000 $\times$ 8 = 984064.

Example 14. 2345 $\times$ 51 =?

Solution: 2345 $\times$ 51 = 2345 $\times$ (50+1) = 2345 $\times$ 50 + 2345 $\times$ 1 =119595.

Example 15. $(1000)^{12} \div 10^{35}$ = ?

Solution: $(1000)^{12} \div 10^{35}$ = $(10)^{3 \times 12} \div 10^{35}$ $(10)^{36-35}$ = 10.

Example 16. If the number 481 *x* 673 is completely divisible by 9, then what is the smallest whole number in place of x?

Solution: Sum of digits = (4+8+1+*x*+6+7+3) = 29+x, which must be divisible by 3.

Therefore, *x* = 7.

Example 17. If the number 91876 x 2 is completely divisible by 8, then what is the smallest whole number in place of   x?

Solution: The number 6 x 2 must be divisible by 8.

Therefore, x =3.

Example 18. What is the sum of first 25 natural numbers?

Solution: S_n = (1+2+3+4+…+25)

This is an A.P., where a =1, d =1, n = 25,

$S_n = \frac{n}{2}$ [2a+ (n-1)d] = $\frac{25}{2}$ [2× 1+ (25-1)1] =25× 13 =325.

Example 19. What will be the remainder when 17^{200} is divisible by 18?

Solution: We know that, when n is even (x^n - a^n) is completely divisible by (x+a).

(17^{200} - 1^{200}) is completely divisible by 17+1 , i.e. 18.

Therefore, on dividing 17^{200} by 18, we get 1 as a remainder.

Example20. If 1200 × p = 30,000, then what is the value of p?

Solution: 1200 × p = 30,000   ⟺ p = 30,000/1200 =25.

EXERCISE

1. Find the unit digit in 67   27 × 23 × 91 × 22 × 33 × 12.
    (a) 2
    (b) 3
    (c) 4
    (d) 5

2. The difference between the place value of 4 in the numeral 23482.
    (a) 398
    (b) 395
    (c) 392
    (d) 396

3. The difference between the place values of two threes in the numeral 234230.

(a) 29970
(b) 29870
(c) 29980
(d) 29940

4. The unit digit in the product ($484 \times 518 \times 217 \times 263$) is :
   (a) 4
   (b) 2
   (c) 6
   (d) 3

5. What is the unit digit in $(21437)^{754}$
   (a) 8
   (b) 9
   (c) 7
   (d) 6

6. 9 + 99 + 9999 + 9.99 =?
   (a) 10116.99
   (b) 1011.69
   (c) 1011.66
   (d) None of these

7. 2500   ? = 122500
   (a) 50
   (b) 52
   (c) 49
   (d) 82

8. 248   4   2 = ?
   (a) 31
   (b) 124
   (c) 64
   (d) 82

9. 104   104 $96 \times 96 = ?$
   (a) 23232
   (b) 20032
   (c) 20034
   (d) 21234

10. 102 5^3 = ?
    (a) 12250
    (b) 12450
    (c) 12650
    (d) 12750

11. $424 \div 8 \times 128 \div 4 = ?$
    (a) 1694
    (b) 1696
    (c) 13.25
    (d) None of these

12. $(1000)^{11} \div (10)^{29}$
    (a) 1000
    (b) 10000
    (c) 100000
    (d) 100

13. $9423 \quad 625 = ?$
    (a) 5889375
    (b) 588937
    (c) 588938
    (d) 588933

14. I the no. 2143*4 is completely divisible by 3, then the smallest whole number in place of * will be
    (a) 1
    (b) 2
    (c) 3
    (d) 4

15. If the number 93124*6 is completely divisible by 9, then the smallest whole number in place of * will be.
    (a) 2
    (b) 4
    (c) 3
    (d) 1

16. If the number 93124*6 is completely divisible by 11, then the smallest whole number in place of *will be.
    (a) 2
    (b) 4
    (c) 6
    (d) 8

17. Which one of the following is a prime number?
    (a) 33
    (b) 83
    (c) 81
    (d) 39

18. Which one is the smallest two digit prime number?
    (a) 13
    (b) 15

(c) 11

(d) None of these

19. If x and y are odd numbers, then which of the following is a even number.
    (a) Xy
    (b) x/y
    (c) xy +1
    (d) x + y

20. Which one of the following cannot be the square of a natural number?
    (a) 43127
    (b) 81225
    (c) 32764
    (d) Cannot be determined

21. The sum of first 46 natural numbers is .
    (a) 1035
    (b) 1081
    (c) 1083
    (d) 1084

22. The sum of first ten prime numbers is
    (a) 129
    (b) 100
    (c) 131
    (d) 137

23. What smallest number should be added to 4453 so that the sum is completely divisible by 6?
    (a) 1
    (b) 5
    (c) 3
    (d) 2

24. The largest four digit number exactly divisible by 77 is
    (a) 19
    (b) 9933
    (c) 22
    (d) None of these

25. Largest five digit number exactly divisible by 88.
    (a) 99967
    (b) 99969
    (c) 99968
    (d) 99964

26. What least number must be subtracted from 99999, so that the remainder is divisible by 88.
    (a) 31

(b) 1136

(c) 33

(d) 1142

27. What least number must be added to 99999, so that the sum is completely divisible by 88

(a) 56

(b) 57

(c) 58

(d) 59

28. On dividing a number by 56, we get 29 as remainder. On dividing the same number by 8, what will be the remainder

(a) 4

(b) 5

(c) 6

(d) 7

29. $(256)^{0.16} \times (16)^{0.18}$ =?

(a) 8

(b) 16

(c) 64

(d) 1.05

(e) None of these

30. If $\frac{x}{y} = \frac{4}{3}$, then $\frac{x^2+y^2}{x^2-y^2}$ = ?

(a) $\frac{16}{7}$

(b) $\frac{17}{7}$

(c) $\frac{11}{7}$

(d) $\frac{25}{7}$

(e) None of these

31. If $\frac{a}{4} = \frac{b}{12} = \frac{c}{8}$, then $\frac{a+b+c}{c}$ = ?

(a) 3.5

(b) 1

(c) 2

(d) 3

(e) None of these

32. $\sqrt[3]{4096}$ =?

(a) 15
(b) 12
(c) 22
(d) 16
(e) None of these

33. $(123)^{2.5} - (123)^? = 123$

(a) 0.5
(b) 1
(c) 2
(d) 1.5

34. 4899×999 =?
(a) 4894101
(b) 4894100
(c) 4899983
(d) 4657890

35. $\sqrt{0.000121}$ = ?
(a) 0.0011
(b) 0.011
(c) 0.00011
(d) 0.11

36. 45% of 600 + 20% of 200 = ?
(a) 310
(b) 315
(c) 312
(d) None of these

37. 7200÷24÷12 = ?
(a) 20
(b) 22
(c) 24
(d) 25

38. $11^2 + \sqrt{?}$ = 146
(a) 624
(b) 625
(c) 626
(d) None of these

39. 600 ÷ 24 × 4800 ÷ 6 =?
(a) 20,000
(b) 20,200
(c) 21,000
(d) 22,000

40. $\frac{5}{8}$ of $\frac{9}{5}$ of $\frac{4}{3}$ of 80 = ?
    (a) 160
    (b) 150
    (c) 140
    (d) 120

41. 1125.25 +720.30 + 203.45 =?
    (a) 2049.50
    (b) 2049
    (c) 2049.10
    (d) None of these

42. 1201×1201= ?
    (a) 1442401
    (b) 1600000
    (c) 1234567
    (d) 1587690

43. (0.7×0.7×0.7- 0.6×0.6×0.6) ÷ (0.7×0.7+0.6×0.6+0.7×0.6) =?
    (a) 0.1
    (b) 1
    (c) 1.3
    (d) 1.1

44. The product of 10% of a positive number and 5 % of the same number is 0.125. What is the half of that number?
    (a) 2.5
    (b) 2.7
    (c) 3
    (d) 5

45. The sum of the two numbers is 35 and their product is 250.What is the sum of the reciprocals of these numbers.

    (a) $\frac{6}{25}$

    (b) $\frac{4}{25}$

    (c) $\frac{9}{50}$

    (d) $\frac{7}{50}$

46. The maximum number of girls among them 2923 bags and 3239 eyeliners can be distributed in such a way that each student gets the same number of bags and eyeliners.
    (a) 80

(b) 79
(c) 78
(d) 81

47. Which of the following fractions is less than $\frac{8}{9}$ and greater than $\frac{1}{2}$?

(a) $\frac{7}{8}$

(b) $\frac{11}{12}$

(c) $\frac{1}{4}$

(d) $\frac{9}{10}$

48. The value of $\frac{4.8 \times 0.54 \times 2.50}{0.9 \times 0.06 \times 0.5}$ is:
    (a) 200
    (b) 240
    (c) 300
    (d) 280

49. A number when divided successively by 4 and 5 leaves remainders 1 and 4 respectively. When it is successively divided by 5 and 4, then the remainders will be:
    (a) 1, 2
    (b) 2, 3
    (c) 3, 2
    (d) 4, 1

50. 4500× ? = 3375
    (a) 2/5
    (b) 3/4
    (c) 1/4
    (d) 3/5

ANSWERS:

1	(c)	11	(b)	21	(b)	31	(d)	41	(b)
2	(d)	12	(b)	22	(a)	32	(d)	42	(a)
3	(a)	13	(a)	23	(b)	33	(d)	43	(a)
4	(b)	14	(a)	24	(b)	34	(a)	44	(a)
5	(b)	15	(d)	25	(c)	35	(b)	45	(d)
6	(a)	16	(b)	26	(a)	36	(a)	46	(b)
7	(c)	17	(b)	27	(b)	37	(d)	47	(a)
8	(a)	18	(c)	28	(b)	38	(b)	48	(b)
9	(b)	19	(d)	29	(a)	39	(a)	49	(b)
10	(d)	20	(a)	30	(d)	40	(d)	50	(b)

CHAPTER 2: AVERAGES AND ALLIGATIONS

Averages

The term Average refers to the sum of all observations divided by the total number of observations. Average is used quite regular in our day to day life. For example to calculate the average marks of the students, Average height of a particular group etc. The term average is also referred to as 'Mean'. Basic formula to calculate the average is as follows:

$$\text{Average} = \left(\frac{\text{Sum of all observation}}{\text{Number of observation}}\right)$$

Alligation

Alligation is the rule which enables us to find the ratio in which two or more ingredients at the given price must be mixed to produce a mixture of a desired price.

Mean Price

The cost price of a unit quantity of the mixture is called the mean price.

Rule of Alligation

If two ingredients are mixed, then

$$\frac{\text{Quantity of cheaper}}{\text{Quantity of dearer}} = \frac{(\text{C.P. of dearer}) - (\text{Mean price})}{(\text{Mean Price}) - (\text{C.P. of cheaper})}$$

C.P. of unit quantity of cheaper   C.P. of a unit quantity of dearer

(c)   (d)

Mean price

(m)
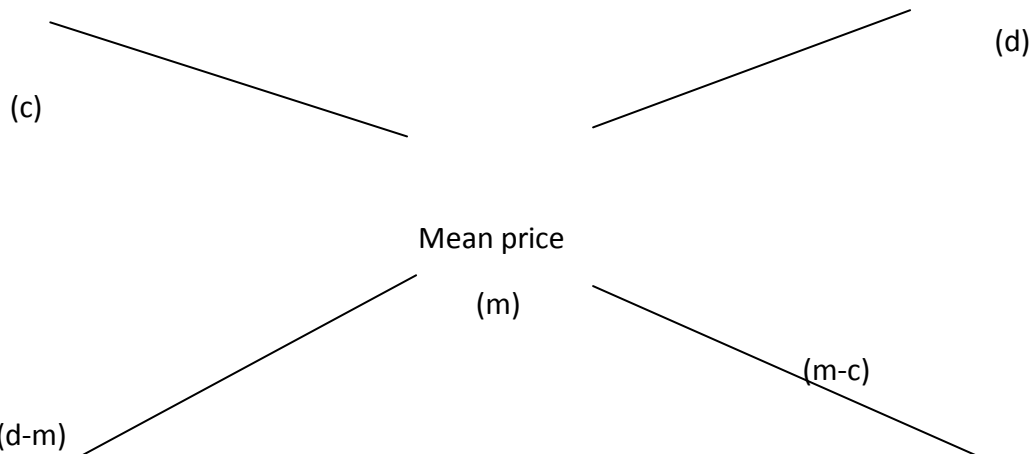
(d-m)   (m-c)

Therefore,

(Cheaper quantity): (Dearer quantity) = (d – m):(m – c)

SOLVED EXAMPLES

Example 1: What is the average of First 10 Prime numbers?

Solution: First 10 Prime number are 2,3,5,7,11,13,17,19,23,29.

Hence, Average = {2+3+5+7+11+13+17+19+23+29} / 10

= 129 / 10

= 12.90

So, Average of First 10 Prime numbers is 12.90.

Example 2: The total number of sales visits made by a Salesman in the month of June is 90. What is the Average visit he makes per day?

Solution: Number of days in the month of June are 30

Hence, Average Visit per day = Number of total visits / Number of total days

= 90 / 30

= 3

So, the salesman makes 3 visits per day.

Example 3: The average of 50 numbers is 30. If two numbers, 25 & 35 are removed, then what will be the average of remaining numbers?

Solution: Total Sum of 50 numbers = 50 x 30 = 1500

Now, If two numbers 25 & 35 are removed then,

Sum of 48 numbers = 1500 – (25 + 35) = 1500 – 60 = 1440

Hence, Average of Remaining 48 numbers = 1440 / 48

= 30

So, the answer is 30.

Example 4 : A batsman scores 87 runs in 17th inning & thus increases his average by 3. What is the average after 17th inning?

Solution: Let the Average after 17th innings be x

Then Average after 16th innings will be x-3

Hence, Total Score After 17th innings = 17x

Now, 16(x-3) + 87 = 17x

16x-48+87 = 17x

X = 39

So, the average score after 17th innings is 39.

Example 5. In Arun's opinion, his weight is greater than 65 kg but less than 72 Kg. his brother does not agree with Arun and he thinks that Arun's weight is greater than 60 Kg but less than 70 Kg. His mother's view is that his weight cannot be greater than 68 kg. If all of them are correct in their estimation, what is the average of different probable weights of Arun?

Solution: Let Arun's Weight be S kg

According to Arun, 65 < S < 72

According to Arun's brother, 60 < S < 70

According to Arun's mother, S < 68

The values satisfying all the above conditions are 66 and 67

Therefore, Required Average= $(\frac{66+67}{2})$ = $(\frac{133}{2})$ = 66.5 Kg

Example 6. David obtained 76, 65, 82, 67 and 85 marks (out of 100) in English, Mathematics, Physics, Chemistry and Biology. What are his Average marks?

Solution:

Average = $(\frac{76+65+82+67+85}{5})$ = $(\frac{375}{5})$ = 75

Example 7.The Average age of35 students in a class are 16 years. The average age of 21 students is 14. What is the average age of remaining 14 students?

Solution : Sum of ages of 14 students = (16 x 35) – (14 x 21) = 560 -294 = 266

Therefore, required average = $(\frac{266}{14})$ = 19 years

Example 8. Of the three numbers, the first is twice the second and the second is twice the third. The average of the reciprocal of the numbers is$\frac{7}{72}$. The numbers are

Solution : Let the third number be x. then, second number = 2x. First number = 4x

Therefore, $\frac{1}{x} + \frac{1}{2x} + \frac{1}{4x} = (\frac{7}{72}$ x 3$) \Rightarrow \frac{7}{4x} = \frac{7}{24}$ or 4x = 24 or 6

So, the numbers are 24, 12 and 6

Example 9.The average price of 10 books is Rs. 12 while the average price of 8 of these books is Rs. 11.75 of the remaining two books, if the price of one book is 60% more than the price of the other, what is the price of each of these two books?

Solution: Total price of the books = Rs. [(12 x 10) – (11.75 x 8)] $\Rightarrow$ Rs. (120 – 94) $\Rightarrow$ Rs. 26

Let the price of one book be Rs. X

Then, the price of other book = Rs. (x +60% of x) = Rs. (x +$\frac{3}{5}$x) =Rs. ($\frac{8x}{5}$)

So, x +$\frac{8x}{5}$ = 26 $\Rightarrow$ 13x = 130 $\Rightarrow$ x = 10

The price of the books is Rs. 10 and Rs. 16

Example 10. In What Ratio must a grocer mix two varieties of pulses costing Rs. 15 and Rs. 20 per kg respectively so as to get a mixture worth Rs. 16.50 per kg?

Solution: By the rule of allegation

Cost of 1 Kg pulses of 1st kind

Rs. 15

Cost of 1 Kg pulses of 2nd kind

Rs. 20

Mean price

Rs. 16.50

3.50

1.50
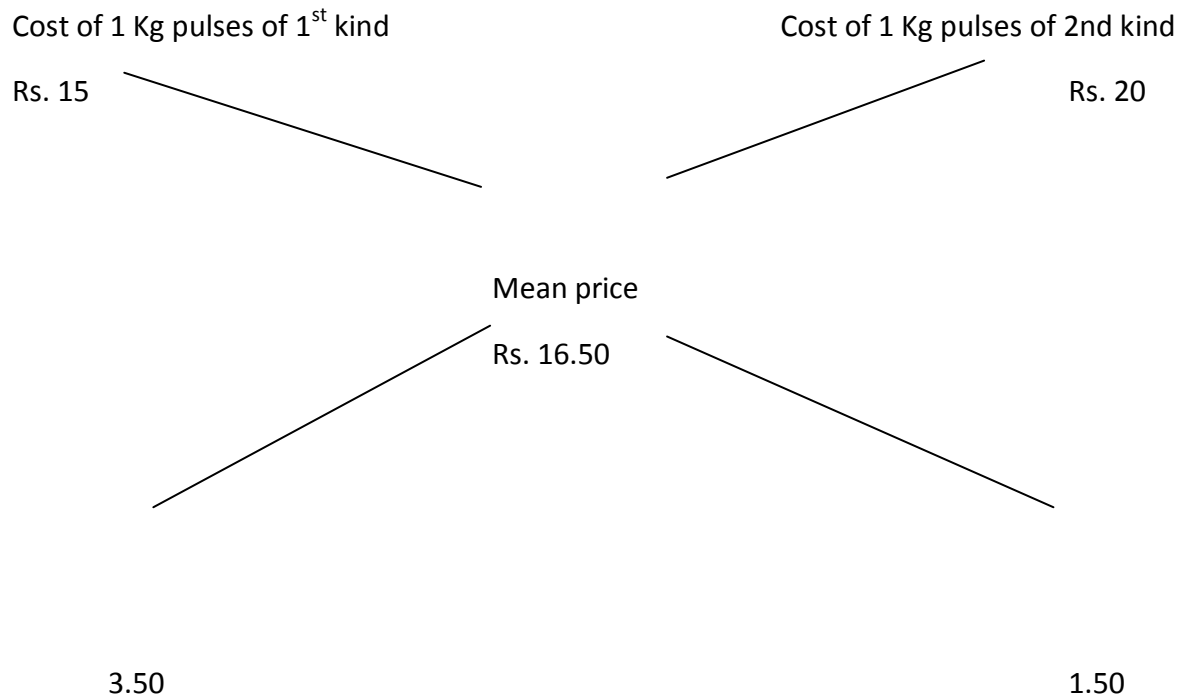
Therefore, Required rate = 3.50: 1.50 = 35 : 15 = 7 : 3

Example 11. Find the ratio in which rice at Rs. 7.20 a kg is mixed with rice at Rs. 5.70 a kg to produce a mixture worth Rs. 6.30 a kg.

Solution: By the rule of allegation

Cost of 1 Kg rice of 1st kind

Cost of 1 Kg rice of 2nd kind

720 p

570 p

Mean price

630 p

60

1.50

Therefore, Required rate = 60 : 90 = 2 : 3

Example 12. In what ratio must a grocer mix two varieties of tea worth Rs. 60 a kg and Rs. 65 a kg so that by selling the mixture at Rs. 68.20 a kg he may gain 10%?

Solution. S.P. of 1 Kg of the mixture = Rs. 68.20, Gain = 10%

C.P. of 1 Kg of the mixture = Rs. ($\frac{100}{110}$ x 68.20) = Rs. 62

By the rule of allegation

Cost of 1 Kg tea of 1st kind

Rs. 60

Cost of 1 Kg tea of 2nd kind

Rs.65

Mean price

Rs. 62

3

2
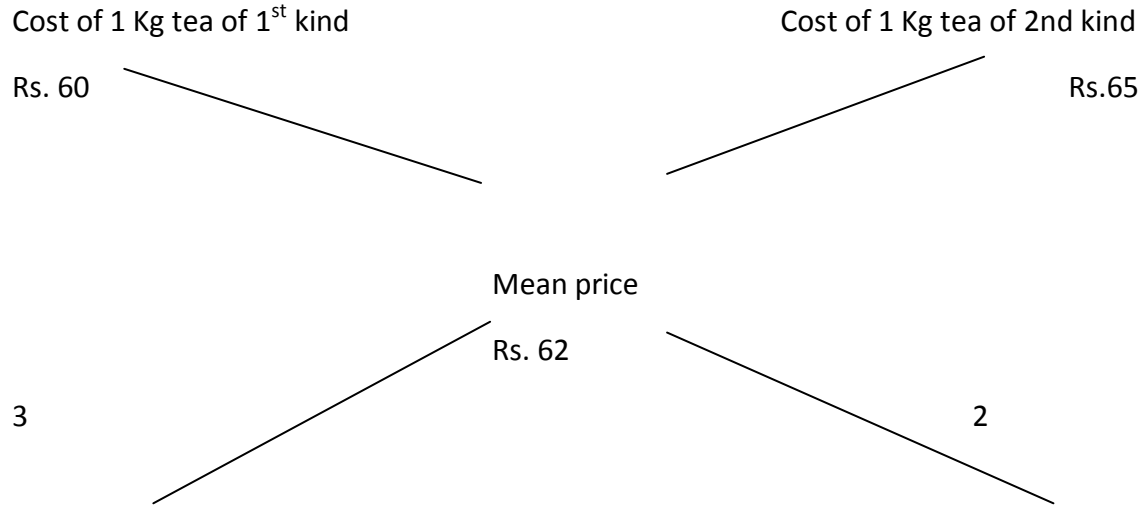
Therefore, Required rate = 3 : 2

Example 13. In what ratio must water be mixed with milk to gain $16\frac{2}{3}$% on selling the mixture as cost price?

Solution: Let C.P. of 1 litre milk be Rs. 1

S.P. of 1 litre of mixture = Rs. 1, gain = $\frac{50}{3}$%

Therefore, C.P. 1 litre of mixture = $(100 \times \frac{3}{350} \times 1)$ = Rs. $\frac{6}{7}$

By the rule of allegation

C.P. of 1 litre of water

0

C.P. of 1 litre of milk

Rs. 1

Mean price

Rs. $\frac{6}{7}$
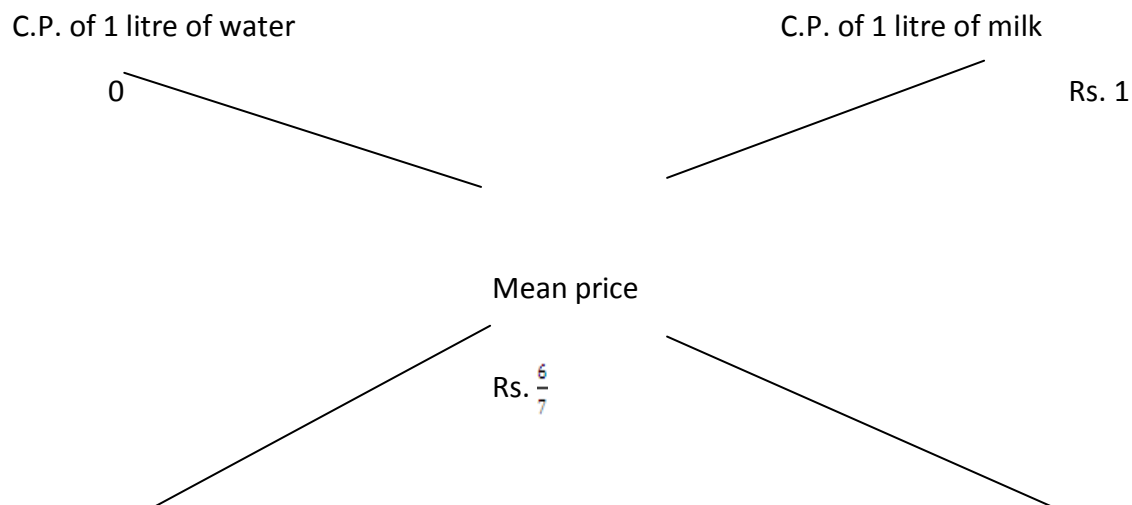
$$\frac{1}{7} \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad \frac{6}{7}$$

Therefore, Required rate $= \frac{1}{7} : \frac{6}{7} = 1 : 6$

Example 14: Tea worth Rs. 126 per kg and Rs. 135 per kg is mixed with a third variety in the ratio 1:1:2. If the mixture is worth Rs. 153 per kg, the price of the third variety per kg will be:

Solution : Since first and second varieties are mixed in equal proportions, so their average price

$= $ Rs. $(\frac{126+135}{2}) = $ Rs. 130.50

So, the mixture is formed by mixing two varieties, one at Rs. 130.50 per kg and the other at say Rs. X per kg in the ratio 2:2 ie, 1:1, we have to find x.

By the rule of allegation

Cost of 1kg tea of 1st kind   Cost of 1kg tea of 2nd kind

Rs. 130.50   Rs. x

Mean price

Rs. 153

(x-153)   22.50

Therefore, $= \frac{x-153}{22,50} = 1 \Rightarrow x - 153 = 22.50 \Rightarrow$ x=175.50

Hence, price of the third variety = Rs. 175.50 per kg.

Example15. Find the average of first 10 natural numbers.

Solution: We know that sum of first n natural numbers $= \frac{n(n+1)}{2}$

Then, the sum of first 10 natural numbers = $\frac{10\ (10+1)}{2} = \frac{10 \times 11}{2} = 55$.

∴ The required average = 55.

Example 16: If the average of four consecutive even numbers is 9, then find the smallest of these numbers.

Solution: Suppose four consecutive even numbers are a, a+2, a+4 and a+6.

Then, $\frac{a+(a+2)+(a+4)+(a+6)}{4} = 9 \Rightarrow \frac{4a+12}{4} = 9 \Rightarrow a+3 = 9 \Rightarrow a=6$.

Hence, the smallest even number = 6.

Example 17. There are two departments, Accounts and Technical in an organization, consisting of 24 and 36 employees respectively. If the average weight of all the employees in Accounts section is 40 kg and that of Technical department is 45 kg. Find the average weight of both the Accounts and Technical departments.

Solution: According to the given problem,

$$\frac{\text{Total weight of all the employees in Accounts Department}}{\text{Number of Employees in Accounts Department}} = 40$$

Total weight of all the employees in Accounts Department = 40 × 24 = 960 kg.

Similarly, total weight of all the employees in Technical Department = 45 × 36 = 1620 kg

Total weight of (Accounts + Technical) Department = 2580 Kg

And total employees in both the Departments = 60.

∴ Average Weight = $\frac{2580}{60}$ = 43 kg

Example 18. The average of 35 numbers is 70. If the average of first 17 numbers is 60 and that of last 17 numbers is 65, then find the 18th number.

Solution: Sum of first 17 numbers = 17 × 60 = 1020

Also, sum of last 17 numbers = 17 × 65 = 1105

∴ 18th number = {Sum of 35 numbers – (sum of first 17 numbers + sum of last 17 numbers)}

= {35 × 70 – (1020+1105)} ⟹ 2450 – 2125 = 325.

Example 19: A famous batsman makes a score of 92 runs in the 15ᵗʰ inning and by this his average increased by 5.what is his average after the 15ᵗʰ inning.

Solution: Suppose his average after 15ᵗʰ inning = a

Then, average after 14ᵗʰ inning = (a – 5)

∴ 15 ✕ a = 14 (a – 5) + 92 ⟹ a =22.

Example 20. What is the average of first five multiples of 3?

Solution: Average = $\frac{3(1+2+3+4+5)}{5}$ = $\frac{45}{5}$ =9.

EXERCISE

1. The average of 50 numbers is zero. Of them, at the most, how many may be greater than zero?
   (a) 1
   (b) 0
   (c) 49
   (d) 19

2. The average of first three multiples of 5 is :
   (a) 10
   (b) 9
   (c) 5
   (d) 3

3. Astha was asked to find the arithmetic mean of the numbers 13, 19, 7, 9, 6, 19, 18, 19, 11, 24, 14 and n. She found the mean to be 12. What should be the number in place of n?
   (a) 12
   (b) 5
   (c) 7
   (d) 13

4. The average temperature of January, February and March was 31°C. The average temperature of February, March and April was 30°C. If the temperature of January was 29°C, find the temperature of April.
   (a) 26 °C
   (b) 23 °C
   (c) 24 °C
   (d) 28 °C

5. In what ratio must Wheat at Rs. 10.30 per kg be mixed with Wheat at Rs. 11.80 per kg so that the mixture be worth Rs. 11 per kg ?
   (a) 7 : 8
   (b) 8 : 7
   (c) 6 : 7

   (d) 7 : 6

6. In what ratio must water be mixed with milk to gain 20% by selling the mixture at cost price?
   (a) 1:6
   (b) 1:5
   (c) 1:4
   (d) 1:3

7. How many kgs of Rice costing Rs. 16 per kg must be mixed with 86 kg of wheat costing Rs. 10.80 per kg so that 20% gain may be obtained by Selling the mixture at Rs. 14.40 per kg ?
   (a) 10.8kg
   (b) 10.7kg
   (c) Cannot be determined
   (d) None of these

8. Rahul thinking, his weight is greater than 130 kg but less than 144 Kg. his friend Alok does not agree with Rahul and he thinks that Rahul's weight is greater than 120 Kg but less than 140 Kg. His Teacher's view is that his weight cannot be greater than 136 kg. If all of them are correct in their estimation, what is the average of different probable weights of Rahul?
   (a) 120 Kg
   (b) 130 Kg
   (c) 140 Kg
   (d) 133 Kg

9. The average age of employees of a company is 31.6 years. The average age of males in the company is 32.8 years and that of the females is 30.8 years. The ratio of the number of males to the number of females in the company is
   (a) 3 : 2
   (b) 1 : 4
   (c) 2 : 3
   (d) 1 : 2

10. The average salary of all Employees in a Company is Rs. 16000. The average salary of 7 IT experts is Rs. 24000 and the average salary of the rest is Rs. 12000. The total number of Employees in the company is
   (a) 32
   (b) 42
   (c) 21
   (d) 84

11. A jar full of whisky contains 80% alcohol. A part of this whisky is replaced by another containing 38% alcohol and now the percentage of alcohol was found to be 52%. The quantity of whisky replaced is:

(a) $1\frac{2}{3}$

(b) $\frac{2}{3}$

(c) $\frac{1}{3}$

(d) $\frac{3}{2}$

12. In what ratio must tea at Rs. 124 per Kg be mixed with tea at Rs. 144 per Kg so that the mixture must be worth Rs. 129 per Kg?
(a) 1 : 3
(b) 2 : 3
(c) 3 : 1
(d) 3 : 2

13. A pot is filled with juice, 3 parts of which are water and 5 parts fruit pulp. How much of the mixture must be drawn off and replaced with water so that the mixture may be half water and half fruit pulp?

(a) $\frac{1}{5}$

(b) $\frac{2}{5}$

(c) $\frac{3}{4}$

(d) $\frac{1}{4}$

14. The average weight of 6 person's increases by 3.5 kg when a new person comes in place of one of them was weighing 70 kg. What might be the weight of the new person?
(a) 111
(b) 65
(c) 70
(d) 91

15. in a class, some student's marks were wrongly entered as 63 instead of 43. Due to that the average marks for the class got increased by half ($\frac{1}{2}$). The number of Students in the class is
(a) 45
(b) 40

(c) 50
(d) 60

16. The captain of a hockey team of 11 members is 27 years old and the Goal keeper is 4 years older. If the ages of these two are excluded, the average age of the remaining players is one year less than the average age of the whole team. What is the average age of the team?
(a) 24
(b) 25
(c) 23
(d) 22

17. Distance between two stations A and B is 886 km. A train covers the journey from A to B at 168 km per hour and returns back to A with a uniform speed of 112 km per hour. Find the average speed of the train during the whole journey?
(a) 67.2 Kmhr
(b) 134.4 Kmhr
(c) 100 Kmhr
(d) 300 Kmhr

18. After replacing old player by a new player, it was found that the average age of five players of a team is the same as it was 3 years ago. What is the difference between the ages of the replaced and the new Player?
(a) 20
(b) 18
(c) 15
(d) 10

19. In 10th Class 16 children are to be divided into two groups RED and BLACK of 10 and 6 children. The average percent marks obtained by the children of group RED are 75 and the average percent marks of all the 16 children is 76. What is the average percent mark of children of group BLACK?

(a) $77\frac{3}{2}$

(b) $77\frac{2}{3}$

(c) $77\frac{3}{4}$

(d) $77\frac{1}{3}$

20. Find the average of first five multiples of 2
(a) 5.5
(b) 6.5

(c) 5
(d) 6

21. If the average of 5, 3, 6, 7, 9, 2, 8, a is 12, then what is the value of a?
   (a) 55.5
   (b) 59
   (c) 56
   (d) 56.5

22. In Arun's opinion, his weight is greater than 65 kg but less than 72 kg. His brother does not agree with Arun and he thinks that Arun's weight is greater than 60 Kg but less than 70 kg .His mother's view is that his weight cannot be greater than 68 kg. If all of them are correct in their estimation, what is the average of different probable weights of Arun?
   (a) 68 kg
   (b) 67 kg
   (c) 69 kg
   (d) None of these

23. A certain number of sweets were distributed among 56 children equally. After each child getting 8 sweets, 17 sweets were left out. How many total sweets were there initially?
   (a) 448
   (b) 431
   (c) 475
   (d) 465
   (e) None of these

24. The average of five positive integers is 385.The average of first two integers is 568.5. The average of the fourth and fifth integers is 187.5. What is the third integer?
   (a) 20
   (b) 382
   (c) 415
   (d) Cannot be determined
   (e) None of these

25. Find the average of the following set of numbers:
      352, 283, 625, 518, 445, 700, 878
   (a) 544
   (b) 568
   (c) 599
   (d) None of these

26. The average height of 40 boys is 1.5 m. When 10 boys leave the group then the average height increases by 0.2 m. What is the average height of the 10 boys who leave?
   (a) 0.8m
   (b) 0.9m
   (c) Cannot be determined

(d) None of these

27. None of theseA car driver travels to a place 100 km away at an average speed of 60km/hr. His average speed for the whole journey in km/hr is:
    (a) 45 km/h
    (b) 43km/h
    (c) 46km/h
    (d) 48km/h

28. The average of the two digit numbers, which remain the same when the digits interchange their positions, is:
    (a) 33
    (b) 44
    (c) 55
    (d) 66

29. The average of a non- zero number and its square is 5 times the number. The number is:
    (a) 9
    (b) 17
    (c) 29
    (d) 295

30. The average age of the boys in a class is 16 years and that of the girls is 15 years. The average age for the whole class is:
    (a) 15 years
    (b) 15.5 years
    (c) 16 years
    (d) Cannot be computed with the following information

31. If the average marks of three batches of 55, 60 and 45 students respectively is 50, 55 and 60, then the average marks of all the students is:
    (a) 53.33
    (b) 54.68
    (c) 55
    (d) None of these

32. The average of six numbers is x and the average of three of these is y. If the average of the remaining three is Z, then:
    (a) X = y + z
    (b) 2X = y + z
    (c) X = 2y + 2z
    (d) None of these

33. Out of nine persons, 8 persons spent Rs. 30 each for their meals. The ninth one spent Rs. More than the average expenditure of all the nine. The total money spent all of them was :
    (a) Rs. 260

(b) Rs. 290
(c) Rs. 292.50
(d) Rs. 400.50

34. The average of 50 numbers is 30. If two numbers, 35 and 40 are discarded, then the average of the remaining numbers is nearly :
(a) 28.32
(b) 28.78
(c) 29.27
(d) 29.68

35. The average age of 35 students in the class is 16 years. The average age of 21 students is 14. What is the average of remaining 14 students?
(a) 15 years
(b) 17 years
(c) 18 years
(d) 19 years

36. The average of six numbers is 3.95. The average of two of them is 3.4, while the average of the other two is 3.85. What is the average of the remaining two numbers?
(a) 4.5
(b) 4.6
(c) 4.7
(d) 4.8

37. The average price of ten books is Rs. 12 while the average price of these books is Rs.11.75.0f the remaining two books, if the price of one book is 60% more then the price of other, what is the price of each of these two books?
(a) Rs. 5, Rs.7.50
(b) Rs. 8, Rs.12
(c) Rs. 10, Rs.16
(d) Rs. 12, Rs.14

38. The average of runs of a cricket player of 10 innings was 32. How many runs must he make in his next innings so as to increase his average of runs by 4?
(a) 2
(b) 4
(c) 70
(d) 76

39. In the first 10 overs of a cricket game, the run rate was only 3.2. What should be the run rate in the remaining 40 overs to reach the target of 282 runs?
(a) 6.25
(b) 6.5
(c) 6.75
(d) 7

40. If the arithmetic mean of 75 numbers is calculated, it is 35. If each number is increased by 5, then mean of new number is:
    (a) 30
    (b) 40
    (c) 70
    (d) 90

41. The mean of 50 observations was 36. It was found later that an obsetrvation 48 was wrongly taken as 23. The corrected new mean is:
    (a) 35.2
    (b) 36.1
    (c) 36.5
    (d) 39.1

42. The average age of 15 students of a class is 15 years. Out of these, the average age of students is 14 years and that of the other 9 students is 16 years. The average of the 15th student is:
    (a) 11 years
    (b) 14 Years
    (c) 15 Years

    (d) $15\frac{2}{7}$ years

43. The average temperature of the town in the first four days of a month was 58 degrees. The average for the second, third, fourth and 5th days was 60 degrees. If the temperatures of the first and fifth days were in the ratio 7:8, then what is the temperature on the 5th day?
    (a) 64 degrees
    (b) 62 degrees
    (c) 56 degrees
    (d) None of these

44. The average monthly income of P and Q is Rs. 5050. The average monthly income of Q and R is Rs. 6250 and the average monthly income of P and R is Rs.5200. The monthly income of P is :
    (a) Rs.3500
    (b) Rs.4000
    (c) Rs.4050
    (d) Rs.5000

45. The average age of 36 students in a group is 14 years. When teachers age is included to it, the average increases by 1. What is the teacher's age in years?
    (a) 31
    (b) 36
    (c) 51

(d) Cannot be determined

46. A cricketer has a certain average for 10 innings. In the 11th inning he scored 108 runs, thereby increasing his average by 6 runs. His new average is:
    (a) 48 runs
    (b) 52 runs
    (c) 55 runs
    (d) 60 runs

47. Three years ago, the average age of a family of 5 members was 17 years. A baby having been born, the average age of the family is the same today. The present age of the baby is:
    (a) 1 year
    (b) $1\frac{1}{2}$ years
    (c) 2 years
    (d) 3 years

48. The Arithmetic mean of the scores of a group of students in a test was 52. The brightest 20% of them secured a mean score of 80 and the dullest 25% a mean score of 31. The mean score of remaining 55% is:
    (a) 45
    (b) 50
    (c) 51.4 approx
    (d) 54.6 approx

49. The average salary of all the workers in a workshop is Rs.8000.the average salary of 7 technicians is Rs. 12000 and the average salary of the rest is Rs. 6000. The total number of workers in the workshop is :
    (a) 20
    (b) 21
    (c) 22
    (d) 23

50. The average age of students of a class is 15.8 years the average age of boys in the class is 16.4 years and that of the girls is 15.4 years. The ratio of the number of boys to the number of girls in the class is:
    (a) 1 : 2
    (b) 2 : 3
    (c) 3 : 4
    (d) 3 : 5

ANSWERS:

1	(c)	11	(b)	21	(c)	31	(b)	41	(c)
2	(a)	12	(c)	22	(d)	32	(b)	42	(a)
3	(c)	13	(a)	23	(d)	33	(d)	43	(a)
4	(a)	14	(d)	24	(e)	34	(d)	44	(b)
5	(b)	15	(b)	25	(d)	35	(d)	45	(c)
6	(b)	16	(a)	26	(b)	36	(b)	46	(a)
7	(a)	17	(b)	27	(d)	37	(c)	47	(c)
8	(d)	18	(c)	28	(c)	38	(d)	48	(c)
9	(c)	19	(b)	29	(a)	39	(a)	49	(b)
10	(b)	20	(d)	30	(d)	40	(b)	50	(b)

CHAPTER 3: PERCENTAGES

In mathematics, a percentage is a way of expressing a number like Ratio, as a fraction of 100.It is denoted by the symbol "%". Percentages are used to express how large/small one quantity is, relative to another quantity. The percent value is computed by multiplying the numeric value of the ratio by 100.

For example 50% read as Fifty percent and it is equal to 50/100 or 0.5.

Percentage is one of the most critical links between **Quantitative Aptitude** and **Data interpretation.**

There are few important points that student should keep in their mind about percentage.

➢ Candidate should remember the basic percentage value for example 10%, 20%, 25% etc.
➢ Candidate should understand the typical language of every question based on percentage.
➢ Candidate should develop the short cut methods for some standard calculations.

CALCULATION OF PERCENTAGE

The Percent Value is computed by multiplying the numeric value of the ratio by 100.

For Example:

If we want to calculate the percentage of 20 oranges out of 80 oranges then,

The required percentage= (20/80) × 100 = 25%

Calculation of Percentage of a Percentage

To calculate a percentage of a percentage first we should convert all the percentages to fractions of 100.

For Example:

40% of 50% = (40/100)× (50/100) = 0.40 × 0.50 = 0.20 = 20/100 = 20%

Percentage Increase

When the value increased by 10 percent, it becomes 1.1 times of itself

Suppose the value of X increased by 10%

> => X + 10% of X

> => X + {(10/100)×X}

> => X + (0.1×X)

=> (1+0.1) ×X

=> (1.1)X

Here new value is 1.1 times of its original value

Percentage Decrease

When any value decreased by 10 percent, it becomes 0.9 times of itself

Suppose the value of X decreased by 10%

=> X - 10% of X

=> X – {(10/100)×X}

=> X – (0.1×X)

=> (1-0.1) ×X

=> (0.9)X

Here new value is 0.9 times of its original value.

SOLVED EXAMPLES

Example 1. Evaluate 35% of 400 + 20% of 280?

Solution: 35% of 400 + 20% of 280 = $\frac{35}{100} \times 400 + \frac{20}{100} \times 280$ = 140 + 56 = 196.

Example 2. What percent of 25 is 400?

Solution: Required percentage = ($\frac{400 \times 100}{25}$)% =1600%.

Example 3.75% of a number is 15 less than 2/5 of that number. What is the number?

Solution: Let the number is x, then

$\frac{2}{5}$ x −75% of x = 15

$\frac{2}{5}$ x − $\frac{75}{100}$ x = 15

($\frac{200 - 75}{500}$) x = 15

$\frac{125}{500}$ x = 15

$$x = \frac{15 \times 500}{125} = 60.$$

Example 4. What is 20% of 50% of 80% 0f 200?

Solution:20% of 50% of 80% of 200 = $\frac{20}{100} \times \frac{50}{100} \times \frac{80}{100} \times 200$ =16.

Example 5: What should be the value of 42($\frac{2}{19}$) % as a fraction?

Solution: 42($\frac{2}{19}$) % = ($\frac{800}{19}$) %

As a fraction ($\frac{800}{19}$) % = $\frac{800}{19 \times 100} = \frac{8}{19}$.

Example 5. if 25% of a number is 250 then what is 10% of that number?

Solution: Suppose the number is x.

Then 25% of x = 250 $\Leftrightarrow \frac{25}{100} \times$ x = 250 $\Leftrightarrow$ x = 1000.

Now 10 % of 1000 = $\frac{10}{100} \times$ 1000 = 100.

Example 6. If 25% of x = 14% of y and y =5000, then find the value of x.

Solution: Here,

25% of x = 14% of y and Y = 5000 $\Leftrightarrow \frac{25}{100} \times$ x = $\frac{14}{100} \times$ 5000

$\Leftrightarrow$ 25 x = 14 $\times$ 5000 = 2800

Example 7. In an election between Ram and Shyam, 65% of the voters cast their votes, out of which 5% of the votes were declared invalid. Ram got 80275 votes which were 65% of the total votes. Find the total number of votes enrolled in this section.

Solution: Suppose the total number of votes enrolled is x, then number of votes cast = 65% of x

Now, valid votes = (100 – 5) % of 65% of x

= 95% of 65% of x

Also, it is mentioned that Ram got 80275 votes which were 65% of the total votes

$\Rightarrow$ 65% of [95% of (65% of x)] = 80275

$$\Rightarrow \frac{65}{100} \times \frac{95}{100} \times \frac{65}{100} \times x = 80275$$

$$\Rightarrow x = \frac{80275 \times 100 \times 100 \times 100}{65 \times 95 \times 65}$$

$$\Rightarrow x = 2,00,000$$

Example 8. The ratio of the salaries of Raghav and Ravi is 20:23. By what percentage is Ravi's salary greater than that of Raghav.

Solution: Given that the ratio of the salaries of Raghav and Ravi = $\frac{20}{23}$

It shows that the salary of Raghv is 20 parts when the salary of Ravi is 23 parts.

Therefore, the percentage by which Ravi's salary is greater than Raghav's salary = $\frac{(23-20)}{20} \times$ 100

$$= 15\%$$

Example 9. The length of a rectangle is increased by 20% and the breadth is increased by 10% then what is the percentage increase in its area.

Solution: Suppose the initial length and breadth of a rectangle is l and b respectively.

Then area of a rectangle = lb

Now, increase in length = $\frac{20}{100}$ l

Increase in breadth = $\frac{10}{100}$ b

New area of the rectangle = (l + $\frac{20}{100}$ l) (b + $\frac{10}{100}$ b)

$$= (1.2) (1.1) lb$$

Percentage increase in area = ($\frac{1.32\, lb - lb}{lb}$) $\times$ 100 = 32%.

Example 10. In a mixture of 60 litres of milk and water, 40% of the mixture is milk. How much water should be added to the mixture so that milk becomes 24% of the mixture?

Solution: From the above situation quantity of milk in a mixture of 60 litres of milk and water

$$= 60 \times 40\% = 60 \times \frac{40}{100} = 24 \text{ litres}$$

Now, if we are adding water to this and keeping the milk constant i.e. 24 litres then it is clear that 24 litres of milk should correspond to 24% of the total mixture.

Therefore, the amount of total mixture should be 100, which shows that we should add 40 litres of water to make 100 litres of mixture.

Example 11. 65% of a% of b is 85% of b% of c then what is the value of c?

Solution: given that,

65% of a% of b = 85% of b % of c

$\Rightarrow \quad \frac{65}{100} \times \frac{a}{100} \times b = \frac{85}{100} \times \frac{b}{100} \times c$

$\Rightarrow \quad 65ab = 85bc$

$\Rightarrow \quad \frac{65}{85} a = c$

$\Rightarrow \quad c = 0.765a$

Example 12. Mr. Kumar invests Rs. 24000 in some shares in the ratio 3:4:5 which pay dividends of 20%, 25% and 10% on his investment for that year respectively. Find his dividend income?

Solution: Mr. Kumar's investments are 24000 × 3/12 = Rs.6000, 24000 × 4/12 = Rs.8000,

24000 × 5/12 = Rs.10000 respectively.

Now, his dividends are

6000 × 20/100 = Rs.1200

8000 × 25/100 = Rs.2000

10000 × 10/100 =Rs.1000

Total Dividend = Rs. (1200 + 2000 + 1000) = Rs. 4200

Example 13. Kushal is a salesman and his commission is 10% on all sales exceeding this. He remits Rs. 2300 to his parent company after deducting his commission. Find the total sales.

Solution: Suppose Kushal's total sales = Rs.x

Then,

Total sales – Commission = Rs. 14320.

∴ x – [10% of 20,000 + 8% of (x – 20000)] = 14320

$\Leftrightarrow$ x - $\frac{10}{100}$ $\times$ 20000 - $\frac{8}{100}$ x + $\frac{8}{100}$ $\times$ 20000 = 14320

$\Leftrightarrow$ 92 x = 1472000

$\Leftrightarrow$ x = 16000.

Example 14. How many Kg of pure salt must be added to 30 kg of 2% solution of salt and water to increase it to a 10% solution?

Solution: In 30 kg solution, amount of salt = ($\frac{2}{100}$ $\times$ 30) kg = 0.6 Kg.

Suppose s kg of pure solt should be added.

Then, $\frac{0.6+s}{30+x}$ = $\frac{10}{100}$ $\Leftrightarrow$ x = $\frac{8}{3}$.

Example 15. Raghuveer's salary was decreased by 50% and subsequently increased by 50%. How much percent does he loss?

Solution: Suppose the original salary = Rs. 100

Then, new final salary = 150% of (50% of Rs. 100) = Rs. ($\frac{150}{100}$ $\times$ $\frac{50}{100}$ $\times$ 100) = Rs. 75.

Example (16-20): Study the following bar graph and answer the questions given below.
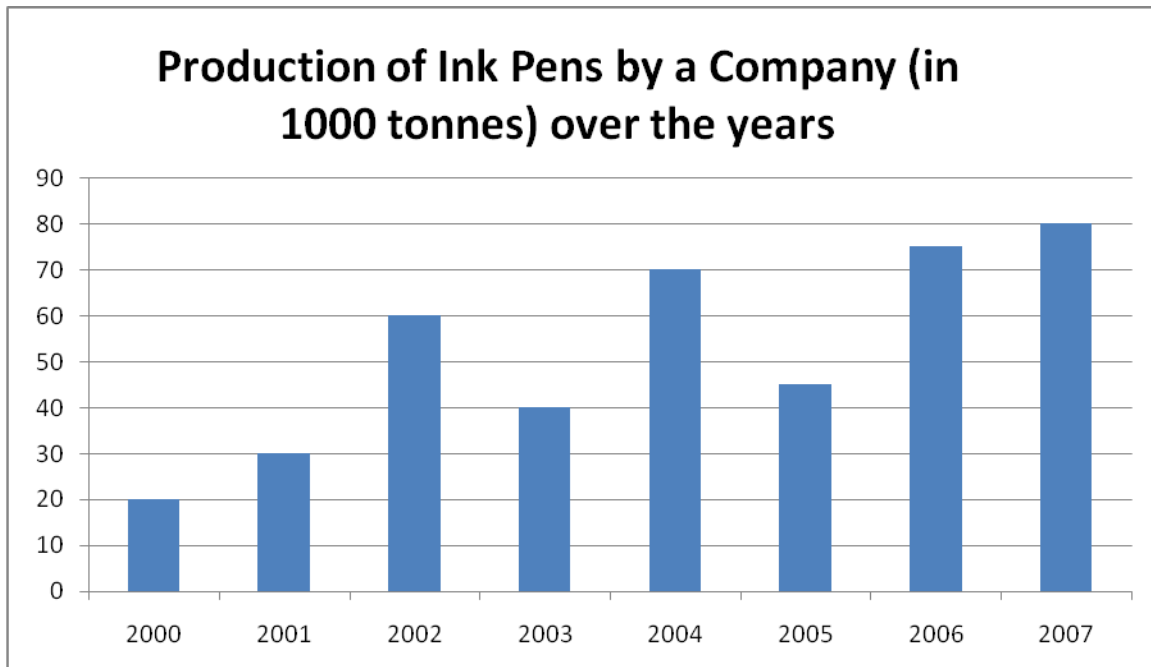
Ex.16 In how many of the given years was the production of ink pens more than the average production of the given years?

(a) 5
(b) 4

(c) 3
(d) 2

Solution: (b) Average production (in 1000 tones) over the given years

$$= \frac{1}{8}(20+30+60+40+70+45+75+80) = \frac{420}{8} = 52.5.$$

Here we can see that the production during the years 2002, 2004, 2006 and 2007 are more than the average production.

Ex.17 The average production of 2002 and 2003 was exactly equal to the average production of which of the following pairs of years?

(a) 2000 and 2004
(b) 2005 and 2006
(c) 2001 and 2004
(d) 2001 and 2007

Solution: (C) Average production of 2002 and 2003 = $\frac{60+40}{2}$ = 50.

Now average production of 2001 and 2004 = $\frac{30+70}{2}$ = 50.

Ex.18 In which year was the percentage increase in production as compared to the previous year the maximum?

(a) 2002
(b) 2001
(c) 2000
(d) 2007

Solution: (a) The percentage increase in as compared to previous years for all the given years are:

In 2001 = $[\frac{(30-20)}{20} \times 100]$ % = 50%

In 2002 = $[\frac{(60-30)}{20} \times 100]$ % = 100%
In 2003 there is a decrease in %.

In 2004 = $[\frac{(70-40)}{40} \times 100]$ % = 75%
In 2005 there is again a decrease in %.

In 2006 = $[\frac{(75-45)}{45} \times 100]$ % = 66.67%

In 2007 = $[\frac{(80-75)}{75} \times 100]$ % = 6.67%

Ex.19What was the percentage decline in the production of ink pens from 2002 to 2003?

(a) 33.33%
(b) 35%
(c) 34.3%
(d) 32.6%

Solution: (a) Percentage decline in the production of ink pens from 2002 to 2003

$$= [\frac{(40-60)}{60} \times 100] \% = 33.33\%.$$

Ex.20. What was the percentage increase in production of ink pens in 2007 compared to that in 2000?

(a) 200
(b) 225
(c) 300
(d) 350

Solution: (c) Required % increase = $[\frac{(80-20)}{20} \times 100] \%$ =300%

EXERCISE

1. If x% of x is 81, then x is equal to:
   (a) 30
   (b) 92
   (c) 90
   (d) 91

2. 65% of a number is more than its two fifth by 140. What is 30% of that number?
   (a) 186
   (b) 168
   (c) 164
   (d) 182

3. 78% of a number is 2496.What is 55% of that number?
   (a) 1815
   (b) 1650
   (c) 1760
   (d) 1705

4. The difference between 78% of a number and 59% of the same number is 323. What is 62% of that number?
   (a) 1071
   (b) 1178
   (c) 1159
   (d) None of these

5. 96% of a number is 5600. What is the value of the number?

(a) 21,000
(b) 20,000
(c) 22,000
(d) 24,000

6. 35% of 411 - x % of 272 = 84.01. Then the value of x is:
   (a) 42
   (b) 36
   (c) 18
   (d) 22

7. Suman went to the stationers and bought things worth Rs. 25, out of which 30 paise went on sales tax on taxable purchases. If the tax rate was 6%, then what was the cost of the tax free items?
   (a) Rs. 15
   (b) Rs. 15.70
   (c) Rs. 19.70
   (d) Rs. 20

8. Of the 2000 inhabitants of a town, 80% are females of whom 40% are litrate. If, of all the inhabitants, 30% are literate, then what percent of the males of the town are literate?
   (a) 85.6%
   (b) 89%
   (c) 90%
   (d) 92%

9. Ishan invests Rs. 4,448.Which is 25% of his monthly income in insurance policy. What is his monthly income?
   (a) Rs. 17, 792
   (b) Rs. 16, 584
   (c) Rs. 16,442
   (d) Rs. 17,774

10. A number is increased by 10% and then again by 10%.By what % should the increased number be reduced so as to get back the original number?
    (a) 17.36%
    (b) 17.11%
    (c) 17.23%
    (d) 17%

11. Milk contains 5% water. What quantity of pure milk should be added to 10 litres of milk to reduce this to 2%?
    (a) 5 litres
    (b) 7 litres
    (c) 15 liters
    (d) Cannot be determined

12. The price of a washing machine set is decreased by 15% as a result of which the sale increased by 10%. What will be the effect on the total revenue of the shop?

(a) 6.5%

(b) 6%

(c) 6.4%

(d) 7%

13. If price of a T- Shirt is increased by 10% and then reduced by 10%. The final price of T-shirt is:

(a) Decrease by 1%

(b) Increase by 1%

(c) Does not change

(d) Cannot determined

14. If in a fraction, numerator is increased by 20% and denominator is increased by 60%, then what fraction of the original is the new fraction?

(a) 4/3

(b) 3/4

(c) 2/3

(d) None of these

15. The total population of a village is 5000. The number of males and females increases by 10% and 15% respectively and consequently the population of the village becomes 5600. What was the number of males in the village?

(a) 2000

(b) 2500

(c) 3000

(d) 4000

16. Mr. Devar spends 38% of his monthly income on food and the remaining amount of Rs. 5800 he saves. What is Mr. Devar's monthly income?

(a) Rs. 23,200

(b) Rs. 24,200

(c) Rs. 23,800

(d) Rs. 24,400

17. Two numbers A and B are less than a third number C by 40% and 48% respectively. How much percent is the second number less than the first?

(a) 13.63

(b) 13.53

(c) 13.43

(d) 13.33

18. The value of a car depreciates at the rate of 20% every year. It was purchased 2 years ago. If its present value is Rs. 9088, then its purchase price was:

(a) Rs. 15,400

(b) Rs. 15,200

(c) Rs. 14,900

(d) Rs. 14,200

19. In a party, 50% had vegetarian lunch and 40% had non-vegetarian lunch and 30% had both types of lunch. If 150 people was present in the party, how many did not eat either type of lunch?
    (a) 68
    (b) 60
    (c) 52
    (d) 48

20. Ram's salary is 40% of Bhanu's salary which is 25% of Chetan's salary. What percentage of Chetan's salary is Ram's salary?
    (a) 10%
    (b) 12%
    (c) 14%
    (d) 16%

21. In a higher secondary examination, 65% students passed in Mathematics and 60% in Physics, 40 % passed in both of these subjects. If 90 students failed in Mathematics and Physics both, then what is the total number of students?
    (a) 550
    (b) 580
    (c) 600
    (d) 620

22. A cow and a calf cost Rs. 5000 and Rs. 2500 respectively. If the price of the Cow and that of the calf is increased by 10% and 20% respectively then the price of 1 dozen cows and 1 dozens calves is:
    (a) 102000
    (b) 102200
    (c) 102400
    (d) 102600

23. Due to an increase of 30% in the price of eggs, 3 eggs less are available for Rs. 7.80. The percent rate of eggs per dozen is:
    (a) Rs. 8.64
    (b) Rs. 8.88
    (c) Rs. 9.36
    (d) Rs. 10.40

24. The daily wage is increased by 50% and a person now gets Rs 45 per day. What was his daily wage before the increase?
    (a) Rs. 40
    (b) Rs. 30
    (c) Rs. 25
    (d) Rs. 28

25. Due to fall in manpower, the production in a factory decreases by 30%. By what percent should the working hour be increased to restore the original production level?

    (Hint: Required percentage increase in working hours = $\left(\frac{30}{100-30}\right) \times 100$)

(a) 300/7%

(b) 400/9%

(c) 350/7%

(d) None of these

26. The population of a City is 5500. If the number of females increased by 20%, and number of males increased by 11%, then the population of the city becomes 6330. Find the population of females in the town.

(a) 3200

(b) 2500

(c) 1999

(d) 2800

27. If 20% of a = b, then b% of 20 is the same as:

(a) 8% of a

(b) 7% of a

(c) 6% of a

(d) 4% of a

28. In the recent survey, 40 % houses contained two or more people. Of those houses containing only one person, 25% were having only a male. What is the percentage of all houses, which contain exactly one female and no males?

(a) 20

(b) 55

(c) 75

(d) None of these

29. Akash gave 40% of the amount he had to Raj. Raj in turn gave one-fourth of what he received from Akash to Sagar. After paying Rs. 200 to the taxi driver out of the amount he got from Raj, Sagar now has Rs. 600 left with him. How much amount did Akash have?

(a) Rs. 7500

(b) Rs.8000

(c) Rs.8500

(d) Rs.9000

30. Due to an increase of 30 % in the price of Bananas, 3 bananas less are available for Rs. 7.80.
The present rate of Bananas per dozen is:

(a) Rs. 9.36

(b) Rs. 9.56

(c) Rs.9.34

(d) Rs.10

31. In some quantity of ghee, 60 % is pure ghee and 40 % is vanaspati. If 10 kg of pure ghee is added, then the strength of Vanaspati ghee becomes 20%. The original quantity was:

(a) 12

(b) 10

(c) 8

(d) 11

32. The value of a washing machine depreciates at the rate of 10% every year.It was purchased 3 years ago. If its present value is Rs. 8748, its purchase price was:
    (a) Rs.11,000
    (b) Rs.12,000
    (c) Rs.13,000
    (d) Rs.14,000

Directions (Q.33 – 37): The following table gives the percentage of marks obtained by seven students in six different subjects in an examination. Study the table and answer the questions based on it. The numbers in the brackets give the maximum marks in each subject.

Subjects (Max. Marks) Student	Management Process (150)	Quantitative Techniques (130)	Managerial Economics (120)	Business Environment (100)	Accounting for Managers (60)	Computer Application for Business (40)
Akash	90	50	90	60	70	80
Arman	100	80	80	40	80	70
Sagar	90	60	70	70	90	70
Rahul	80	65	80	80	60	60
Mukesh	80	65	85	95	50	90
Tiya	70	75	65	85	40	60
Tamanna	65	35	50	77	80	80

33. What was the aggregate of marks obtained by Sagar in all the six subjects?
    (a) 489
    (b) 449
    (c) 469
    (d) 459

34. What is the overall percentage of Tamanna?
    (a) 53.5%
    (b) 59%
    (c) 60%
    (d) 63%

35. What are the average marks obtained by all the seven students in Managerial Economics? (rounded off to two digits after decimal)
    (a) 79.26
    (b) 89.14
    (c) 91.37
    (d) 96.11

36. The number of students who obtained 60% and above marks in all the subjects is:
    (a) 4
    (b) 2
    (c) 1

(d) None of these

37. The overall percentage is the best in:
    (a) Accounting for Managers
    (b) Management Process
    (c) Managerial Economics
    (d) Quantitative Techniques

Directions (Question 38 to 42): A survey of magazine reading habits of the people living in five P, Q, R, S and T is summarized in a table given below. The Column I in the gives percentage of summarized of magazine- readers in each city who read only one magazine a week. The Column II gives the table number of magazine – readers who read two or more magazine a week. Read the table and then answer these questions:

City	I	II
P	75	6000
Q	80	3500
R	60	3000
S	55	2700
Y	25	4200

38. The city with the lowest number of magazine – readers is :
    (a) Q
    (b) R
    (c) S
    (d) T

39. Which city has the highest number of magazine – readers who read only magazine a week?
    (a) P
    (b) Q
    (c) R
    (d) S

40. The highest number of magazine – readers in any given city is :
    (a) 17500
    (b) 18000
    (c) 12500
    (d) 16500

41. How many magazines – readers in city Q read only one magazine a week?
    (a) 14000
    (b) 18000
    (c) 12500
    (d) 16500

42. The total number of all the magazine – readers in the five cities who read only one magazine a week is :
    (a) 19400
    (b) 24000

(c) 41200

(d) 42000

43. The population of a town is 1,00,000. Increase rate per annum is 10%. Find the population at the starting of the fourth year.

(a) 141000

(b) 142300

(c) 133100

(d) 133200

44. In January or February, Ramesh can run 'a' meters on one bottle of Glucose. But in May or June, he can only run 0.5a meters on one bottle of Glucose. How many bottles of Glucose are required to run 400 meters during summer?

(a) 900/a

(b) 850/a

(c) 800/a

(d) 750/a

45. Arjun scored 30% marks and failed by 15 % marks. Birju scored 40% marks and obtained 35% marks more than those required to pass. The pass percentage is:

(a) 35%

(b) 34%

(c) 33%

(d) 32%

Directions (Q.46-50): Below is the pie chart of the percentage market share of the companies in the detergent market for 2002 and 2003
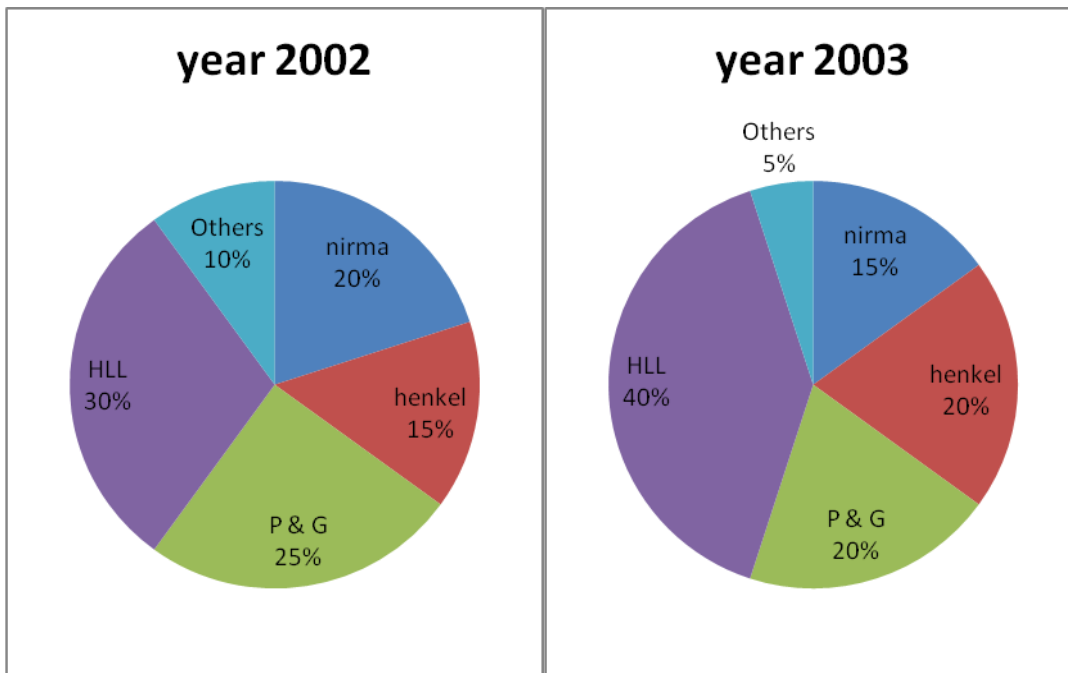
The total size of the market has increased from Rs 150 crore in 2002 to Rs. 375 crore in 2003?

46. What is the percentage increase in sales of the overall detergent market in 2003 over 2002?
    (a) 100 %
    (b) 150 %
    (c) 200 %
    (d) 250 %

47. Which of the following shows the minimum growth in sales in the year 2003 over the year 2002?
    (a) P & G
    (b) HLL
    (c) Henkel
    (d) others

48. What is the approx growth rate of HLL?(d)
    (a) 133 %
    (b) 233 %
    (c) 333 %
    (d) 433 %

$$\{Hint:\ growth\ rate\ of\ HLL = \frac{40\%\ of\ 375 - 30\%\ of\ 150}{30\%\ of\ 150} \times 100\ \}$$

49. What is the ratio of sales of P & G in the year 2003 to its sales in the year 2002?
    (a) 5:2
    (b) 3:2
    (c) 2:5
    (d) 1:2

50. If the sales value of all the companies in 2002 would have been higher by 10 %, then the detergent market would have been larger by how much value?
    (a) 15 crore
    (b) 25 crore
    (c) 30 crore
    (d) 10 crore

ANSWERS:

1	(c)	11	(c)	21	(c)	31	(b)	41	(a)
2	(b)	12	(a)	22	(a)	32	(b)	42	(c)
3	(c)	13	(a)	23	(c)	33	(b)	43	(c)
4	(d)	14	(b)	24	(b)	34	(c)	44	(c)
5	(b)	15	(c)	25	(a)	35	(b)	45	(a)
6	(d)	16	(a)	26	(a)	36	(b)	46	(b)
7	(c)	17	(d)	27	(d)	37	(b)	47	(d)
8	(c)	18	(d)	28	(d)	38	(d)	48	(b)
9	(a)	19	(b)	29	(b)	39	(a)	49	(d)
10	(a)	20	(a)	30	(a)	40	(c)	50	(a)

CHAPTER 4: PROFIT AND LOSS

Profit and Loss is an extension of the chapter of percentages. It is a very important branch of basic Mathematics. This branch deals with the study of Profit and loss made in any commercial transaction. The entire economy and the concept of capitalism is based on the so called "Profit Motive".

Some basic terms used in Profit and loss are:

Cost price – The price, at which an article is purchased, is called Cost price and it is abbreviated by C.P.

Selling Price – The price, at which an article is sold, is called its selling price and it is abbreviated by S.P.

Profit –

If S.P. > C.P., then seller is said to have a profit.

Loss –

If SP < CP, Then seller is said to have incurred a loss.

Formulae –

- Profit or Gain = S.P. – C.P.

- Loss = C.P. – S.P.

- Gain % = $\frac{Gain \times 100}{C.P.}$

- Loss % = $\frac{Loss \times 100}{C.P.}$

- S.P. = $\frac{(100 + Gain\%)}{100} \times C.P.$

- S.P. = $\frac{(100 - Loss\%)}{100} \times C.P.$

- C.P = $\frac{100}{(100 + Gain\%)} \times S.P.$

- C.P = $\frac{100}{(100 - Loss\%)} \times S.P.$

➢ If a person sells two similar items, one at a gain of A%, and the other at a loss of A%, then the seller always incurs a loss. This loss can be calculated by:

$$\text{Loss \%} = \left(\frac{\text{Common loss and gain \%}}{10} \right)^2$$

➢ If an article sold at two different selling price sale price_1 and sale price_2 respectively. On one gain_1 is made and on the other gain_2 is made then:

$$\frac{\text{sale price}_1}{100 + \text{gain}_1 \%} = \frac{\text{sale price}_2}{100 + \text{gain}_2 \%}$$

Profit calculation on the basis of equating the Amount Spent and the Amount Earned:

If the person is going through the transaction has got back all the money that he has spent, but has ended up with some amount of goods left over after the transaction.

$$\text{\% Profit} = \frac{\text{Goods left}}{\text{Goods sold}} \times 100$$

SOLVED EXAMPLES

Example: 100 apples are bought at the rate of Rs. 500 and sold at the rate of Rs. 84 per dozen. What will be the percentage of profit and loss?

Solution: We will solve this in steps

Step I: Given that C.P. of 100 apples = 500

$$\text{Then, C.P. of 1 apple} = \frac{500}{100}$$
$$= 5$$

Step II: Also given that per dozen S.P. of apples = 84

$$\text{Then, S.P. of 1 apple} = \frac{84}{12}$$
$$= 7$$

Step III: Now, we know that

$$\text{Gain \%} = \frac{\text{Gain} \times 100}{\text{C.P.}}$$

$$= \frac{(\text{S.P. of 1 apple} - \text{C.P. of 1 apple}) \times 100}{\text{C.P.}}$$

$$= \frac{(7-5) \times 100}{5}$$

$$= \frac{2 \times 100}{5}$$
$$= 40\%$$

Therefore, there is a profit of 40% in the whole selling process.

Example2. Kartik sold an item for Rs. 6,500 and incurred a loss of 20%. At what price should he sold the item to have gained a profit of 20%

Solution: If selling price = Rs. 6,500

Then, loss = 20%

We know the formula S.P. = $\frac{(100-Loss\%)}{100}$ × C.P. $\Leftrightarrow$ C.P.= $\frac{S.P.\times 100}{(100-Loss\%)}$ $\Leftrightarrow$ $\frac{6500\times 100}{80}$ $\Leftrightarrow$

Rs.8,125

Now new S.P = $\frac{(100+20)}{100}$ × 8125. $\Leftrightarrow$ Rs.9750

Hence, new selling Price should be Rs. 9750.

Example 3. The list price of an article is Rs. 80. There is a discount of 10% . What is the selling price?

Solution: Given that the list price of an article = Rs. 80.

Discount = Rs. 80 ✕ 10% = Rs. 80 ✕ 10% = 8

Therefore, the selling price = Rs. (80 − 8) = Rs. 72.

Example 4. Find the selling price of an article listed at Rs. 1500 on which there are discounts of 30 %, 20% and 10%.

Solution: Given that listed price = Rs. 1500

Rs. 1500 ✕ 30% = Rs. 450

Rs. 1500 − Rs. 450 = Rs. 1050

Now, Rs. 1050 ✕ $\frac{20}{100}$ = Rs.210

Rs. 1050 − Rs. 210 = Rs. 840.

Example 5. A trader offers his customers 15% discount and still makes a profit of 25%. What is the actual cost to him of an article marked Rs. 350.

Solution: Given that marked price = Rs. 350

Marked price – Marked price ✕ discount % = selling price _____ (1)

& selling price = Cost price + cost price ✕ gain % _____ (2)

From (1) and (2)

Marked price – Marked price ✕ discount % = Cost price + cost price ✕ gain %

$\Rightarrow$ 350 (1 – 15 %) = Cost price (1+ 25 %)

$\Rightarrow$ 350 (1 – $\frac{15}{100}$) = cost price (1+$\frac{25}{100}$)

$\Rightarrow$ Cost price = 14 ✕ 17 = Rs. 238.

Example 6. A whole – seller allows a discount of 30 % on the list price to a retailer. The retailer sells at 10 % discount on the list price. If the customer paid Rs. 63 for an article, what profit is made by the retailer?

Solution: The customer pays Rs. 63 after a discount of 10%.

If the list price is Rs. x , then

 X – 10% of x = 63

X = Rs. 70

Therefore, the list price = Rs. 70

The retailer buys the article at 30 % discount

= 70 – 30 % of 70

=Rs. 59

Then the profit for the retailer = Rs. (63 -59) = Rs.4.

Example 7.A book costs Rs.480. If it is sold at a loss of 55%. What will be its cost price as a percentage of its selling price?

Solution: A loss of 55 % means cost price is 100 corresponding to a selling price of 45 .

Cost price as a percentage of selling price =($\frac{100}{45}$ ✕ 100) = 222.22%.

Example 8. What are the successive discounts of 10 %, 12 % and 15% amount to a single discount?

Solution: Suppose the marked price = Rs. 100

 The, S.P. = 85% of 88% of 90% of Rs. 100 = Rs. 67.32.

Therefore, the single discount = (100 – 67.32) % = 32.68 %.

Example 9. Find the selling price of an article if a shopkeeper allows two successive discounts of 5% each on the marked price of Rs.80.

Solution: Selling price = 95% of 95% of Rs. 80 = Rs.($\frac{95}{100}$ ✕ $\frac{95}{100}$ ✕ 80) = Rs. 72.20.

Example 10. The cost price of an article is 64% of the marked price. Calculate the gain percent after allowing a discount of 12%.

Solution: Suppose the marked price = Rs. 100.

Then, CP = Rs. 64. S.P. = Rs.88.

Therefore, gain percent = ($\frac{24}{64} \times 100$) % = 37.5%.

Example11. A shopkeeper sold a T.V. set for Rs. 17,940 with a discount of 8% and earned a profit of 19.6 %. What would have been the percentage of profit earned if no discount was offered?

Solution: S.P. = Rs 17,940.

Suppose the marked price = Rs. x.

Then, $\frac{92}{100}$ x = 17940 $\Rightarrow$ x = Rs. (17940 $\times \frac{100}{92}$) = Rs. 19500.

C.P. = Rs. (17940 $\times \frac{100}{119.6}$)= Rs.15000

Now, required profit % = ($\frac{4500}{15000} \times 100$)% = 30%.

Example 12. Find S.P., when C.P. = Rs. Rs.150, gain = 20%.

Solution: S.P. = 120% of Rs.150 = Rs.180.

Example13. Find C.P., when S.P = 240, gain = 20%.

Solution: C.P. = Rs. ($\frac{100}{120} \times 240$) = Rs. 200.

Example14. On selling 17 balls at Rs. 720, there is a loss equal to the cost price of 5 balls. What is the cost price of a ball?

Solution: (Cost price of 17 balls – (Selling price of 17 balls) = (CP of 5 balls)

$\Rightarrow$ C.P. of 12 balls = S.P. of 17 balls = Rs. 720

$\Rightarrow$ C.P. of 1 ball = Rs. $\frac{720}{12}$ = Rs. 60.

Example14. A vendor bought toffees at 6 for a rupee. How many for a rupee must he sell to gain 20%?

Solution: cost price of 6 toffee = Rs. 1

Selling price of 6 toffees = 120% of Rs1 = Rs.$\frac{6}{5}$

Then, for Rs.$\frac{6}{5}$, toffee sold = 6. For Rs.1, toffees sold = (6 $\times \frac{5}{6}$)=5.

Example 15. A fruit vendor recovers the cost of 15 oranges by selling 10 oranges. Find his percentage profit.

Solution: Here the money spent is equal to the money earned the percentage profit is given by

% Profit = $\frac{Goods\ left}{Goods\ sold}$ $\times$ 100 = 5 $\times$ 100/10 =50%.

Example 16. At what percentage above the CP must an article be marked so as to gain 33% after allowing a customer a discount of 5%?

Solution: Suppose CP = Rs. 100.

Then , S.P. = Rs.133

Also suppose that marked price = Rs. x.

Then, 95% of x = 133 $\Rightarrow$ 95x/100 =133 $\Rightarrow$ x =140.

Example 17. A retailer buys 40 pens at the marked price of 36 pens from a wholesaler. If he sells these pens giving a discount of 1%, what is the profit percent?

Solution: Suppose the marked price of each pen be Rs.1

Then, C.P. of 40 pens = Rs 36 S.P. of 40 pens = 99% of Rs.40 =Rs. 39.60.

∴ profit % =($\frac{3.60}{36}$ $\times$ 100)% =10%.

Example 18. A man sold two plots for Rs. 15,00,000 each. On one he gains 25% while on the other he loses 25%. How much does he gain or loss in the whole transaction.

Solution: In such a case there is always a loss

∴ Loss % = ($\frac{Common\ loss\ and\ gain\ \%}{10}$)^2 =($\frac{25}{10}$)^2 =6.25%.

Directions (Ex.19-20): The following line graph represent the annual percent profit earned by XYZ Company during the period 2000 – 2006. Study the line-graph carefully and answer the questions accordingly.

Percent profit Earned by XYZ Company over the years

$$\textbf{\% Profit} = \frac{Income - Expenditure}{Expenditure} \times 100$$

Y axis represent the percent profit and X axis represent the years
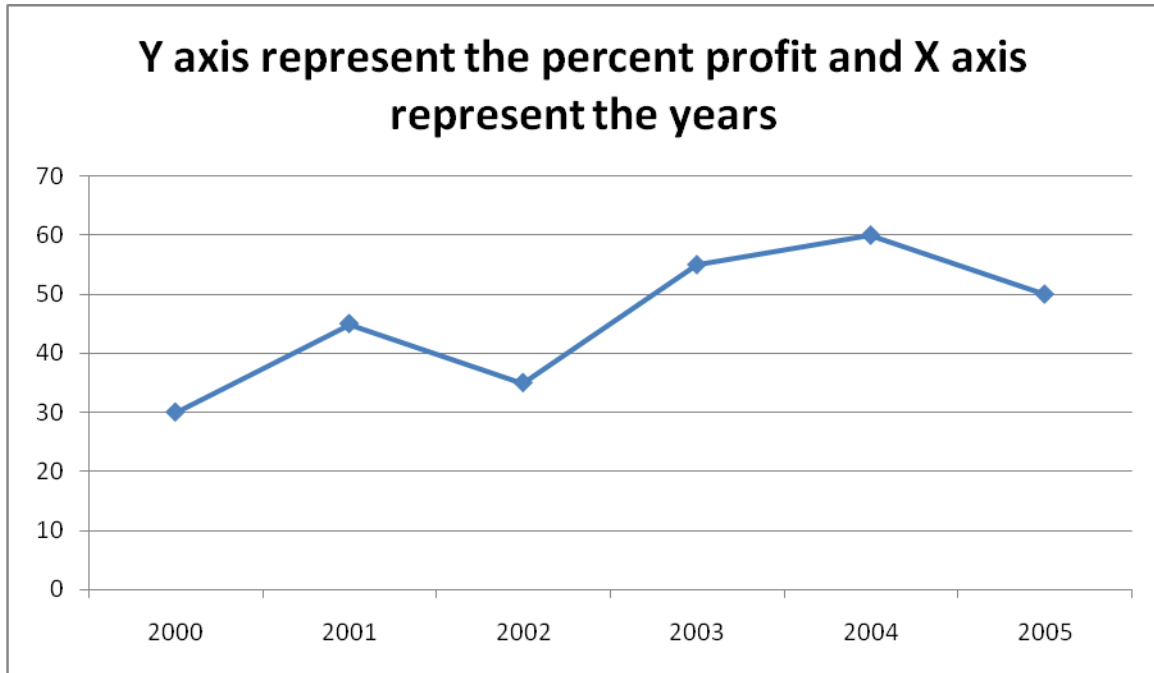
Example 19.If the income in 2004 was Rs.288 crores, then what was the expenditure in 2004?

Solution: Suppose the expenditure in 2004 is 288 crores.

Then, $60 = \left(\frac{288 - \text{Expenditure}}{\text{Expenditure}}\right) \times 100 \Leftrightarrow$ Expenditure = 180 crore.

Example 20: In which year the expenditure is minimum?

Solution: This graph gives the comparison of percentage profit for different years. Here the data is not sufficient to compare the expenditures.

EXERCISE

1. Arjun buys an old car for Rs 1, 12,000 and spends 8000 on its repairs. If he sells the Car for Rs 1,80,000, his gain percent is:
   (a) 50
   (b) 51
   (c) 52
   (d) 53

2. Ajay sells a painting which costs him Rs 500 to Bablu at a profit of 20%. Bablu then sells it to Chirag, making a profit of 30% on the price he pays to A. How much does Chirag pay to Bablu?
   (a) 789
   (b) 790
   (c) 782
   (d) 780

3. When a Scooter is sold for Rs. 25,000, the owner loses 20%.At what price must the scooter be sold in order to gain 20 %?
   (a) 37,500
   (b) 37,520
   (c) 37,000
   (d) 39,000

4. The ratio between the sale price and the cost price of an article is 8:3.What is the ratio between the profit and sale price of that article?
   (a) 5:3
   (b) 5:8
   (c) 5:9
   (d) 5:7

5. On selling 19 balls at Rs. 840, there is a loss equal to the cost price of 7 balls. The cost price of a ball is:
   (a) 84
   (b) 83
   (c) 70
   (d) 72

6. Rajesh purchased toffees at 12 for a rupee. How many for a rupee must he sell to gain of 20%?
   (a) 8
   (b) 9
   (c) 10
   (d) 11

7. A man bought some bananas at the rate of 16 for Rs.24 and sold them at the rate of 8 for Rs 18.What is the profit percentage?
   (a) 30%
   (b) 60%
   (c) 50%
   (d) 55%

8. If loss is 1/4 of S.P., the loss percentage is:
   (a) 25%
   (b) 20%
   (c) 35%
   (d) 40%

9. By selling an article for Rs. 150, a man gains Rs. 25.Then his gain percent is:
   (a) 22%
   (b) 25%
   (c) 20%
   (d) 30%

10. Rahul gain 80 paisa on Rs. 40.His gain percent is:
   (a) 1%

(b) 2%
(c) 3%
(d) 4%

11. Ramesh buys a chair for Rs. 2000.00 & sells it to Mohan at a profit of 12.5%. What is the selling price of the chair?
    (a) Rs. 2225
    (b) Rs. 2275
    (c) Rs. 2250
    (d) Rs. 2325

12. A shopkeeper purchased 40 ceiling fans at a price of Rs.500 per ceiling fan from a wholesaler, but due to competition in the retail market, he was forced to sell at a price of Rs. 490 per ceiling fan. What is his Loss percent per ceiling fan?
    (a) 1%
    (b) 2.5%
    (c) 0.5%
    (d) 2%

13. If rice is sold for Rs.50 per kg, then there is a loss of 2%. What is the cost price of rice per kg?
    (a) Rs. 51
    (b) Rs. 52
    (c) Rs. 51.5
    (d) Rs. 50.5

14. If sohan gains Rs.2 on Rs.80, then what is his gain percent?
    (a) 3%
    (b) 2.5%
    (c) 1.5%
    (d) 2%

15. A man buys a bicycle for Rs.1750 & sells it for Rs.1820. What is his gain percent?
    (a) 5%
    (b) 4%
    (c) 4.5%
    (d) 6%

16. A man gains 20% by selling an article for a certain price. If he sells it at double the price, then what will be the profit percentage?
    (a) 60
    (b) 100
    (c) 80
    (d) 140

17. If the selling price of 40 pens is equal to the cost price of 30 pens, then the loss or gain percent is:
    (a) 30% Gain
    (b) 25% Loss

(c) 25% Gain
(d) 20% Loss

18. By selling 20 mobiles for Rs. 36000, the seller gains the cost price of 4 mobiles. Then what is the cost price of each mobile?
(a) Rs. 1500
(b) Rs. 1800
(c) Rs. 1600
(d) Rs. 1550

19. Ashish bought goods for Rs.5000 & sold half of them at a gain of 5%. At what gain percent he must sell the remaining half of the goods to get a gain of 20% on the whole.
(a) 45%
(b) 30%
(c) 35%
(d) 25%

20. If loss is 1/6 of Selling Price, the loss percentage is :
(a) 28.57%
(b) 28.27%
(c) 27.5%
(d) 28%

21. A book costs Rs.480. If it is sold at a loss of 55%. What will be its cost price as a percentage of its selling price?
(a) 220.22%
(b) 221.22%
(c) 222.22%
(d) 224%

22. A whole seller allows a discount of 30% on the list price to a retailer. The retailer sells at 10% discount on the list price. If the customer paid Rs.63 for an article, what profit is made by the retailer?
(a) Rs.4
(b) Rs.5
(c) Rs.6
(d) Rs.7

23. Ramesh sold his paternal house for Rs. 14,40,000 & makes a profit of 20%. If he had sold it for Rs.11,40,000, then what percentage of loss or gain he would have made ?
(a) 5% Gain
(b) 5% Loss
(c) 6% Loss
(d) 7.5 Gain

24. Due to recession a Real Estate company sells each constructed flat @ Rs.4,50,000 & there by loses 10% on each flat. Had it been a good market conditions then at what price company must have a sold the flats to make a of gain of 15% on each flat?
(a) Rs. 6,00,000

(b) Rs. 5,50,000
(c) Rs. 5,75,000
(d) Rs. 6,25,000

25. A shopkeeper gains 25% by selling a ceiling fan for a certain price. If he sells it at double the price, the profit percentage will be?
(a) 125%
(b) 50%
(c) 150%
(d) 140%

26. If the cost price of 16 pencils Is equal to the selling price of 12 pencils, then gain percent?
(a) 50%
(b) 33%
(c) 33.33%
(d) 40%

27. A businessman purchased an old Oil factory for Rs.60,00,000 & spent Rs.5,00,000 on repair of machinery then sold the factory at a profit of 20%. At what price did he sell the factory?
(a) Rs. 75,50,000
(b) Rs. 78,00,000
(c) Rs. 70,00,000
(d) Rs. 80,00,000

28. A Vegetable seller bought 120 Kg Onions @Rs.12 per kg from a Wholesaler & sells it @ Rs.15 per kg. What is his gain percent?
(a) 20%
(b) 22%
(c) 25%
(d) 27.5%

29. Mr. Joseph from Mumbai purchased 400 CCTV Cameras @Rs.1500 per camera from a Seller in Delhi. He spent Rs.40,000 on transportation from Delhi to Mumbai & paid Rs.20,000 as entry tax. If he sells each CCTV @Rs.1848, then what is the gain or loss percent per CCTV?
(a) 15% Loss
(b) 12% Gain
(c) 18% Gain
(d) 15% Gain

30. If the ratio of cost price to selling price is 6:5. The loss percent will be?
(a) 15%
(b) 16.66%
(c) 17.5%
(d) 16%

31. Raman sold a pen at a profit of 5%. If he would have sold it for Rs.8.50 more, he would have gained 22%. What is the cost price of pen?
(a) Rs. 60
(b) Rs. 30
(c) Rs. 50
(d) Rs. 55

32. A Shopkeeper sold two bicycles for Rs.1800 each. If he makes a profit of 20% on first cycle & 10% loss on second cycle. What is the total cost price of both cycles?
(a) Rs. 4000
(b) Rs. 3500
(c) Rs. 3800
(d) Rs. 4200

33. A retailer buys 25 toffees for Rs.5. How many toffees for a rupee the retailer must sell to to gain a profit of 25%
(a) 5
(b) 4
(c) 6
(d) 3

34. If a shopkeeper reduces the selling price of a mixer from Rs.1500 to Rs.1400, his loss increases by 5%. What is the cost price of mixer?
(a) Rs. 2500
(b) Rs. 1800
(c) Rs. 2000
(d) Rs. 3000

35. A shopkeeper bought a number of bananas at 6 for a rupee & an equal number at 3 for a rupee. At what price per dozen should the shopkeeper sell to make a profit of 20%?
(a) Rs. 5
(b) Rs. 3.60
(c) Rs. 4.20
(d) Rs. 6

36. A man bought some toffees at the rate of 8 for Rs. 12 & sold them at the rate of 4 for Rs.8. What is the profit percent?
(a) 33.33%
(b) 37.50%
(c) 50%
(d) 40%

37. The difference between cost price & selling price of a chair is Rs.120. If the loss is 15%, then cost price is?
(a) Rs. 1000
(b) Rs. 900
(c) Rs. 800
(d) Rs. 920

CSAT Comprehensive

38. A trouser marked at Rs.800 is being sold at Rs.560. What is the percentage of discount given?
(a) 20%
(b) 30%
(c) 35%
(d) 25%

39. The Marked price of a shirt is Rs.2000; the shopkeeper offers successive discounts of 10% & 15% respectively. What is the selling price of shirt?
(a) Rs. 1600
(b) Rs. 1520
(c) Rs. 1530
(d) Rs. 1620

40. A discount of 20% on Refrigerator is same as discount of 25% on Washing Machine. The costs of both the items can be :
(a) Rs. 18000 , Rs. 15000
(b) Rs. 15000 , Rs. 12000
(c) Rs. 9000 , Rs. 6000
(d) Rs. 16000 , Rs. 14000

41. A shopkeeper gives additional 10% discount on the discounted price, after giving an initial discount of 15% on the marked price of a cell phone. If the final sale price of cell phone is Rs. 3825, then what is the marked price?
(a) Rs. 3825
(b) Rs. 3775
(c) Rs. 3725
(d) Rs. 4000

42. A Microwave is labeled at Rs. 7000 & a discount of 15% is offered on the labeled price. What additional discount must be offered by shopkeeper to bring the buying price to Rs.5236?
(a) 10%
(b) 12%
(c) 14%
(d) 13%

43. A wholesaler gains 25% on a pair of shoes by selling them at Rs.400. During off season he offers a discount of 10% on the marked price. What is his gain percent during off season?
(a) 12%
(b) 15%
(c) 13%
(d) 14%

44. If a merchant offers a discount of 40% on the marked price of his goods and thus ends up selling at cost price, what was the % mark up?
(a) 28.57%
(b) 40%

(c) 66.66%

(d) 8.33%

45. A wholesaler mixes 85 kg of wheat at Rs. 20 per kg with 105 kg of wheat at Rs.15 of wheat of other variety & sells the mixed wheat at Rs.19 per kg. What is his profit percent?
    (a) 8%
    (b) 10%
    (c) 7.5%
    (d) 12%

46. Soya bean oil costs Rs.90 per kg. After mixing inferior quality oil of Rs. 50 per kg with it, the shopkeeper sells the mixture at Rs. 96 per kg, thereby making a profit of 20%. In what ratio does the shopkeeper mixes the two?
    (a) 12:8
    (b) 14:7
    (c) 11:9
    (d) 10:9

47. A shopkeeper makes a profit of 15% on his goods. He lost 20% goods in a fire at his shop. What is his loss percent?
    (a) 10%
    (b) 12%
    (c) 9%
    (d) 8%

48. Ram sells his cottage worth Rs.25,00,000 to Shyam at 5% profit. Shyam sells the cottage back to at 3% loss. How much Ram loses or gains :
    (a) Ram gains Rs. 78750
    (b) Ram loses Rs. 88750
    (c) Ram loses Rs. 78750
    (d) Ram gains Rs. 88750

49. Samsung offers a discount of 20% on the marked price of LED TV. The dealer offers another 30% discount on reduced price. Hence the two discounts are equivalent to single discount on marked price :
    (a) 50%
    (b) 42%
    (c) 44%
    (d) 48%

50. Albert bought a scooter at a discount of 20% on its original price. He sold the scooter with 30% profit on the price he bought it. By what percent the new sale price is more than original price?
    (a) 4%
    (b) 6%
    (c) 8%
    (d) 5%

ANSWERS:

1	(a)	11	(c)	21	(c)	31	(c)	41	(a)
2	(d)	12	(d)	22	(a)	32	(b)	42	(b)
3	(a)	13	(a)	23	(a)	33	(b)	43	(c)
4	(b)	14	(b)	24	(c)	34	(c)	44	(c)
5	(c)	15	(b)	25	(c)	35	(b)	45	(b)
6	(c)	16	(d)	26	(c)	36	(a)	46	(c)
7	(c)	17	(b)	27	(b)	37	(c)	47	(d)
8	(b)	18	(a)	28	(c)	38	(b)	48	(a)
9	(c)	19	(c)	29	(b)	39	(c)	49	(c)
10	(b)	20	(a)	30	(b)	40	(b)	50	(a)

CHAPTER 5: SPEED, DISTANCE AND TIME

Speed, Distance and time is one of the most important chapter for the purpose of the maths section in aptitude exams. Time and Distance Formulae relates Time, Distance and Speed. These relationships have many practical applications. The basic concepts of Speed, Distance and time are used in solving questions based on relative motion, circular motion, problem based on trains, problem based on boats, races, etc.

The questions asked in CSAT is very diverse in nature, therefore this chapter is very important for CSAT aspirants. For example if you know the speed of any vehicle and the distance covered by that vehicle, then we can easily calculate the time taken in whole journey by using the formula of Time and Distance.

Important Formulae

(i)   Speed = $\frac{Distance}{Time}$,Distance= Speed×Time, Time= $\frac{Distance}{Speed}$

(ii) S km/hr =(s× $\frac{5}{18}$)m/sec

(iii) S m/sec =(s× $\frac{18}{5}$)km/hr

Points to remember:

1. Read the units of time speed and distance carefully.

2. If the distance is given in km and the speed is in m/s then always convert the units. According to the demand of the question you can change the kilometer in to meter or m/s in to km /hr.

SOLVED EXAMPLES

Example1. A Taj Express travelling at $\frac{5}{11}$ of its actual speed and covers 42 km in 1 hr 40 min 48 sec. Find the actual speed of the Taj Express.

Solution: Suppose the actual speed of Taj = S km/hr

Then new speed = $\frac{5}{11}$ × S

Time taken by Taj with new speed

 = 1 hr 40 min 48 sec

= 1hr+40 $\times \frac{1}{60}$ hr+48 $\times \frac{1}{60 \times 60}$ [Because 1hr = 60 minutes,

1 minute = 60 Second,

& 1 minute = $\frac{1}{60}$ hr ,

1 Second = $\frac{1}{60}$ minute]

= 1hr +$\frac{2}{3}$ hr + $\frac{1}{75}$ hr

= $\frac{126}{75}$ hrs

Now, according to the formula

New Speed × Time taken by Taj with new speed =

Distance covered by Taj

⇨ $\frac{5}{11}$ S× $\frac{126}{75}$ = 42

⇨   S = $\frac{42 \times 75 \times 11}{126 \times 5}$

⇨   S =55km/hr

Hence, the actual speed of the Taj Express is 55 km/hr

Example 2. The speed of the boat in still water is 20 m/s and the speed of the stream is 12 m/s. if the boat is moving upstream and again downstream, then what is the ratio of the time taken to cover a particular distance in each direction?

Solution: Let the distance travelled in one direction be x.

Time taken for covering the distance upstream = $(\frac{x}{20-12}) = \frac{x}{8}$

Time taken for covering the same distance downstream = $(\frac{x}{20+12}) = \frac{x}{32}$

Hence the ratio of the times = $\frac{x}{8} : \frac{x}{32} = 4 : 1$

Example 3. A boat takes a total of 8 hours to travel 12 kms downstream and to return back to the starting point. If speed of the boat is 4 kmph, then for how much time was the boat moving downstream and for how much time upstream?

Solution: let the speed of the stream be x ,

Then,

$$\frac{12}{4+x} + \frac{12}{4-x} = 8 \Rightarrow \frac{36-12x+36+12x}{16-x^2} = 8 \Rightarrow 72 = 128 - 8x^2 \Rightarrow 8x^2 = 56 \Rightarrow x = \sqrt{7} kmph$$
=2.64 kmph

Thus time taken downstream = $\frac{12}{4+2.64} = \frac{12}{6.64} = 1.80$ hours

Time taken upstream= $\frac{12}{4-2.64} = \frac{12}{1.36} = 8.82\ hours$

Example 4.a boat travel 3 hours downstream and then 3 hours upstream and covers a total distance of 12 kms . if the speed of stream is 1 kmph , how much time will he have to travel upstream to reach the starting point ?

Solution: let the speed of the boat be x

And the speed of the stream be y = 1 kmph

Then upstream speed = x-y and downstream speed = x+y

Time taken = 3 hours, then

3(x+y) + 3(x-y) = 12 $\Rightarrow$ 3(x+1) + 3(x-1) = 12 $\Rightarrow$ 6x = 12 $\Rightarrow$ x= 2 kmph

The distance left to be covered to reach starting point = 3(x+1) -3(x-1)= 6km

Thus time taken to reach the top = $\frac{6}{x-1} = 6\ hours$.

Example 5. A man on a platform sees that a train going in one direction takes 10 s to pass him, and a train of same length going in the opposite direction takes 15s to pass him. What is the time taken by two trains to pass one another if the length of the trains is 200 m each?

Solution: speed of first train = $\frac{200}{10}$ m/s = 20 m/s .

Speed of second train = $\frac{200}{15}$ m/s = 40/3 m/s

Relative speed of two trains when they move in opposite direction = 20+ 40/3 =100/3

Time taken by two train to completely pass each other = $\frac{200+200}{100/3}$ = 12 s.

Example 6. Two persons start from A and B with the speed of 25 kmph and 49 kmph respectively towards each other. After they cross each other ,the person from B covers 145 km to reach A .What is the distance AB ?

Solution: let the total distance between A and B be x

Since B had to travel 145 km to reach A , this means they met at a distance of 145 km from A.

Hence, distance between the meeting place and the B = x-145 km

Ratio of speed = ratio of distance

25:49= 145: (x-145)

X= 429.2 km.

Example 7. If two pipes A and B fill the tank simultaneously, a tank will be full in 10 hr. if one of the pipes takes 8 hr less than the other, how much time does the other take to fill the tank?

Solution: Pipes A and B both fill the tank together.

Therefore, $\frac{1}{A} + \frac{1}{B} = \frac{1}{10}$,

Let A takes x hours to fill then B will take x-8 hr ,

$$\frac{1}{x} + \frac{1}{x-8} = \frac{1}{10} \implies \frac{x-8+x}{x(x-8)} \implies \frac{1}{10} \implies \frac{2x-8}{x^2-8x} = \frac{1}{10}$$

20x-96=x^2-8x $\implies$ x^2-28x+96=0 $\implies$ x= 24 hr (because x cannot be 4 hr)

Example 8. If a car can finish a journey in 10 hr with a speed of 48 kmph . The by how much the speed be increased to cover the same distance in 8 hr?

Solution: Distance = speed $\times$ time = 48 $\times$ 10 = 480 km

To cover the same distance in 8 hr .

Speed = d/t = 480 / 8 = 60 kmph

Therefore, speed must be increased by 60-48 = 12 kmph .

Example 9. A man gets late by 2 hr if he walks ¾ th of his normal speed. What time will he take to cover the same distance at his normal speed?

Solution: let his normal speed be s kmph and normal time be t hr

Distance, d = st = $\frac{3}{4}$ s $\times$ (t+2)

Or, 4t = 3t + 6 , t = 6 hr .

Example 10 . The speed of A and B are in ratio 4:5. A takes 40 min more than b to cover the same distance. How much time does A take to cover this distance?

Solution. Since the ratio of speed is 4 : 5 , so the ratio of time will be 5 : 4 .

If it takes 40 min more , then 5x-4x = 40 $\implies$ x = 40 min

A takes 5 x min or 5 $\times$ 40 = 200 min.

Example 11. A man goes a hill at 20 kmph and comes down at 32 kmph along the same path. What is his average speed?

Solution : Average speed = $\frac{2xy}{x+y} = \frac{2 \times 20 \times 32}{20+32} = \frac{320}{13} = 24.61\ kmph.$

Example12. A train travelling at the rate of 72 kmph crosses a pole in 8 seconds . What is its length?

Solution: time = 8 secs

Speed = 72 kmph = 72 $\times$ $\frac{5}{18}$ m/s = 20 m/s

Length = s $\times$ t = 8 $\times$ 20 = 160 m.

Example 13. A 200 m long train crossed a 700 m long platform in 1 in 6 seconds . What is the speed of the train (in kmph) ?

Solution : Total length to be covered = length of the train + length of the platform

= 200+ 700 = 900

Tota time = 60+6 = 66 min

Speed = distance / time = 900/66 = 450/33 m/s = $\frac{450}{33} \times \frac{18}{5} = 49\frac{1}{11}$ kmph.

Example 14. If a boy walks from his house at 5 kmph , he reaches school 5 min early , and if he walks at 4 kmph he reaches 5 min late . How far does he work for his school?

Solution : let his normal speed be x kmph .

Let his normal time t hr.

D = st $\Longrightarrow$ 5 (t - $\frac{5}{60}$)= 4 (t + $\frac{5}{60}$) $\Longrightarrow$ 5t - $\frac{1}{12}$ = 4t + $\frac{1}{12}$ $\Longrightarrow$ t = $\frac{1}{6}$ hr

Distance = 5 ($\frac{1}{6}$ − $\frac{1}{12}$) = 41 km

Example 15. Two train travel in opposite direction one at 30 kmph and the other at 42 kmph. A man sitting in the slower train passes the faster train in 6 s. what is the length of the faster train?

Solution : since the train are running in opposite direction , hence the length of the faster train

= (30+42) $\times \frac{5}{18} \times$ 6 m = 72 $\times \frac{5}{18} \times 6$ = 120 m

Example 16. A river runs at 3 kmph . if the time taken by a man to row his boat upstream is twice the time taken by him to row it downstream , then at what speed can he row his boat in still water ?

Solution : let x be the speed of the boat in still water and speed of the river = 3 kmph

Speed upstream = x- 3 kmph

Speed downstream = x+3 kmph

(x-3)2t = (x+ 3) t

2 (x- 3) = x+ 3

X= 9 kmph.

Example 17. A train passes a pole in 20 s and crosses a platform of 200 m long in 60 s . find the length of the train ?

Sol.   Let I be the length of the train in metres.

Then the speed of the train = $\frac{l}{20}$ m/s = $\frac{l+200}{60}$

3 l = l + 200

L = 100 m

Example 18. If a man rows at 8 kmph in still water and at 5.5 kmph against the current, then what is his speed of rowing along the current?

Solution : Let the speed of the boat in still waters be x = 7 kmph

Let the speed of the stream be y

x- y = 5.5 kmph

y = 2.5 kmph

rate along the stream = 2.5 + 8 = 10.5 kmph.

Example 19. A stream runs at 1 kmph . A boat goes 35 km upstream and comes back taking a total time of 12 hr . The speed of the boat in still water is?

Solution : Speed of stream = 1 kmph

Let the speed of the boat in still waters = x kmph

Total time = 12 hr

$12 = \frac{35}{x-1} + \frac{35}{x+1} \implies \frac{35x+35+35x-35}{x^2-1} \implies 12\,x^2 - 12 = 70\,x \implies 12x^2 - 70\,x - 12$

$\implies 6\,x^2 - 35\,x - 6 = 0 \implies (x-6)(x-\frac{1}{6}) = 0 \implies x = 6$ kmph.

Example20. A cat passed by a train in 108 seconds. Find the length of the train if its speed is 16 Kmph.

Solution: Length of the train = $16 \times \frac{5}{18} \times 84 = 480$ m

EXERCISE

1. Abhinav can cover a distance in 42 Minutes by covering 2/3 of the distance at 4 kmph and the rest at 5kmph. The total distance is?
    (a) 3 km
    (b) 6 km
    (c) 12 km

(d) 18 km

2. Adnan can walks at 5 kmph for 6 hr and at 4 kmph for 12 hr. The average speed is.

(a) $9 \frac{1}{3}$ mph

(b) 2 km

(c) $4 \frac{1}{3}$ mph

(d) $7 \frac{2}{3}$ km

3. Madhuri covers a certain distance at 36 kmph .How many meters does he cover in 20 minutes.
   (a) 2420 m
   (b) 24000 m
   (c) 3400 m
   (d) 6600 m

4. Two Girls starting from the same place walk at a rate of 10 kmph and 10.5 kmph respectively. What time will they take to be 17 km apart, if they walk in the same direction?
   (a) 32 hrs
   (b) 33 hrs
   (c) 34 hrs
   (d) 35 hrs

5. Mr. A steals a car at 2.30 pm and drives it at 60 kmph. Mr. A is discovered at 3pm and the policeman sets off in another car at 75 kmph. When he will overtake the Mr. A?
   (a) 5 PM
   (b) 6 PM
   (c) 9 PM
   (d) None of these

6. A Bus covers 4 successive 3 km stretches at speed of 10 kmph, 20 kmph, 30 kmph & 60 kmph respectively. Its average speed is.
   (a) 15 Kmph
   (b) 20 Kmph
   (c) 25 Kmph
   (d) 30 Kmph

7. Walking at $\frac{3}{4}$ of his usual speed, Manmohan is late by $2 \frac{1}{2}$ hours. The usual time is:

(a) $8 \frac{1}{2}$

(b) 6

(c) $7\,{}^{1}\!/_{2}$

(d) 5

8. A train covers a distance in 50 minutes, if it runs at a speed of 36 kmph on an average. The speed at which the train must run to reduce the time of journey to 40 min will be.
   (a) 55 Kmph
   (b) 45 Kmph
   (c) 65 Kmph
   (d) 30 Kmph

9. Excluding stoppages, the speed of the Metro is 54 kmph and including stoppages, it is 45 kmph. For how many minutes does the bus stop per hour?
   (a) 15 Minutes
   (b) 20 Minutes
   (c) 10 Minutes
   (d) 1 Hours

10. Delhi & Noida is two Cities. Mr.Kamal covers the distance from Delhi to Noida on cycle at 17 kmph and returns to Delhi by a tonga running at a uniform speed of 8 kmph his average speed during the whole journey is.
    (a) 12.56 Kmph
    (b) 11.88 Kmph
    (c) 10.88 Kmph
    (d) None of these

11. Two trains start from Patna and Delhi respectively and travel towards each other at a speed of 50 km/hr and 40 km/hr respectively. By the time they meet, the first train has travelled 100 km more than the second. The distance between Patna and Delhi is:
    (a) 400 Km
    (b) 750 Km
    (c) 960 Km
    (d) 900 Km

12. A train 140 m long running at 90 kmph. In how much time will it pass a platform 260m long?
    (a) 24 Seconds
    (b) 12 Seconds
    (c) 18 Seconds
    (d) 15 Minutes

13. In covering a distance of 30 km, Aamir takes 2 hours more than Salman. If Aamir doubles his speed, then he would take 1 hour less than Salman. Aamir speed is:
    (a) 15 Km/hr
    (b) 50 Km/hr
    (c) 25 Km/hr

(d) 5 Km/hr

14. A train traveling at 72 kmph crosses a platform in 30 seconds and a man standing on the platform in 18 seconds. What is the length of the platform in meters?
(a) 200 Metre
(b) 360 Metre
(c) 240 Metre
(d) None of these

15. Zee and Sony begin together to write out a booklet containing 535 lines. The Zee starts with the first line, writing at the rate of 100 lines an hour; and the Sony starts with the last line then writes line 534 and so on, backward proceeding at the rate of 50 lines an hour. At what line will they meet?
(a) 260
(b) 357
(c) 277
(d) 642

16. A passenger train covers the distance between stations X and Y, 50 minutes faster than a goods train. Find this distance if the average speeds of the passenger train is 60 kmph and that of goods train is 20 kmph.
(a) 30 Kms
(b) 25 Kms
(c) 20 Kms
(d) 42 Kms

17. Arman can row 50 km upstream and 72 km downstream in 9 hours. He can also row 70 km upstream and 90 km downstream in 12 hours. Find the rate of current.
(a) 5 Kmph
(b) 4 Kmph
(c) 2 Kmph
(d) 3 Kmph

18. Sneha left home and drove at the rate of 45 mph for 2 hours. She stopped for lunch then drove for another 3 hours at the rate of 55 mph to reach her destination. How many miles did sneha drive?
(a) 255 Miles
(b) 300 Miles
(c) 100 Miles
(d) 177 Miles

19. The speed of a motor boat itself is 20 km/h and the rate of flow of the river is 4 km/h. moving with the stream the boat went 120 km. What distance will the boat cover during the same time going against the stream?
(a) 81 Km

(b) 80 Km

(c) 100 Km

(d) 95 Km

20. It takes eight hours for a 600 km journey, if 120 km is done by Rajdhani Express and the rest by Farari. It takes 20 minutes more, if 200 km is done by Rajdhani Express and the rest by Farari. The ratio of the speed of the Rajdhani Express to that of the Farari is:

(a) 2 : 3

(b) 1 : 3

(c) 3 : 4

(d) 4 : 3

21. The ratio between the speeds of two Metro is 5 : 7. If the second Metro runs 400 km in 4 hours, then the speed of the first Metro is:

(a) 87.40 Kmph

(b) 71.40 Kmph

(c) 81.40 Kmph

(d) 90.40 Kmph

22. Sania is twice as fast as Mahesh and Mahesh is thrice as fast as Bopana is. The journey covered by Bopana in?

(a) 18 Minutes

(b) 36 Minutes

(c) 54 Minutes

(d) 9 Minutes

23. A Jet covers a certain distance at a speed of 480 kmph in 5 hours. To cover the same

distance in $1\frac{2}{3}$ hours, it must travel at a speed of:

(a) 1000 Kmhr

(b) 1200 Kmhr

(c) 1440 Kmhr

(d) 1600 Kmhr

24. Harry is travelling on his Bike and has calculated to reach Cinema Hall at 2 P.M. if he travels at 20 kmph, he will reach there at 12 noon if he travels at 30 kmph. At what speed must he travel to reach Cinema Hall at 1 P.M.?

(a) 12 Kmhr

(b) 16 Kmhr

(c) 14 Kmhr

(d) 18 Kmhr

25. Shucita travelled a distance of 56 km in 9 hours. He travelled partly on foot @ 4 km/hr and

partly on bicycle @ 9 km/hr. The distance travelled on foot is
(a) 10 Km
(b) 16 Km
(c) 20 Km
(d) 18 Km

26. Raman boat takes 90 minutes less to travel 36 miles downstream than to travel the same distance upstream. If the speed of the boat in still water is 10 mph. the speed of the stream is
(a) 4 mph
(b) 6 mph
(c) 8 mph
(d) 2 mph

27. Madan is standing on a Metro bridge which is 360 m long. He finds that a Metro crosses the bridge in 40 seconds but himself in 8 seconds. Find the length of the Metro.
(a) 120 m
(b) 160 m
(c) 90 m
(d) 100 m

28. I walk a certain and ride back taking a total time of 18 minutes. I could walk both ways in 33 minutes. How long would it take me to ride both ways?
(a) 3 min
(b) 7 min
(c) 9 min
(d) 10 min

29. Two buses start from the same place in opposite directions. One goes towards north at 36 kmph and the other goes towards south at 40 kmph. What time will they take to be 95 km apart?

(a) $2\,^3/_4$ hrs

(b) $1\,^1/_4$ hrs

(c) $4\,^1/_4$ hrs

(d) 5 hrs

30. If Narendra runs at a speed of 10 km/hr then how many minutes does he take to cover a distance of 200 m?
(a) 72 Second
(b) 73 Second
(c) 74 Second
(d) 75 Second

31. Rahul can cover a certain distance in 1 hr 30 minutes by covering one – fourth of the

distance at 5 km/he and the rest at 6 km/hr. Find the total distance covered by Rahul.
(a) 8km
(b) 7km
(c) 8.57km
(d) Cannot be determined

32. Ram runs along the four sides of a Square at the speeds of 2, 4 , 6 and 8 km/hr. what is the average speed of Ram around the field?
(a) km/hr
(b) 3km/hr
(c) 3.84km/hr
(d) 3.2km/hr

33. A car covers a distance of 666 km in 9 hours. What is the speed of the car?
(a) 78km/hr
(b) 76km/hr
(c) 74km/hr
(d) Cannot be determined
(e) None of these

34. Gwalior and Agra are two stations 160 km apart. A train starts from Gwalior at 8 a.m. and travels towards Agra at 60 km/hr .Another train starts from Agra at 9 a.m. and travels towards Gwalior at 40 km/hr. At what time do they meet?
(a) 9.15a.m.
(b) 9.45a.m
(c) 9.55a.m.
(d) 10a.m.

35. The ration between the speeds of two trains is 7:8. If the second train runs 400kms in 4 hours, then the speed of the first train is:
(a) 70 km/hr
(b) 75 km/hr
(c) 84 km/hr
(d) 87.5 km/hr

36. An express train travelled at an average speed of 100 km/hr, stopping for 3 minutes after every 75 km. How long did it take to reach its destination 600 km from the starting point?
(a) 6 hrs 21 min
(b) 6 hrs 24 min
(c) 6 hrs 27 min
(d) 6 hrs 30 min

37. A Salesman travels a distance of 50 km in 2 hours and 30 minutes. How much faster, in kilometers per hour, on an average, must he travel to make such a trip in $\dfrac{5}{6}$ hour less time?

(a) 10

(b) 20

(c) 30

(d) None of these

38. A can complete a journey in 10 hours. He travels first half of the journey at the rate of 21 km/hr and second half at the rate of 24 km/hr. Find the total journey in km.

(a) 220 km

(b) 224 km

(c) 230 km

(d) 234 km

39. A man on tour travels first 160 km at 64 km/hr and the next 160 km at 80 km/hr. The average speed for the first 320 km of the tour is:

(a) 35.55 km/hr

(b) 36 km/hr

(c) 71.11 km/hr

(d) 71 km/hr

40. A boy rides his bicycle 10 km at an average speed of 12 km/hr and again travels 12 km at an average speed of 10 km/hr. His average speed for the entire trip is approximately:

(a) 10.4 km/hr

(b) 10.8 km/hr

(c) 11 km/hr

(d) 12.2 km/hr

41. A car travels the first one-third of a certain distance with a speed of 19 km/hr, the next one-third distance with a speed of 20 km/hr, and the last one-third distance with a speed of 60 km/hr. The average speed of the car for the whole journey is:

(a) 18 km/hr

(b) 24 km/hr

(c) 30 km/hr

(d) 36 km/hr

42. Starting from his house one day, a student walks at a speed of kmph and reaches his school 6 minutes late. Next day he increases his speed by 1 kmph and reaches the school 6 minutes early. How far is the school from his house?

(a) 1 km

(b) $1\frac{1}{2}$ km

(c) $1\frac{3}{4}$ km

(d) 2 km

43. Robert is travelling on his cycle and has calculated to reach point A at 2 P.M. if he travels at

10 kmph; he will reach there at 12 noon if he travels at 15 kmph. At what speed must he travel to reach A at 1 P.M.?
(a) 8 kmph
(b) 11 kmph
(c) 12 kmph
(d) 14 kmph

44. A train can travel 50% faster than a car. Both start from point A at the same time and reach point B 75 kms away from A at the same time. On the way, however, the train lost about 12.5 minutes while stopping-at the stations. The speed of the car is:
(a) 100 kmph
(b) 110 kmph
(c) 120 kmph
(d) 130 kmph

45. In covering a certain distance, the speeds of A and B are in the ratio of 3:4. A takes 30 minutes more than B to reach the destination. The time taken by A to reach the destination is
(a) 1 hour
(b) $1\dfrac{1}{2}$
(c) 2 hours
(d) $2\dfrac{1}{2}$

46. With a uniform speed a car covers the distance in 8 hours. Had the speed been increased by 4 km / hr, the same distance could have been covered in 7 hours. What is the distance covered?
(a) 240 km
(b) 480 km
(c) 640 km
(d) Cannot be determined
(e) None of these

47. If a person walks at 14 km/hr instead of 10 km/hr, he would have walked 20 km more. The actual distance travelled by him is:
(a) 50 km
(b) 56 km
(c) 70 km
(d) 80 km

48. In a flight of 600 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 km / hr and the time of flight increased by 30 minutes. The duration of the flight is:

(a) 1 hour
(b) 2 hours
(c) 3 hours
(d) 4 hours

49. A walks around a circular field at the rate of one round per hour while B runs around it at the rate of six rounds per hour. They start in the same direction from the same point at 7.30 a.m. They shall first cross each other at:
(a) 7.42 a.m.
(b) 7.48 a.m.
(c) 8.10 a.m.
(d) 8.30 a.m.

50. A and B walk around a circular track. They start at 8 a.m. from the same point in the opposite directions. A and B walk at a 'speed of 2 rounds per hour and 3 rounds per hour respectively. How many times shall they cross each other before 9.30 a.m.?
(a) 5
(b) 6
(c) 7
(d) 8

ANSWERS

1	(a)	11	(d)	21	(b)	31	(c)	41	(a)
2	(c)	12	(b)	22	(c)	32	(c)	42	(c)
3	(b)	13	(d)	23	(c)	33	(c)	43	(c)
4	(c)	14	(c)	24	(a)	34	(d)	44	(c)
5	(a)	15	(b)	25	(c)	35	(a)	45	(c)
6	(b)	16	(b)	26	(d)	36	(a)	46	(b)
7	(c)	17	(b)	27	(c)	37	(a)	47	(a)
8	(b)	18	(a)	28	(a)	38	(b)	48	(a)
9	(c)	19	(b)	29	(b)	39	(c)	49	(a)
10	(c)	20	(c)	30	(a)	40	(b)	50	(c)

CHAPTER 6: RATIO AND PROPORTION

Ratio

Ratio is the relation which one quantity bears to another of the same kind. The ratio of two

quantities a and b is the fraction $\frac{a}{b}$ and we write it as a:b.

In the ratio a:b, we call a as the first term or **antecedent** and b, the second term or **consequent.**

Note: The multiplication or division of each term of a ratio by the same non- zero number does not affect the ratio.

> **Compounded Ratio**

   The compounded ratio of the ratios (a:b), (c:d), (e:f) is (ace:bdf)

> **Duplicate Ratio -** ($a^2 : b^2$) is called the duplicate ratio of a:b

> **Sub duplicate ratio -** ($\sqrt{a} : \sqrt{b}$) is called the sub duplicate ratio of a:b.

> **Triplicate ratio -** $a^3 : b^3$ is called the triplicate ratio of a:b.

> **Sub- triplicate ratio –** ($a^{\frac{1}{3}} - b^{\frac{1}{3}}$) is called the sub-triplicate ratio of (a:b).

Proportion

When two ratios are equal then the four quantities involved in the two ratios are called proportional.

If a:b = c:d, then a, b, c, d are proportional. Here a and d are called extremes, while b and c are called mean terms.

> **Third Proportional –** If a: b: b: c, then c is called the third proportional to a and b.
> **Fourth Proportional -** If a: b: c: d, then d is called the fourth proportional to a and b.

> **Mean Proportional –** Mean Proportional between a and b is $\sqrt{ab}$

SOLVED EXAMPLES

Example1. What must be subtracted from the numerator and the denominator of fraction $\frac{6}{7}$

to give a fraction equal to $\frac{16}{21}$?

Solution: Let the number to be subtracted be x .

Then,

$$\frac{6-x}{7-x} = \frac{16}{21} \implies 126 - 21x = 112 - 16x \implies 5x = 14 \implies x = 2.8$$

Hence the number is 2.8.

Example 2. Ram father is thrice as old as Ram was 2 years ago. After Five years his father's age will be 6 years more than twice the Ram's age. What is Ram's present age?

Solution: let Ram's age be x and his father's present age be y .

Then 2 years ago,

Y=3(x-2)……………………….i

And after five years,

(y+5) – 6 = 2 (x+5)………………….ii

From I and ii

Y=3x-2 and y+5-6= 2x+10

3x-y = 2 and 2x-y= -11

X = 17 and y = 45, Ram age = 17 years and his father's age = 45 years.

Example 3. Two numbers are in the ratio 2 : 3 . The difference between their squares is 45. Find the numbers?

Solution: let the two numbers be 2x and 3x

Then $(3x)^2$ - $(2x)^2$ = 45

$5x^2$ = 45 $\implies$ x = 3 or -3 .

Hence the numbers are either (6,9) or (-6 , -9)

Example 4. The incomes of A and B are in the ratio 3 : 2 and the expenditure of A and B are in ratio 5 :3 . If each saves Rs. 3000, what are their incomes?

Solution: Let 3a , 2a be the incomes and 5b and 3 b be the expenditures of A and B respectively.

We have 3a – 5b = 2a – 3b = 3000

6a-10b = 6000

6a – 9b = 9000

B=3000 and a = 6000

Therefore A incomes = Rs 18000 and B income = Rs. 12000.

Example 5. The ratio of the prices of two houses was 16: 23. Two years later when the price of the first had risen by 10% and that of the second by Rs. 477, the ratio of prices became 11: 20. What were the original prices?

Solution: Let the first and second houses be priced 16x and 23x respectively.

If price of first is increased by 10% then number is 17.6x and if the price of second is increased by 477 then   23x+477.

And the final ratio is 11: 20. so,

$$\frac{17.6x}{23x + 477} = \frac{11}{20} \Rightarrow 352x = 253\,x + 5247 \Rightarrow x = 53$$

So the values of the house are Rs 848 and Rs 1219 respectively.

Example 6. From a total of Rs 200000, Rs 10000 is to be divided between A and B in the ratio 2 : 3 . The rest of the money is to be divided between A, B and C in the ratio 5:3:3 . How much money did A and B get respectively?

Solution: Since Rs 10000 is to be divided between A and B in the ratio 2 : 3 .

A's share = Rs 4000

B's share= Rs 6000

Amount left is 190000and it is to be divided in the ratio 5:3:3.

A's share = Rs $\frac{5}{11} \times 190000 = Rs\ 86363.63$

B 's share = Rs $\frac{3}{11} \times 190000 = Rs\ 51818.18$

C's share = Rs $\frac{3}{11} \times 190000 = Rs\ 51818.18$

A's total share = 86363.63+4000= 90363.63 Rs

B's total share = 51818.18+6000=57818.18 Rs

Example 7. A and B enter into a partnership. A invested Rs 3000 and B invested Rs 4000. After 6 months, B withdrew for the business . At the end of the year , the profit was Rs 5000 . How much would B get out of this profit?

Solution: The ratio in which A and B would share the profits is $2000 \times 12 : 3000 \times 6 = 3 : 2$

So B 's profit $= \frac{2}{5} \times 5000 = 2000$ Rs.

Example 8. A , B and C enter into a partnership with an amount of Rs 10000 each . After 4 months A invest an additional amount Rs 3000 . Three months later B invests Rs 5000 and C at the same time withdraws Rs 3000 . Profit at the end of the year is Rs 233000. What are their respective shares if C is to be allowed Rs. 3000 as monthly salary from profits at the end ?

Solution: A's capital investment in that year = $10000 \times 4 + 13000 \times 8 = 144000$

B's capital investment in that year = $10000 \times 7 + 15000 \times 5 = 145000$

C's capital investment in that year = $10000 \times 4 + 7000 \times 8 = 105000$

Ratio in which profit are to be shared = 144 : 145 : 105

Annual Salary of C = $3000 \times 12 = Rs\ 36000$

Profit to be shared = 233000-36000 = 197000

A' share = $\frac{197000 \times 144}{394} = Rs\ 72000$

B's share = Rs 72500

C's share = Rs 52500

Example 9 . A can do a piece of work in 12 days , B is 50% more efficient than A . Find the number of days that B takes to do the same piece of work?

Solution : Ratio of the efficiency is A:B = 100 : 150 = 2 : 3

Since efficiency is inversely proportional to the number of days , the ratio of days taken to complete the jobs is 3 : 2 .

So number of days taken by B = $\frac{2}{3} \times 12 = 8\ days.$

Example 10.Mohan's expenditure and savings are in the ratio 7 : 3 . His income increases by 20% . If his saving also increases by 12% , by how much percentage would his expenditure increases?

Solution : let Mohan's expenditure = 7x

Mohan's savings = 3x

Therefore income = 10 x

New income = 10x +20% of 10x = 10x+2x= 12x.

New savings = 3x+ 12% of 3x = 3.12 x

New expenditure = 8.88 x.

Percentage increase in expenditure = $(\frac{8.88x - 7x}{7x}) \times 100 = \frac{1.88}{7} \times 100 = 26.85\%$

Example 11 . A bag contains Rs 1800 in the form of one rupee , 50 paise and 25 paise coins in the ratio 3: 4 : 12 . Find the number of 50 paise coins ?

Solution : Ratio of values of 1 rupee , 50 paise and 25 paise coin is $\frac{3}{1} : \frac{4}{2} : \frac{12}{4}$ i. e , 3: 2 : 3

Therefore 3x+2x+3x= 1800

8x = 1800

X= 225 .

Value of 50 paise coin = 2 ✕ 225 = 450 .

And the number of 50 paise coin s = 450 ✕ 2 = 900 .

Example12. The ratio of prices of two computers was 13 : 17 . The price of the first computer went up , 10 years later by 100% and that of the second went up by Rs 2500 and new ratio of their prices became 3 : 5 . Find the original prices of the two computers?

Solution : Let the original price be 13 x and 17 x . so ratio for new prices = $\frac{13x + 100\% \ of \ 13x}{17x + 2500} = \frac{3}{5}$

$$\frac{26x}{17x + 2500} = \frac{3}{5}$$

130x = 51x+7500

79x = 7500

X = 94.93

So the original prices are 13 $\times$ 94.93 $= Rs\ 1234.08$ and 17 $\times$ 94.93 $= Rs\ 1613.81$

Example13. Rs 9700 has been divided among x.y and z such that if their shares are reduced respectively by Rs 30 , Rs 20 and Rs 50 . The balances are in the ratio of 3 : 4 : 5 . What is y's share?

Solution : let a be the common ratio then ,

X's share = 3a+30

Y's share = 4a+20

Z's share = 5a+50

Sum = 9700, so 12a + 100 = 9700 $\implies$ 12a = 9600 $\implies$ a = 800

Y's share = 4a +20 = 4 $\times$ 800+20 = 3200+20 = 3220

Example14. The sum of Rs 530 is divide among A , B and C such that A gets Rs 70 more than B and B gets Rs 80 more than C . What is the ratio of the amount with A and C ?

Solution: Let B gets Rs x then A get Rs x+70 and C gets Rs x+80

Now ,

X+x+70+x-80 = 530 $\implies$ 3x-10 = 530 $\implies 3x = 540 \implies x = 180$

Now,

$$\frac{A's\,share}{C\,share} = \frac{180+70}{180-80} = \frac{250}{100} = \frac{5}{2}$$

Example15. The income of A and B are in the ratio of 3 : 2 and their expenses are in the ratio of 5 : 3 . If each of them saves Rs 3000 , then what is B's income ?

Solution: Let A' s income = Rs 3x , B's income = Rs 2x and A's expenses = Rs 5y , B's expenses = Rs 3y.

A's saving = 3x-5y = 3000 ………………………i

and B's saving = 2x- 3y = 3000………………………………ii

Solving I and ii we get

. x = 6000 , so B's income = 2x = Rs 12000.

Example 16. The ratio of the present ages of A and B is 5 : 7 . If the difference between the present age of B and that of A 6 years hence is 2 , then what is the total of present ages of A and B ?

Solution: If A's age is 5x, B's age = 7x

Now according to the question,

7x – (5x + 6) = 2

So x = 4

A's age = 5 x = 5 ✕ 4 = 20 years

B's age = = 7 x =7 ✕ 4 = 28 years

Therefore the sum of their ages is = 20 + 28 = 48 years

Example 17. Salaries of Vivek & Vikas are in the ratio 4:3.If the salary of each is increased by Rs 6000 , the new ratio becomes 35:27. What is Vikas's present salary?

Solution. Let the original salaries of Vivek and Vikas be Rs 4x and Rs 3x respectively. Then,

$$\frac{4x+6000}{3x+6000} = \frac{35}{27}$$

= 27(4x + 6000) = 35(3x+ 6000) ⟺ 3x = 48000

Vikas's present salary = 3x+ 6000 = Rs (48000+6000) = 54000.

Example 18. The salaries of X, Y, Z are in the ratio 4 : 6 : 10. If increment of 25%, 20% and 30% are allowed respectively in their salaries, then what will be the new ratio of their salaries?

Solution: Let X= 4k, Y = 6k and Z = 10k

X's new salary = 25% of 4k = 25/100 x 4k = k

Y's new salary = 20% of 6k = 20/100 x 6k = $\overline{6k}$

5

Z's new salary = 30% of 10k = 30/100 x 10k = 3k

New ratio = k : $\overline{6k}$: 3k = 5: 6 : 15

5

Example 19. A sum of currency is to be distributed among A, B, C, D in the proportion of 5 : 2 : 4 : 3. If C gets Rs. 1000 more than D, what is B's share?

Solution: Let the shares of A, B, C and D be Rs. 5x, Rs. 2x, Rs. 4x and Rs. 3x respectively.

Then, 4x - 3x = 1000 $\implies$ x = 1000.

B's share = Rs. 2x = Rs. (2 x 1000) = Rs. 2000.

Example 20. Salaries of Ram and Rahim are in the ratio 2 : 3. If the salary of each is increased by Rs. 4000, the new ratio becomes 40: 57. What is Rahim's salary?

Solution: Let the original salaries of Ram and Rahim be Rs. 2x and Rs. 3x respectively.

Then, $\dfrac{2x + 4000}{3x + 4000} = \dfrac{40}{57}$

57(2x + 4000) = 40(3x + 4000)

6x = 68,000

3x = 34,000

Rahim's present salary = (3x + 4000) = Rs.(34000 + 4000) = Rs. 38,000.

Que 4 The fourth proportional to 5, 8, 15 is:

Let the fourth proportional to 5, 8, 15 be n.

Then, 5 : 8 :: 15 : n

$\implies$ 5n = (8 x 15)

$\implies$ x = $\dfrac{(8 \times 15)}{5}$ = 24

EXERCISE

1. If $\dfrac{P}{2} = \dfrac{Q}{3} = \dfrac{R}{5}$. Then P : Q : R is
   (a) 2 : 3 : 5
   (b) 2 : 5 : 3
   (c) 3 : 2 : 5

(d) None of these

2. In a bag, there are coins of 25p, 10p, and 5p in the ratio of 1 : 2 : 3. If there are Rs. 30 in all, how many 5p coins are there?
   (a) 200
   (b) 150
   (c) 100
   (d) 50

3. Two numbers are respectively 40% and 50% more than a third number. The ratio of the two numbers is:
   (a) 11 : 15
   (b) 12 : 17
   (c) 14 : 15
   (d) 14 : 17

4. If 20% of a number is equal to three- fourth of another number, what is the ratio of second number to the first number?
   (a) 15 : 4
   (b) 15 : 7
   (c) 4 : 17
   (d) 4 : 15

5. The numbers are in the ratio 1:2. If 7 is added to both, their ratio changes to 3:5. The greatest number is:
   (a) 24
   (b) 26
   (c) 28
   (d) 32

6. The fourth proportional to 5, 8, 15 is:
   (a) 24
   (b) 19
   (c) 20
   (d) 21

7. If A : B : C = 2 : 3 : 4, then $\frac{A}{B} : \frac{B}{C} : \frac{C}{A}$ is equal to :
   (a) 4: 9 : 16
   (b) 8 : 9 : 12
   (c) 8 : 9 : 16
   (d) 8 : 9 : 24

8. If A : B = 2 :3, B : C = 4 :5 and C : D = 6 : 7, then A : B : C : D is
   (a) 16 : 22 : 30 : 35

(b) 16 : 24 : 15 : 35
(c) 16 : 24 : 30 : 35
(d) 18 : 24 : 30 : 35

9. If 0.75 : ✕ : : 5 : 8, then ✕ is equal to:
(a) 1.20
(b) 1.25
(c) 1.34
(d) 1.32

10. If ✕ : y = 5 : 2, then (8✕ + 9 y) : (8✕ + 2y) is :
(a) 22 : 29
(b) 26 : 61
(c) 29 : 22
(d) 61 :26

11. The salaries of A, B, C are in the ratio 2 : 3 : 5.if the increments of 15%, 10% and 20% are allowed respectively in their salaries, then what will be the new ratio of their salaries ?
(a) 3 : 3 : 1
(b) 10 : 11 : 20
(c) 23 : 33 :60
(d) Cannot be determined

12. If Rs. 782 be divided into three parts, proportional to $\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$, then the first part is :
(a) Rs. 182
(b) Rs. 190
(c) Rs. 196
(d) Rs. 204

13. Two numbers are in the ratio 3 : 5.if 9 is subtracted from each, the new numbers are in the ratio 12 : 23. The smaller number is :
(a) 27
(b) 33
(c) 49
(d) 55

14. Two numbers are in the ratio 1 : 2. If 7 is added to both, their ratio changes to 3 : 5. The greatest number is :
(a) 24
(b) 26
(c) 28
(d) 32

15. In a bag, there are coins of 25 p, 10 p and 5 p in the ratio of 1 : 2: 3. If there are Rs. 30 in all, how many 5 p coins are there?
(a) 50
(b) 100
(c) 150
(d) 200

16. Salaries of ravi and sumit are in the ratio 2 : 3. If the salary of each is increased by Rs. 4000, the new ratio becomes 40 : 57. What is sumit's present salary ?
(a) Rs. 17,000
(b) Rs. 20.000
(c) Rs, 25,500
(d) none of these

17. if the Rs. 510 be divided among A, B, C in such a way that A gets 2/3 of what B gets and B gets ¼ of what C gets, than their shares are respectively :
(a) Rs. 120, Rs. 240, Rs. 150
(b) Rs. 60, Rs. 90, Rs. 360
(c) Rs. 150, Rs. 300, Rs. 60
(d) None of the above

18. The sum of three numbers is 98. If the ration of the first to the second is 2:3 and that of the second to the third is 5:8, then the second number is :
(a) 20
(b) 30
(c) 48
(d) 58

19. A and B together have Rs. 1210. If 4/15 of A's amount is equal to 2/5 of B's amount, how much amount does B have?
(a) Rs. 460
(b) Rs. 484
(c) Rs. 550
(d) Rs. 664

20. The fourth proportional to 5, 8, 15 is :
(a) 18
(b) 24
(c) 19
(d) 20
(e) 21

21. $\times$ Varies inversely as square of y. given that y = 2 for $\times$ = 1. The value of $\times$ for y = 6 will be equal to :
(a) 3

(b) 9

(c) $\frac{1}{3}$

(d) $\frac{1}{9}$

22. If 10% of $\times$ = 20% of y, then $\times$: y is equal to :
   (a) 1 : 2
   (b) 2 : 1
   (c) 5 : 1
   (d) 10 : 1

23. Two numbers are respectively 20% and 50% more than a third number. The ratio of the two numbers is :
   (a) 2 : 5
   (b) 3 : 5
   (c) 4 : 5
   (d) 6 : 7

24. A fraction which bears the same ratio to $\frac{1}{27}$ that $\frac{3}{11}$ does to $\frac{5}{9}$, is equal to :

   (a) $\frac{1}{55}$

   (b) $\frac{1}{11}$

   (c) $\frac{3}{11}$

   (d) 55

25. Seats for the mathematics, physics and biology in a school are in the ratio 5 : 7 : 8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?
   (a) 2 : 3 : 4
   (b) 6 : 7 : 8
   (c) 6 : 8 : 9
   (d) None of these

26. The ratio of the number of boys and girls in a college is 7 :8. If the percentage increase in the number of boys and girls be 20% and 10 % respectively, what will be the new ratio ?
   (a) 8 : 9
   (b) 17 : 18
   (c) 21 : 22
   (d) Cannot be determined

27. A sum of money is to be distributed among A, B, C, D in the proportion of 5 : 2 : 4 :l 3. If C gets Rs. 1000 more than D, what is B's share?
    (a) Rs. 500
    (b) Rs.1500
    (c) Rs. 2000
    (d) None of these

28. If 40% of a number is equal to two- third of other number, what is the ratio of first number to the second number?
    (a) 2 : 5
    (b) 3 : 7
    (c) 5 : 3
    (d) 7 : 3

29. Ratio of the earning of A and B is 4 : 7. If the earning of A increase by 50% and those of B decrease by 25%, the new ratio of their earnings becomes 8 : 7. What are A's earning?
    (a) Rs. 21,000
    (b) Rs. 26,000
    (c) Rs 28,000
    (d) Data inadequate

30. A sum of Rs. 1300 is divided amongst P, Q, R and S such that

    $$\frac{P's\,share}{Q's\,share} = \frac{Q's\,share}{R's\,share} = \frac{R's\,share}{S's\,share} = \frac{2}{3}.$$ then, P's share is :….
    (a) Rs. 140
    (b) Rs. 160
    (c) Rs. 240
    (d) Rs. 320

31. A number a lies between 0 and 1, then which of the following is true.

    (a) $1/a > \sqrt{a}$
    (b) $a > 1/a$

    (c) $1/a > \sqrt{a}$
    (d) None of these

32. The compound ratio of (3:4), (5:7), (6:11) is:
    (a) 19:154
    (b) 45:154
    (c) 44:154
    (d) 45:152

33. Which of the following ratio is greatest?
    (a) 5/7
    (b) 3/4

(c) 2/5

(d) 8/9

34. Which of the following fractions is less than $\frac{8}{9}$ and greater than $\frac{1}{2}$?

(a) $\frac{7}{8}$

(b) $\frac{11}{12}$

(c) $\frac{1}{4}$

(d) $\frac{9}{10}$

35. What is the third proportional to $(x^2 - y^2)$ and (x+y)

(a) (x+y)/(x-y)

(b) (x-y)/(x+y)

(c) $(x^2 - y^2)$/ (x+y)

(d) None of these

36. The fourth proportional to 4, 6, 8 is:

(a) 14

(b) 11

(c) 12

(d) 10

37. The ratio between two numbers is 3:4 and their LCM is 150. The first number is:

(a) 25

(b) 30

(c) 35

(d) 40

38. The mean proportional between 117 and 208 is:

(a) 142

(b) 156

(c) 160

(d) 162

39. Two number are in the ratio 3 : 5. If 9 is subtracted from each, the new numbers are in the ratio 12: 23. The smaller number is:

(a) 33

(b) 36

(c) 38

(d) 40

40. If x varies as y, and y = 8 when x = 21. Find the value of x when y = 24.
    (a) 88
    (b) 63
    (c) 64
    (d) 86

41. The whole numbers whose sum is 64 cannot be in the ratio:
    (a) 5:3
    (b) 3: 4
    (c) 3:5
    (d) 1:3

42. The whole numbers whose sum is 81 cannot be in the ratio:
    (a) 5:4
    (b) 4:5
    (c) 2:1
    (d) 2:7

43. If 64 is divided into four parts proportional to 7, 4, 2, 3, then the smallest part is:
    (a) 14
    (b) 12
    (c) 16
    (d) 8

44. If (x:y) = 3:2, then $(x^2 - y^2 + 1) : (x^2 + y^2 - 1)$ is:
    (a) 2:7
    (b) 2:1
    (c) 1:2
    (d) 5:7

45. If 35% of x = 85% of y, then y:x is:
    (a) 17:7
    (b) 7:17
    (c) 5:17
    (d) 17:5

46. What number must be added to each term of the ratio 5:37 to make it equal to 1:3?
    (a) 10
    (b) 11
    (c) 12
    (d) 13

47. I used 6 litres of oil paint to paint a map of India 6 meters high. How many litres of paint would I need for painting a proportionately scaled map that is 18 meters high?
    (a) 18

(b) 30
(c) 54
(d) Cannot be determined

48. If the ratios $\dfrac{a}{b} = \dfrac{c}{d} = \dfrac{e}{f}$ then the expression $\dfrac{2a^4b^2 + 3a^2e^2 - 5e^4f}{2b^6 + 3b^2f^2 - 5f^5}$ is equal to:

(a) a/b
(b) 1
(c) a^2/b^2
(d) a^4/b^4

49. What is the least possible number which must be subtracted from 7, 9 and 12 so that the resulting numbers are in continued proportion?
(a) 1
(b) 2
(c) 3
(d) 4

50. The fourth proportional of 21, 15 and 7 is:
(a) 5
(b) 4
(c) 7
(d) 8

ANSWERS

1	(a)	11	(c)	21	(d)	31	(a)	41	(b)
2	(b)	12	(d)	22	(b)	32	(b)	42	(d)
3	(c)	13	(b)	23	(c)	33	(d)	43	(d)
4	(d)	14	(c)	24	(a)	34	(a)	44	(c)
5	(c)	15	(c)	25	(a)	35	(a)	45	(b)
6	(b)	16	(d)	26	(c)	36	(c)	46	(b)
7	(d)	17	(b)	27	(c)	37	(a)	47	(c)
8	(c)	18	(b)	28	(c)	38	(b)	48	(d)
9	(a)	19	(b)	29	(d)	39	(a)	49	(c)
10	(c)	20	(b)	30	(b)	40	(b)	50	(a)

CHAPTER 7: GEOMETRY AND MENSURATION

Introduction

- Geometry is one of the branches of mathematics that deals with the questions of shape, size, area, volume and relative position of different figures.
- Menstruation deals with the study of all different geometric shapes.

Angles and Lines:

- **Right Angle-** An angle of 90°.
- **Obtuse Angle-** An angle between 90° and 180°.
- **Reflex Angle-** An angle between 180° and 360°.
- **Complementary angles-** Two angles whose sum is 90°.
- **Supplementary angles –** Two angles whose sum is 180°.
- **Perpendicular lines-** Two lines which makes an angle of 90° with each other.
- **Bisector-** A line that passes through the midpoint of another line.
- **Angular bisector –** a line which is drawn at the vertex of an angle and divides it into two equal parts.
- **Parallel lines –** Two lines lie on the same plane and do not intersect each other.

Polygons:-

Polygons are many sided figures whose sides are line segments.

For example: Triangle, Rectangle, Square etc.

There are basically two types of polygons:

Regular Polygons- whose all the sides and angles are equal.

Irregular Polygons- whose all the sides and angles are not of the same measure.

Name of the Polygon	No. of Sides	No. of Angles	No. of Vertices	No. of Diagonals	Sum of all the Angles
Triangle	3	3	3	0	180°
Quadrilateral	4	4	4	2	360°
Pentagon	5	5	5	5	540°
Hexagon	6	6	6	9	720°
Heptagon	7	7	7	14	500°
Octagon	8	8	8	20	1080°
Nonagon	9	9	9	27	1260°
Decagon	10	10	10	35	1440°

Triangles:-

- ➢ **Actual angle triangle:** A triangle with all the angles less than 90°.
- ➢ **Right Angle Triangle:** Triangle with one of the angle is equal to 90°.
- ➢ **Obtuse angle triangle:** Triangle with one of the angle more than 90°.
- ➢ **Equilateral triangle:** who's all the sides are equal and every angle.
  - • Sum of the angles of a triangle is 180°
  - • The sum of any two sides of a triangle is greater than the third side.
  - • Pythagoras Theorem: In a right angle triangle

$$(\text{Hypotenuse})^2 = (\text{Base})^2 + (\text{Height})^2$$

Volume and Surface Area

Cuboid

Let length = l, breadth = b and height = h units. Then,

1. **Volume =** (l x b x h) cubic units.
2. **Surface area** = 2(lb + bh + lh) sq. units.

3. **Diagonal** = $\sqrt{l^2 + b^2 + h^2}$ units.

Cube
Let each edge of a cube be of length a. Then,
1. **Volume** = a^3 cubic units.
2. **Surface area** = $6a^2$ sq. units.

3. **Diagonal** = $\sqrt{3}\,a$ units.

Cylinder

Let radius of base = r and Height (or length) = h. Then,
1. **Volume** = ($\pi r^2 h$) cubic units.
2. **Curved surface area** = ($2\pi rh$) sq. units.
3. **Total surface area** = ($2\pi rh + 2\pi r^2$) sq. units
              = $2\pi r$ (h+r) sq. units

Cone

Let radius of base = r and Height = h. Then,

1. **Slant height**, *l* = $\sqrt{h^2 + r^2}$ units.

2. **Volume** = $\left(\frac{1}{3}\pi r^2 h\right)$ cubic units.

3. **Curved surface area** = (πrl) sq. units.
4. **Total surface area** = ($\pi rl + \pi r^2$) sq. units.

Sphere

Let the radius of the sphere be r. Then,

1. **Volume** = $\left(\frac{4}{3}\pi r^3\right)$ cubic units.

2. **Surface area** = $(4\pi r^2)$ sq. units.

Hemisphere

Let the radius of a hemisphere be r. Then,

1. **Volume** = $\left(\frac{2}{3}\pi r^3\right)$ cubic units.
2. **Curved surface area** = $(2\pi r^2)$ sq. units.
3. **Total surface area** = $(3\pi r^2)$ sq. units.

Remember: 1 liter = 1000 cm^3.

SOLVED EXAMPLES

Example: 1 how many degrees are there in an angle which is equal to one fifth of its supplement?

Solution: Suppose the angle is x.

Then its supplement = 180° - x -*-*

Given that x= $\frac{1}{5}$ (180° - x)

$$5x = 180° - x$$

$$6x = 180°$$

$$X = 30°$$

Example: 2 If the sides of a triangle are 8cm, 10cm and 12 cm long, then find the area of the triangle.

Solution: We know that the area of a triangle whose sides are a, b, c =

$$\sqrt{s\,(s-a)(s-b)(s-c)}$$

Where s = $\frac{a+b+c}{2}$

Here, a = 8cm, b = 10 cm, c = 12 cm. Then,

$$s = \frac{8+10+12}{2} = 15$$

Area = $\sqrt{15\,(15-8)(15-10)(15-12)} = \sqrt{15 \times 7 \times 5 \times 3} = 15\sqrt{7}$ sq. cm.

Example:3 In the given triangle PQ is perpendicular to RS, then calculate the value of x and y.
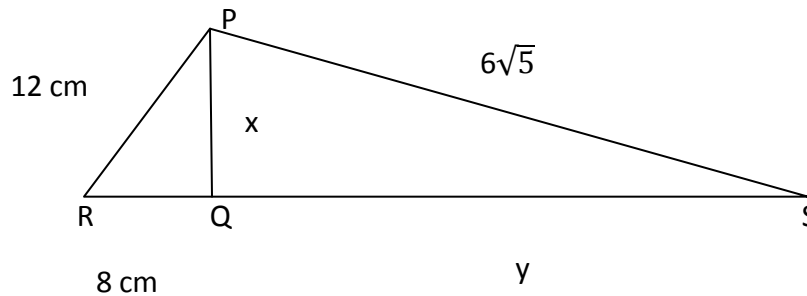
By the Pythagoras theorem from triangle △ PQR

$x^2 = 12^2 - 8^2 = 80 = 4\sqrt{5}$

Now from △ PQS

$y^2 = \left(6\sqrt{5}\right)^2 - \left(4\sqrt{5}\right)^2 = 180 - 80 = \sqrt{100} = 10$ cm.

Example: 4 Raju have two pieces of aluminium wire. First piece he bent in the form of a circle of radius 21 cm and the second piece he bent in the form of a square. Find the difference in the area of the square and the circle.

Solution: Perimeter of the circular wire = 2πr = $2 \times \frac{22}{7} \times 21$ =132 cm

Perimeter of the square = perimeter of a circle = 132 cm

$$4 \times (side) = 132 \text{ cm}$$

$$(Side) = \frac{132}{4} = 33 \text{ cm}$$

Now, area of the square = $(33)^2$ = 1089 sq.cm.

Area of the circle = $\pi\,(21)^2$ = 1386 sq.cm.

Required difference = 297 sq.cm.

Example 5.An office wall with measurements 14m × 40cm × 9m is to be constructed with bricks of dimensions 16cm × 10cm × 9cm. Find the number of bricks required to construct the wall.

Solution:

Volume of the wall = 1400cm × 40cm × 9cm

Volume of one brick = 12cm × 10cm × 9 cm

No of brick required = $\dfrac{1400 \times 40 \times 9}{16 \times 10 \times 9}$ = 350

Example 6.What is the Volume of the largest sphere that can be cut from a cube having edges of 5cm length.

Solution:

The diameter of the largest sphere will be equal to the edge of the cubes.

$\therefore$ r = $\dfrac{5}{2}$ Cm.

Now

Volume of the largest sphere = $\dfrac{4}{3} \times \dfrac{22}{7} \times \left(\dfrac{5}{2}\right)^3$ = $\dfrac{11000}{168}$ = $\dfrac{1375}{21}$ Cm^3

Example 7. If the area of an equilateral triangle is 256 $\sqrt{3}$ sq, cm., then find its side?

Solution:

We know that the area of an equilateral triangle of side a = $\dfrac{\sqrt{3}}{4}a^2$

then 256 $\sqrt{3}$ = $\dfrac{\sqrt{3}}{4}a^2$

1024 = a^2

a = 32cm

Therefore, the side of an equilateral triangle = 32cm.

Example 8.The height of a wall is six times its width and the length of the wall is seven times its height. If Volume of the wall be 16128cu.m, then calculate the width.

Solution:

Suppose the width of the wall = x m.

Then height = 6 x

& Length = 7 x height

= 7 x 6 x = 42 x

Also given that volume of the wall = 16128 cu.m.

Therefore,

42x × x × 6 x = 16128

252 x^3 = 16128

$x^3 = \dfrac{16128}{256}$

x^3 = 64

x = 4

Width = 4cm.

Example 9.Find the no. of revolution made by a wheel of a bicycle to cover a distance of 792m. If its diameter is 30cm.

Solution:

No. of revolution made by a wheel = $\dfrac{Distance\ travelled}{Circumference\ of\ the\ Wheel}$

$= \dfrac{792m \times 100m}{\left(2 \times \dfrac{22}{7} \times \dfrac{39}{2}\right)cm}$

$= \dfrac{792 \times 100 \times 7}{22 \times 24} = 840.$

Example 10.Ram wants to pack few spherical balls of radius 5cm in a box of size 50cm × 30cm × 10cm. How many maximum balls he can pack in that box.

Solution:

Given that the radius of each sphere = 5cm
Therefore diameter of each sphere = 10cm

No. of spherical balls that ram can be adjusted along the length of the box = $\dfrac{50}{10}$ = 5

Along the width of the box = $\dfrac{30}{10}$ = 3

Along the height of the box = $\dfrac{10}{10}$

Therefore the total no. of balls that can be packed in the box = 5 × 3 × 1 =15

Example 11. What will be the total surface areas of a cube whose side is 0.2cm.

Solution : Total Surface area

= $6(0.2)^{2} = ^{6/25}$ cm^2

Example: 12 The rectangular grassy plot 110m by 65m has a gravel path 2.5 m wide all round it on the inside. Find the cost of gravelling the path at 80 paise per sq. meter

Solution: Area of the plot = (110×65) m^2 = 7150 m^2

Area of the plot excluding the path = [(110-5)(65 -5)] m^2 = 6300 m^2

Therefore, the area of the path (7150 -6300) m^2

Then, the cost of gravelling the path = Rs. (850 × 80/100) =Rs. 680.

Example 13. The diagonals of two squares are in the ratio 2:5. Find the ratio of their areas.

Solution: Suppose the diagonals of the square are 2x and 5x respectively.

Therefore, ratio of their areas = ½ × $(2x)^2$: 1/2× $(5x)^2$ = 4:25.

Example 14.If the diagonal of a square is 16 cm , then find the side of the square.

Solution: Let the side of the square be a cm. diagonal of a square = $\sqrt{2}$ time its side

$$a\sqrt{2} = 16 \Rightarrow a = \frac{16}{\sqrt{2}} = 8\sqrt{2}.$$

Example 15. The number of sides of a regular polygon is 12. Find the interior angle of the polygon.

Solution: Exterior angle of a regular polygon $= \frac{360^{\circ}}{n} = \frac{360^{\circ}}{12} = 30^{\circ}$

The sum of the interior angle and the exterior angle is 180°

$\therefore$ Interior angle of this polygon $= 180^{\circ} - 30^{\circ} = 150^{\circ}$

Example 16.A swimming pool 100m long and 50m wide and 1m deep at the shallow end and 4m deep at the deep end. Find the volume of the pool.

Solution: Area of cross section perpendicular to the width $= 100 \times \left(\frac{1}{2}\right)(1 + 4) = 250. sq. m$

Volume = volume of cross section $\times$ width

    = 250 $\times$ 50
    = 12500 cubic metres

Example 17. If the base of a parallelogram is 10 cm and the height of the parallelogram is 7 cm, find the area of the parallelogram.

Solution: The area of the parallelogram = base $\times$ height = 10 $\times$ 7 = 70 sq. cm

Example 18.In a rhombus ABCD, AC = 26 cm and BD = 22 cm. find the area of the rhombus.

Solution: Area of rhombus

    $= \frac{1}{2} \times$ product of the diagonals

    $= \frac{1}{2} \times$ AC $\times$ BD $= \frac{1}{2} \times 26 \times 22$
    = 286 sq.cm

Example 19. The difference between two parallel sides of a trapezium is 4 cm. The perpendicular distance between them 19 cm. If the area of the trapezium is 475 cm^{2} find the length of the parallel sides.

Solution: Let the two parallel sides of the trapezium be a cm and b cm.

Then, a – b = 4

And, $\frac{1}{2}$ X (a + b) X 19 = $\Leftrightarrow$ 475 (a + b) = $\frac{475 \, X \, 2}{19}$ $\Leftrightarrow$ a + b = 50

From the above equations, we get: a = 27, =23

So, the two parallel sides are 27 cm and 23 cm.

20. Find the length of a rape by which a cow must be tethered in order that it may be able to graze an area of 9856 sq. meters.

Solution. Clearly, the cow will graze a circular field of area sq. meters and radius equal to the length of the rape.

Let the length of the rape be R meters.

Then, $\pi R^2 = 9586 \Leftrightarrow R^2 \left(9586 \times \frac{7}{22}\right) = 3136 \Leftrightarrow R = 56$

Length of the rope 56 m.

EXERCISE

1. The area of a rectangle is 460 square meters. If the length is 15% more than the breadth, what is the breadth of the rectangular field?
   (a) 14 m
   (b) 12m
   (c) Cannot be determined
   (d) None of these

2. The diagonal of a rectangle is √41 cm and its area is 20sq.cm. The perimeter of the rectangle must be:
   (a) 18 cm
   (b) 19 cm
   (c) 20 cm
   (d) 21 cm

3. The percentage increase in the area of a rectangle, if each of its sides is increased by 20%.
   (a) 33%
   (b) 44%
   (c) 55%
   (d) 66%

4. If the length and breadth of a rectangular plot be increased by 50% and 20 % respectively, then how many times will its area be increased?
   (a) 2 times
   (b) 3 times
   (c) 4 times
   (d) None of these

5. The length of a rectangular room is increased by 60%. By what percent would the width have to be decreased so as to maintain the same area?
   (a) 37.5%

(b) 37.4%
(c) 36%
(d) 35%

6. The perimeter of a right angled triangle is 60cm. Its hypotenuse is 26cm. The area of the triangle is:

(a) 60cm^2

(b) 120cm^2

(c) 240cm^2

(d) 360cm^2

7. If the area of a square with side x is equal to the area of a triangle base x, then the altitude of the triangle is:
(a) a
(b) a/2
(c) 2a
(d) 3a

8. A circular plate and a rectangular table have the same perimeter. The sides of the rectangle are 18cm and 26cm. What is the area of the circle?

(a) 90cm^2

(b) 85cm^2

(c) 96cm^2

(d) None of these

9. If the ratio of areas of two circles is 9:100, then the ratio of their circumference will be:
(a) 6:10
(b) 3:9
(c) 3:10
(d) None of these

10. If the ratio of the parameters of two circles is 3:4, then the ratio of their areas will be:
(a) 9:16
(b) 5:8
(c) 9:15
(d) None of these

11. The number of revolutions a wheel of diameter 40cm makes in travelling a distance of 176m, is:
(a) 120
(b) 130
(c) 140

(d) 150

12. What will be the area of a semi-circle of 28m diameter?

(a) 300m^2

(b) 304m^2

(c) 308m^2
(d) None of these

13. If the radius of a circle is doubled, its area is increased by:
(a) 200%
(b) 300%
(c) 400%
(d) 500%

14. In an equilateral triangle, a square and a circle have equal perimeters. If T denotes the area of the triangle, S, the area of the square and C, the area of the circle, then:
(a) S < T <C
(b) S > T > C
(c) T < S < C
(d) Cannot be determined

15. The swimming pool 9m wide and 12m long is 1m deep on the shallow side and 4m deep on the deeper side. Its volume is:

(a) 240 m^3

(b) 250 m^3

(c) 260 m^3
(d) 270 m^3

16. The capacity of a cylindrical tank is 246.4 litres. If the height is 4 meters, what is the diameter of the base?
(a) 12m
(b) 13m
(c) 14m
(d) None of these

17. How many cubes of 10cm edge can be put in a cubical box of 2m edge?
(a) 6000
(b) 2000
(c) 8000
(d) None of these

18. The cuboidal block of 6cm ✕ 9cm ✕ 12cm is cut up into an exact number of equal cubes. The possible number of cubes will be:
(a) 12
(b) 24
(c) 36
(d) 48

19. The cost of the paint is Rs. 36.50 per kg. If 1 kg of paint covers 16 square feet, how much will it cost to paint outside of a cube having 8 feet each side?
(a) Rs. 876
(b) Rs.890
(c) Rs.840
(d) None of these

20. A hemispherical bowl of internal radius 9cm contains a liquid. This liquid is to be filled into cylindrical shaped small bottles of diameter 3 cm and height 4cm. How many bottles will be needed to empty the bowl?
(a) 52
(b) 64
(c) 54
(d) 67

21. A boat having a length 3 m and breadth 2 m is floating on a lake. The boat sinks by 1 cm when a men gets on it. The mass of me is :
(a) 12 kg
(b) 60 kg
(c) 72 kg
(d) 96 kg

22. The edges of a cuboid are in the ratio 1:2:3 and its surface area is 88 cm2. The volume of the Cuboid is:

(a) 24 cm^3

(b) 48cm^3

(c) 64cm^3

(d) 120cm^3

23. How many bricks, each measuring 25 cm ✕ 11.25cm ✕ 6 cm will be needed to build a wall

8 m ✕ 6 m✕ 22.5cm?
(a) 5600
(b) 6000
(c) 6400
(d) 7200

24. The number of bricks, each measuring 25cm $\times$ 12.5cm$\times$ 7.5cm, required to construct a wall 6 m long, 5m high and 0.5 m thick, while the mortar occupies 5 % of the volume of a wall is:
    (a) 3040
    (b) 5740
    (c) 6080
    (d) 8120.

25. 50 men took a dip in a water tank 40 m long and 20m broad on a religious day. If the

    average displacement of water by a man is 4 m^3, then the rise in the water level in the tank will be:
    (a) 20cm
    (b) 25cm
    (c) 35cm and
    (d) 50 cm

26. The sum of the length, breadth and depth of a cuboids is 19 cm and its diagonal is $5\sqrt{5}$ cm. It surface area is:

    (a) 125 cm^2

    (b) 236cm^2

    (c) 361cm^2

    (d) 486cm^2

27. A metallic sheet is of rectangular shape with dimensions 48m$\times$ 36m. From each of its corners, a square is cut of so as to make an open box. If the length of the square is 8m,the volume of the box (in)is :
    (a) 4830
    (b) 5120
    (c) 6420
    (d) 8960

28. The area of the three adjacent faces of a rectangular box which meet in a point are known the product of these areas is equal to:
    (a) The volume of the box
    (b) Twice the volume of the box
    (c) The square of the volume of the box
    (d) The cube root of the volume of the box

29. The perimeter of one face a of cube is 20cm. its volume must be:

(a) $125cm^3$

(b) $400cm^3$

(c) $1000cm^3$

(d) $8000cm3$

30. Total surface area of a cube whose side is 0.5cm is:

(a) $1/4\ cm^2$

(b) $1/8\ cm^2$

(c) $3/4cm^2$

(d) $3/2cm^2$

31. The length of an edge of a hollow cube open at one face is$\sqrt{3}$ m. What is the length of the largest pole that it can accommodate/

(a) $\sqrt{3}\ m$
(b) 3m

(c) $3\sqrt{3}$ m

(d) $3/\sqrt{3}\ m$

32. What is the volume of a cube (in cube cm) whose diagonal measure $4\sqrt{3}\ cm$?
(a) 8
(b) 16
(c) 27
(d) 64

33. A cuboidal block of 6cm $\times\ 9cm\ \times\ 12cm$ is cut up into an exact number of equal cubes. The least possible number of cubes will be:
(a) 6
(b) 9
(c) 24
(d) 30

34. A large cube is formed from the material obtained by melting three smaller cubes of 3 , 4 and 5 cm side. What is the ratio of the total surface areas of the smaller cubes and the large cube?
(a) 2 : 1
(b) 3 : 2
(c) 25 :18

(d) 27 : 20

35. Three cubes with sides in the ratio 3 : 4 : 5 are melted to form a single cube whose

    diagonal is $12\sqrt{3}$ cm. the sides of the cubes are :
    (a) 3 cm, 4cm, 5cm
    (b) 6 cm, 8cm, 10cm
    (c) 9 cm, 12cm, 15cm
    (d) None of these

36. If the volumes of two cubes are in the ratio 27 : 1, the ratio of their edges is :
    (a) 1 : 3
    (b) 1 : 27
    (c) 3 : 1
    (d) 27 : 1

37. The capacity of a cylindrical tank is 246.4 liters. If the height is 4 meters, what is the diameter of the base?
    (a) 1.4 m
    (b) 2.8 m
    (c) 14 m
    (d) 28 m
    (e) None of these

38. The sum of the radius of the base and the height of a solid cylinder is 37 meters. if the total surface area of the cylinder be 1628 sq. meters, its volume is :

    (a) 3180 m^3

    (b) 4620 m^3

    (c) 5240 m^3
    (d) None of these

39. The height of a cylinder of given volume and the minimum surface area is :
    (a) Equal to its diameter Equal to its diameter
    (b) half to its diameter
    (c) double to its diameter
    (d) none of these

40. Two right circular cylinders of equal volumes have height in the ratio 1: 2. The ratio of their radii is :
    (a) 1 : 2
    (b) 1 : 4
    (c) 2 : 1

    (d) $\sqrt{2:1}$

41. The radius and height of a right circular cone are in the ratio 3: 4. If its volume is 96π, what is its slant height?
   (a) 8 cm
   (b) 9 cm
   (c) 10 cm
   (d) 12 cm

42. If the radius of the base and the height of a right circular cone are doubled, then its volume becomes :
   (a) 2 times
   (b) 3 times
   (c) 4 times
   (d) 8 times

43. If the height of a cone be doubled and radius of base remains the same, then the ratio of the volume of the given cone to that of the second cone will be :
   (a) 1 : 2
   (b) 2 : 1
   (c) 1 : 8
   (d) 8 : 1

44. The radii of two cones are in the ratio 2 : 1, their volume are equal. Find the ratio of their height.
   (a) 1 : 8
   (b) 1 : 4
   (c) 2 : 1
   (d) 4 : 1

45. The volume of the largest right circular cone that can be cut out of a cube of edge 7 cm is :

   (a) 13.6 cm^3

   (b) 89.8 cm^3

   (c) 121 cm^3

   (d) 147.68 cm^3

46. If the volume of a sphere is divided by its surface area, the result is 27 cm. the radius of the sphere is :
   (a) 9 cm
   (b) 36 cm
   (c) 54 cm
   (d) 81 cm

47. If the radius of a sphere is increased by 2 cm, then its surface area increases by 2 cm, then

its surface area increases by 352 cm^2. The radius of the sphere before the increase was :
(a) 3 cm
(b) 4 cm
(c) 5 cm
(d) 6 cm

48. If the measured value of the radius is 1.5% larger, the percentage error (correct to one decimal place) made in calculating the volume of a sphere is :
(a) 2.1
(b) 3.2
(c) 4.6
(d) 5.4

49. A solid piece of iron of dimensions 49 × 33 × 24 cm is molded into a sphere. The radius of the sphere is :
(a) 21 cm
(b) 28 cm
(c) 35 cm
(d) None of these

50. A cylindrical vessel of radius 4 cm contains water. A solid sphere of radius 3 cm is lowered into the water until it is completely immersed. The water level in the vessel will rise by :

(a) $\frac{2}{9}$ cm

(b) $\frac{4}{9}$ cm

(c) $\frac{9}{4}$ cm

(d) $\frac{9}{2}$ cm

ANSWERS:

1	(d)	11	(c)	21	(b)	31	(b)	41	(c)
2	(b)	12	(c)	22	(b)	32	(d)	42	(d)
3	(b)	13	(b)	23	(c)	33	(c)	43	(a)
4	(d)	14	(c)	24	(c)	34	(c)	44	(b)
5	(a)	15	(d)	25	(b)	35	(b)	45	(b)
6	(b)	16	(d)	26	(b)	36	(c)	46	(b)
7	(c)	17	(c)	27	(b)	37	(e)	47	(d)
8	(d)	18	(b)	28	(c)	38	(b)	48	(c)
9	(c)	19	(a)	29	(a)	39	(a)	49	(a)
10	(a)	20	(c)	30	(d)	40	(d)	50	(c)

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CHAPTER 8: PERMUTATION AND COMBINATION

PERMUTATION:

The arrangement of a number of things taking some or all of them at a time is called **permutation.** If there are 'n' numbers of things and we have to select 'r' things at a time then

the total number of permutation is denoted by $nP_r = \frac{n!}{(n-r)!}$

For example if there are 3 candidates A ,B and C for the post of president and vice president of a college , since we have to select only 2 candidates , it can be done in 3! Ways. i.e. (A, B) (B, C) (A, C)(B, A)(C,B) and (C,A). Here order of arrangement matters.

Restricted Permutation:

Sometimes we have to find out the number of permutation keeping few specific objects at specific places. In this case, we find out the number of permutation of filling remaining vacant places by the remaining objects.

If r objects are taken out of n dissimilar objects

I.   A specific object is taken each time: if there are n objects $a_1 , a_2 \ldots \ldots \ldots \ldots \ldots . a_n$. Suppose that a_1 is taken each time. If a_1 takes first place then the remaining (n-1) objects can be arranged in $n-1P_{r-1}$ ways. Since a_1 can take any place so number of permutation is r $\times$ $n-1P_{r-1}$.

II.   Specific object never taken: then r objects are taken out of (n-1) objects, so number of permutation is $n-1P_r$.

{Note: nP_r = $n-1P_r$ + r $\times$ $n-1P_{r-1}$ }

Permutation of things when some are identical:

If we have n things in which p are exactly of one kind , q of second kind , r of third kind and the rest are different then the number of permutation of n things taken all at a time $nP_r = \frac{n!}{p!q!r!}$

Repetition of things:

The number of permutation formed by taking r things at a time out of n things in any object arrangement such that each object can be taken any number of time is n^r .

Circular permutation:

If we fix one of the objects around the circumference of a circle then number of permutation of n different thing taken all at a time is (n-1)! Ways. It will be same as by putting (n-1) objects at (n-1) places.

But if we do not consider the direction i.e. clockwise and anticlockwise then the number of permutation is $\frac{(n-1)!}{2}$.

COMBINATION

From a given group of object each of the number of groups which are formed by taking some objects or all objects at a time without caring about the sequence of the objects is called combination. The number of combination formed by taking r objects at a time out of n object is denoted by nC_r where C expresses combination.

$$nC_r = \frac{n!}{r!(n-r)!}$$

For example if we have 3 objects A , B and C , 2 objects are taken out at a time then 3 combination are formed AB , BC and CA.

Note:

- If r= 0 , then $nC_0 = \frac{n!}{0!(n-0)!} = 1$

- If r= 1 , then $nC_1 = \frac{n!}{1!(n-1)!} = n$

- If r= n , then $nC_n = \frac{n!}{n!(n-n)!} = 1$

- $nC_r = nC_{(n-r)}$

Restricted combination:

The combination of r object out of n objects on which p specific objects:

1. Are always included is $n-pC_{r-p}$. We have to keep aside p specific objects and to select remaining (n-p).

2. Are never included is $n-pC_r$. Since p specific object are never included we have to form the combination taking r obects out of (n-p) objects.

The number of ways to select some or all thing out of any number of given thing :

There are 2 ways to select anything i.e. either it will be selected or not. Therefore number of ways to select n things is $2 \times 2 \times \ldots\ldots\ldots$ n times = 2^n. In these empty selection is also include. For non- empty selection is 2^n-1.

Note: $nC_1 + nC_2 + \ldots\ldots\ldots\ldots\ldots + nC_n = 2^n$-1.

Difference between permutation and combination:

Suppose there are 5 objects out of which 2 have to be chosen.

Permutation	Combination
Number of required way $= \dfrac{5!}{(5-2)!}$ $= \dfrac{5!}{3!} = 5 \times 4 = 20$	$= \dfrac{5!}{2!(5-2)!}$ $= \dfrac{5!}{2!3!} = \dfrac{5 \times 4}{2} = 10$

So it is clear that in permutation order matters while in combination order does not matter.

SOLVED EXAMPLES

Example1. Find the value of 27_{P_2}.

Solution: We know that $n_{P_r} = \dfrac{n!}{(n-r)!}$, where n $\geq$ r

Then, $27_{P_2} = \dfrac{27!}{(27-2)!} = \dfrac{27 \times 26 \times 25!}{25!} = 702$.

Example 2. Find the value of 25_{C_2}.

Solution: We know that $n_{C_r} = \dfrac{n!}{(n-r)!\,r!}$, where n $\geq$ r

Then, $25_{C_2} = \dfrac{25!}{(25-2)!2!} = \dfrac{25 \times 24 \times 23!}{23!2!} = 300$.

Example3. If $n_{C_6} = n_{C_5}$, then find the value of n.

Solution: Here, $n_{C_6} = n_{C_5}$

$$\Rightarrow \frac{n!}{(n-6)! \, 6!} = \frac{n!}{(n-5)! \, 5!}$$

$$\Rightarrow \frac{(n-5)}{6!} = \frac{1}{5!}$$

$\Rightarrow$ n-5 =6

$\Rightarrow$ n = 11.

Example 4. In how many ways can the letters of the word LEADER be arranged?

Solution: The word LEADER contains total 6 letters namely 1L, 2E, 1A, 1D, 1R

Therefore, the number of ways to arrange the letters of the word LEADER

$$= \frac{6!}{1! \, 2! \, 1! \, 1! \, 1!} = 360.$$

Example5. How many words can be formed from the letters of the word TABLE so that the vowels always come together?

Solution: The word TABLE contains 5 different letters.

Here the vowels are A and E. When A and E are taken together they can be treated as one letter.

Then the letters to be arranged are (TBL) (AE)

These 4 letters can be arranged in 4_{P_4} = 4! Ways = 24 ways.

The vowels in the group (AE) can also be arranged in 2! Ways.

$\therefore$ Required number of words = 4! $\times$ 2! = 48 ways.

Example 5. In how many different ways can the letters of the word DETAIL be arranged in such a way that the Vowel occupy only odd places.

Solution: There are 6 letters in the word.

Here, no of Vowels =3

& no of consonants = 3

No. of ways of arranging 3 vowels out of 3 odd places = 3_{P_3} =6.

Also, 3 consonants can be arranged at the remaining 3 places

No. of arrangements = 3_{P_3} =6.

Total number of ways = 6 × 6 =36.

Example 6. In how many ways a committee, consisting of 4 men and 5 women can be formed from 7 men and 9 women.

Solution: Required number of ways

= $7_{C_4} \times 9_{C_5}$ = 4410.

Example7. In how many ways can the letters of the word 'STATISTICS' be arranged?

Solution: The word STATISTICS contains 3S, 3T, 1A, 2I and 1C

∴ Required number of ways = $\frac{10!}{3!3!1!2!1!}$ = 50400.

Example 8. Find the value of $\frac{30!}{27!}$.

Solution: We have, $\frac{30!}{27!} = \frac{30 \times 29 \times 28 \times 27!}{27!}$ = 24,360.

Example9. Find the value of 7_{C_7}.

Solution: we have, $7_{C_7} = \frac{7!}{(7-7)! \times 7!} = \frac{7!}{0! \times 7!}$ = 1 {because 0! = 1}

Example 10. Find the value of $100_{C_{99}}$.

Solution: We have, $100_{C_{99}} = \frac{100!}{(100-99)! \times 99!} = \frac{100!}{1! \times 99!}$ = 100 {Because 1! =1}

Example 11. In how many different ways can the letters of the word OPTICAL be arranged so that the vowels always come together.

Solution: The word is OPTICAL and it contains 7 different letters.

Vowels in the word = O, I, A

When the vowels always come together, they can be supposed to form one letter.

Then the letters that we have to arrange PTCL (OIA).

Now, 5 letters can be arranged in 5! Ways = 120 ways.

The vowels (OIA) can be arranged among themselves in 3! = 6 ways.

∴   Required number of numbers = 120 ✕ 6 = 720.

Example12. How many three digit numbers can be formed from the digits 2, 3, 5, 6, 7 and 9, which are divisible by 5 and none of the digits is repeated?

Solution: The each required number is divisible by 5, so we must have 5 at unit place.

So, there is only one way to do it.

Tens places can be occupied by any of the remaining number. Then, there are 5 ways to do it.

The hundreds place can be occupied by any of the remaining 4 digits. So, there are 4 ways to fill the hundreds place.

∴   Required number of numbers = 1   5   4= 20.

Example 13. A golden box contains 2 white balls, 3 black balls and 4 red balls. In how many ways can 3 balls be drawn from the box, if at least one black ball is to be included in the draw?

Solution: Required number of ways = $(3_{C_1}$ $6_{C_2}) + (3_{C_2}$ $6_{C_1}) + (3_{C_3})$

$$= 45 + 18 + 1 = 64.$$

Example 14. In how many ways can a team of 5 members can be chosen out of the batch of 12 players.

Solution: Required numbers of ways = 12_{C_5}

$$= 792.$$

Example 15: If In how many ways can 17 identical white and 14 identical black balls be arranged in a row so that no two black balls are together.

Solution: When 17 identical white balls arranged in a straight line, there will be 18 spaces created.

The, 14 identical balls will have 18 places to fill in.

Therefore, required number of ways =$18_{C_{14}}$.

Example16. There are 7 different books of Mc Graw Hill education, 6 different books of Sultan Chand Publication and 4 different books of Sahitya Bhavan. The number of ways in which at least one book of each author can be given.

Solution: The number of ways in which at least 1 books of Mc Graw Hill education is given

$$= (2^7 - 1)$$

Similarly, for Sultan Chand and Sahitya Bhavan we have $(2^6 - 1)$ and $(2^4 - 1)$.

Therefore, the required number of ways = $(2^7 - 1) ((2^6 - 1) (2^4 - 1)$.

Example 17. There are 7 different books of Mc Graw Hill education, 6 different books of Sultan Chand Publication and 4 different books of Sahitya Bhavan. The number of ways in which at least one book can be given away.

Solution: For each book we have to options, either give it or not to give it.

Then we have 2^{17} ways in which the 17 books can be decided upon.

There will be only one way by which not gives a single book.

Thus required number of ways = 2^{17} - 1.

Example 18. If n_{C_1} = 120, then n =?

Solution: We have n_{C_1} = 120

$$\Rightarrow \frac{n!}{(n-1)!!1!} = 120$$

$$\Rightarrow \frac{n \times (n-1)!}{(n-1)!!1!} = 120$$

$$\Rightarrow n = 120.$$

Example 19. If n_{C_n} = S, then S =?

Solution: We have n_{C_n} = S

$$\Rightarrow \frac{n!}{(n-n)!!n!} = S$$

$\Rightarrow \frac{n!}{0!\,n!}$ = S {Because 0! =1}

$\Rightarrow$ S=1.

Example 20. In how many ways the letters of the word WINTER can be arranged?

Solution: The word WINTER has 6 letters

Required Number of ways = 6! = 720 ways.

EXERCISE:

1. The value of 72_{P_n} is:
    (a) 5112
    (b) 5113
    (c) 5110
    (d) 5111

2. The value of 76_{C_a} is:
    (a) 70300
    (b) 421800
    (c) 72300
    (d) 42900

3. How many three letter words with or without meaning can be formed out of the letters of a word 'DANGER' if repetition of words is not allowed.
    (a) 20
    (b) 60
    (c) 120
    (d) None of these

4. In how many ways can the letters of the word 'SUNDAY' be arranged?
    (a) 720
    (b) 724
    (c) 722
    (d) None of these

5. In how many different ways can the letters of the word 'SUCCESS' be arranged so that the vowels always come together?
    (a) 10
    (b) 5
    (c) 12
    (d) 20

6. In how many ways a committee, consisting of 7 boys and 9 girls can be formed from 12 boys and 11 girls?
    (a) 39916
    (b) 43560
    (c) 43562
    (d) 43555

7. A big box contains 3 white balls, 4 black balls and 5 red balls. In how many ways can 3 balls be drawn from the box, if at least 1 white ball is to be included in the draw?
    (a) 140
    (b) 135
    (c) 136
    (d) 138

8. How many 3 digit numbers can be formed out of digits 1, 2, 3, 4, 5 and 7?
    (a) 120
    (b) 20
    (c) 40
    (d) None of these

9. In how many ways can the 7 letters P, Q, R, S, T, U, and V be arranged so that S and T occupy continuous positions?
    (a) 1440
    (b) 5040
    (c) 360
    (d) None of these

10. In how many ways can 4 boys and 4 girls be seated around table so that no two girls are in adjacent positions?
    (a) 576
    (b) 140
    (c) 144
    (d) None of these

11. Mrs. Dixit with 6 children takes three at a time to see a movie. She goes with every group of three that she can form. How many times can she go to the cinema with distinct groups of three children?
    (a) 24
    (b) 60
    (c) 120
    (d) 20

12. When 9 professionals shake hands with one another in how many ways is it possible?
    (a) 72
    (b) 36
    (c) 45

(d) 54

13. Rahul has 6 coins and each coin is of different denomination. If he can use one or more coins at a time then what is the number of different sums of money he can form?
(a) 63
(b) 64
(c) 24
(d) 128

14. How many words can be formed from the letters of the word 'COUNTRY' so that the vowels are never together?
(a) 4200
(b) 3600
(c) 2400
(d) 2200

15. If n_{C_R} = 210, then the value of n:
(a) 11
(b) 10
(c) 9
(d) 8

16. If 15_{P_r} = 210, then the value of r:
(a) 3
(b) 4
(c) 2
(d) None of these

17. If $25_{C_{2r}} : 25_{C_{2r-4}}$ = 46 : 253, then find the value of r.
(a) 11
(b) 12
(c) 13
(d) 14

18. If $2n + 2_{C_{nn-4}} : 2n + 1_{C_{nn-2}}$ = 6, the find the value of n.
(a) 5
(b) 4
(c) 3
(d) 2

19. For the arrangements of the letters of the word 'DELHI', how many words would start with the letter D?
(a) 120

(b) 24

(c) 36

(d) None of these

20. If the repetition of words is not allowed then how many numbers of 4 digits can be formed with the digits 1, 2, 3, 4, 5 and 6.

(a) 360

(b) 15

(c) 120

(d) None of these

21. In how many ways can 4 distinct prizes be distributed to 7 management students if each student can get any number of prizes?

(a) 5040

(b) 2401

(c) 35

(d) 343

22. How many straight lines can be formed by Ravi from 10 non-collinear points on the X-Y plane?

(a) 45

(b) 90

(c) Cannot be determined

(d) None of these

23. In Rahul's birthday party he wants to distribute 11 identical return gifts among 7 friends in such a way so that each child gets at least one return gift?

(a) 330

(b) 210

(c) None of these

(d) Cannot be determined

24. How many triangles can be formed from 30 non collinear points on X-Y plane?

(a) 4060

(b) 24,360

(c) 4062

(d) 4064

25. If all the four digits are even, then how many 3 digit numbers are possible.

(a) 24

(b) 64

(c) Cannot be determined

(d) None of these

26. How many three digit numbers that do not contain identical digits can be written by means of the digits 1, 2, 3, 4, 5 and 6?

(a) 20
(b) 120
(c) 24
(d) 36

27. In how many ways can 10 bags be arranged if the best and the worst never come together?
(a) 2903040
(b) 2923040
(c) 2923149
(d) 2923242

28. In how many ways can Saroj choose a vowel and a consonant from the letters of the word 'HISTORY'?
(a) 15
(b) 14
(c) 12
(d) 10

29. A manager and an Assistant Manager are to be chosen out of a team having 11 participants, how many ways are there to select them.
(a) 110
(b) 120
(c) 130
(d) 140

30. From a group of 12 Engineers, five have to be taken for a NASA project. Among them Nitin and Ulka decided that either both of them would join or none of them would join. In how many ways can the 5 Engineers be chose?
(a) 372
(b) 120
(c) 240
(d) None of these

31. Ekta has 3 T-shirts, 4 jeans, and 6 wrist watches. In how many ways she can dress herself with a combination of all the three?
(a) 36
(b) 72
(c) 45
(d) None of these

32. How many new words are possible from the letters of the word 'PERMUTATION'?
(a) 11
(b) 11   2
(c) 11 / 2 − 1
(d) None of these

33. In how many different ways can the letters of the word 'MATHEMATICS' be arranged in such a way so that the vowels always come together?
    (a) 120960
    (b) 130969
    (c) 122346
    (d) 142346

34. How many three digits can be formed with the digits 0, 1, 2, if the repetition of digits is not allowed?
    (a) 4
    (b) 6
    (c) 27
    (d) None of these

35. If the repetition of digits is allowed then how many numbers of three digits can be formed with the digits 0, 1 and 2?
    (a) 9
    (b) 18
    (c) 27
    (d) 36

36. In how many ways can Rajesh send his marriage invitation cards to 8 of his friends, if he has 6 servants to distribute the cards?
    (a) $6 \quad 8$

    (b) 6^8

    (c) 8^6
    (d) None of these

37. In how many ways a project team of 4 members can be selected from 6 boys and 5 ladies, consisting 3 boys and 2 girls?
    (a) 240
    (b) 220
    (c) 210
    (d) 1200

38. If $n_{C_2} = n_{C_4}$, then what is the value of n?
    (a) 5
    (b) 4
    (c) 3
    (d) 2

39. In how many ways can the letters of the word 'NUMERACY' be arranged so that every word ends by Y?

(a) 5040

(b) 40320

(c) 5048

(d) 42320

40. In how many ways can the word 'GWALIOR' be rearranged?
    (a) 5040
    (b) 5039
    (c) 5038
    (d) 5033

41. How many distinct words can be formed out of the word 'GWALIOR' which start with L and ends with R?
    (a) 24
    (b) 720
    (c) 120
    (d) None of these

42. In how many ways 3 ball pens can be chosen from an unlimited number of Reynolds, Luxor and Rotomac pens?
    (a) 6
    (b) 27
    (c) 81
    (d) None of these

43. There are 6 different books of Mc Graw Hill education, 5 different books of Sultan Chand publication and 3 different books of Sultan Chand. The number of ways in which at least one book can be given away is

    (a) 2^{14} - 1

    (b) 2^{11} - 1

    (c) $2^{10} - 1$
    (d) None of these

44. There are 6 different books of Mc Graw Hill education, 5 different books of Sultan Chand publication and 3 different books of Sultan Chand. The number of ways in which at least one book of each author can be given.

    (a) $(2^7 - 1) ((2^6 - 1) (2^4 - 1)$

    (b) $(2^6 - 1) (2^5 - 1) (2^3 - 1)$

    (c) $(2^5 - 1) (2^4 - 1) (2^2 - 1)$
    (d) None of these

45. There are 5 routes to go from Agra to Puna and 4 ways to go from Puna to Lucknow, then how many ways are possible for going from Agra to Lucknow via Puna.
    (a) 24
    (b) 23
    (c) 22
    (d) 20

46. In how many ways can a team of 6 members can be chosen out of a batch of 16 people.
    (a) 5765
    (b) 5470
    (c) 8008
    (d) None of these

47. If n_{C_7} = 6435, then n =?
    (a) 12
    (b) 13
    (c) 14
    (d) 15

48. If 16_{C_r} = 6435, then r =?
    (a) 2
    (b) 3
    (c) 4
    (d) 5

49. If In how many ways can 19 identical white and 17 identical black balls be arranged in a row so that no two black balls are together?
    (a) 1140
    (b) 171
    (c) 190
    (d) None of these

50. How many three digits number can be formed out of the digits 3, 4, 5, 6, 7.

    (a) 5_{P_3}

    (b) 5_{C_3}
    (c) Cannot be determined
    (d) None of these

ANSWERS:

1	(a)	11	(d)	21	(b)	31	(b)	41	(c)
2	(a)	12	(b)	22	(a)	32	(c)	42	(b)
3	(c)	13	(a)	23	(b)	33	(a)	43	(a)
4	(a)	14	(b)	24	(a)	34	(a)	44	(b)
5	(d)	15	(b)	25	(b)	35	(b)	45	(d)
6	(b)	16	(c)	26	(a)	36	(b)	46	(c)
7	(c)	17	(a)	27	(b)	37	(d)	47	(d)
8	(a)	18	(d)	28	(a)	38	(a)	48	(c)
9	(a)	19	(b)	29	(a)	39	(a)	49	(a)
10	(c)	20	(a)	30	(a)	40	(b)	50	(a)

CHAPTER 9: PROBABILITY

What is Probability

The mathematical measure of the uncertainty is called probability. For example, consider the following questions:

(a) Will it rain today?
(b) Which of the three candidates will win?
(c) On throwing a dice, the number obtained will be even or odd?
(d) On tossing a coin, head will occur or tail will occur?

The answer to all these question is not sure i.e. there is uncertainty .We study the uncertainty of the result of such question in the theory of probability , which may not have one result but more than one result are possible .

Random experiment:

The experiments in which the outcomes cannot be predicted before hand is called random experiments. When these kind of experiment are repeated under identical condition, they do not produce the same outcome every time and there may be many possible outcome which depends upon chance and cannot be predicted. For example, on tossing a coin either the head will come up or the tail will come up, we cannot predict it. This is an example of random event.

Sample Space:

The set of all possible outcomes of experiments is called the sample space and it is denoted by S. And the subset of a sample space is called an event. That is, every subset A of the sample space S is an event of that random experiment. For example, in an experiment of tossing a coin,

if h is obtained then it is a random event, since here S = {H, T} and {H}⊆S

Now, the *probability* of any event A can be defined as the ratio between the number of favourable outcomes to the event A and the number of total equiprobable outcomes, that is

$$P(A) = \frac{number\ of\ favourable\ outcomes\ to\ that\ event\ A}{number\ of\ total\ outcomes\ related\ to\ that\ event\ A} = \frac{n(A)}{n(S)}$$

Here it should be noted that the probability of a certain or sure event is 1 and that of impossible event is 0.

Now, since the probability of an event to occur is = $\frac{n(A)}{n(S)}$

So the probability of an event A not to occur is = $1 - \frac{n(A)}{n(S)}$

Mutually Exclusive events:

Two events A and B are said to be mutually exclusive if they cannot occur together, that is simultaneously. For example , on throwing a dice , the events A = { 2,4,6 } and B = { 1,3,5 } are

mutually exclusive events , i.e. A∩B = φ.

In term of probability if A and B are mutually exclusive events, then

P(A∪B) = P(A) + P(B)   and,

P(S) = P(A) + P(A') = 1 where A' is Complement of A.

SOLVED EXAMPLES

Example1. If a dice is thrown once then the probability of the number appearing on dice is more than 2 ?

(a) 1/3
(b) 1/2
(c) 2/3
(d) 4.3/4

Solution: As there are 6 faces on a dice,
  So the total number of possible events are 1, 2 , 3 ……. 6 , that is = 6
  Now the number more than are 3, 4 , 5 and 6
  So total number of favourable events =
  Probability of an event = Number of favourable events
                                        Number of possible events

Required probability = $\frac{4}{6} = \frac{2}{3}$

Example2. If the dice are thrown simultaneously then the probability of sum appearing on the dice is less than 3?

(a) 1/12
(b) 1/24
(c) 1/36
(d) 35/36

Solution:

Total number of sum that can appear on two dice are (1,1) , (1,2) , (1,3) , (1,4) , (1,5) , (1,6) ,………………………………… (6, 6).

So , total number of possible events = 6✕6 = 36
Total sum appearing less than 3 is (1,1)
Number of favourable events = 1

Required probability = $\dfrac{\text{Number of favourable events}}{\text{Number of total possible events}}$

$$= \dfrac{1}{36}$$

Example3. If a number is selected at random out of first 20 natural number , then what is the probability that it will be multiple of 5 ?
    (a) 1/4
    (b) 1/5
    (c) 4/5
    (d) 3/4

Solution: Total numbers from 1 to 20 are 1,2, 3, 4 ……………………….20 that is 20

    So total possible events = 20

    Number that are divisible by 5 are 5 , 10 , 15 , 20

    Total number of favourable events = 4

Now,

    The required probability = $\dfrac{4}{20} = \dfrac{1}{5}$

Example4. In example 3, the probability of number being multiple of 5 or 7?
    (a) 4/5
    (b) 2/3
    (c) 3/10
    (d) 1/5

Solution: Total number of possible events are 1 , 2 , 3 …………………20 = 20

    Number divisible by 5 are 5, 10, 15 , 20 = 4

    Number divisible by 7 are 7, 14 = 2

    There is no number divisible by both 5 and 7.

    As it is a case of mutually exclusive events

So number of possible outcomes = p (5or7) = p (5) + p (7)

= 4+2 = 6

Now,

The required probability = $\frac{6}{20} = \frac{3}{10}$

Example5: In example 3, the probability of number being divisible by 3 and 6 ?
   (a) 1/4
   (b) 3/20
   (c) 1/5
   (d) 17/20

Solution: Total number of possible events = 20 (as above)

Number divisible by 3 are 3, 6 , 9 , 12 , 15 , 18

Number divisible by 6 are 6, 12 , 18

Number that are divisible by 3 and 6 both are 6 , 12 , 18 (LCM of 3 and 6)

Total number of favourable events = 3

Now,

The required probability = $\frac{3}{20}$

Example6. In example 3, what is the probability of number being divisible by 3 or 6?
   (a) 3/20
   (b) 3/10
   (c) 1/3
   (d) 7/10

Solution: Total number of possible events = 20

Number divisible by 3 are 3 , 6 , 9 , 12 , 15 , 18 = 6

So, probability of number divisible by 3 is p(3) = 6/20

Number divisible by 6 are 6 , 12 , 18 = 3

So, probability of number divisible by 6 is p(6) = 3/20

Number that are divisible by 3 and 6 both are 6 , 12 , 18 (LCM of 3 and 6) =3

So, probability of number divisible by 3 or 6 is p(3or6) = 3/20

Now,

The required probability = p (3) + p (6) – p(3or6)

$$= \frac{6}{20} + \frac{3}{20} - \frac{3}{20}$$

$$= \frac{6}{20} = \frac{3}{10}$$

Example7. A bag contains 6 red, 4 white and 2 black balls. If we draw two balls at random. What is the probability that both balls are red?

(a) $15/22$

(b) $7/22$

(c) $17/22$

(d) $5/22$

Solution: Total number of balls in a bag is 12.

So number of ways in which 2 balls can be drawn are $12C_2 = \frac{12 \times 11}{1 \times 2}$ = 6 × 11 = 66 ways

Number of ways in which 2 balls can be drawn out of 6 red balls are $6C_2$

$$= \frac{6 \times 5}{1 \times 2} = 3 \times 5 = 15$$

Now,

The required probability = $\frac{15}{66} = \frac{5}{22}$

Example 8. An urn contains 3 green, 6 red, and 4 black balls. 3 balls are drawn. Find the probability that all 3 balls are of same colour?
   (a) 3/44
   (b) 25/286
   (c) 15/286
   (d) 5/286

Solution: Total number of balls in an urn is 13.

Number of ways 3 balls can be drawn out of 13 balls = $13C_3 = \frac{13 \times 12 \times 11}{1 \times 2 \times 3}$ = 286

Numbers of ways 3 green balls are drawn = $3C_3 = \frac{3 \times 2 \times 1}{1 \times 2 \times 3} = 1$

Numbers of ways 6 red balls are drawn = $6C_3 = \frac{6 \times 5 \times 4}{1 \times 2 \times 3} = 20$

Numbers of ways 4 black balls are drawn = $4C_3 = \frac{4 \times 3 \times 2}{1 \times 2 \times 3} = 4$

Now,

The required probability = $\frac{1}{286} + \frac{20}{286} + \frac{4}{286} = \frac{25}{286}$

Example9. If a dice is thrown twice, what is the probability at least one throw give less than 2?

   (a) 25/36
   (b) 11/36
   (c) 5/9
   (d) 4/9

Solution: Probability of getting less than 2 is p = 1/6

Probability of getting less than 2 in at least one throw is = pq + qp + pp

$$= \frac{1}{6} \times \frac{5}{6} \times 2 + \frac{1}{6} \times \frac{1}{6} = \frac{10}{36} \times \frac{1}{36}$$

$$= \frac{11}{36}$$

Example10. A bag contains 6 white and 7 black balls. Two successive drawings of 2 balls are made at a time without replacement. What is the probability that the first draw gives 2 white balls and second draw gives 2 black balls?

   (a) 265/286
   (b) 5/286
   (c) 21/286
   (d) 21/286

Solution: Let,

A= drawing 2 white balls in first draw

B= drawing 2 black balls in the second draw

Probability of drawing 2 white balls P(A) = $\frac{6C_2}{13C_2} = \frac{6 \times 5}{13 \times 12} = \frac{5}{26}$

Probability of drawing 2 black balls P$\left(\frac{B}{A}\right)$ = $\frac{7C_2}{11C_2} = \frac{7 \times 6}{11 \times 10} = \frac{21}{55}$

Now,

The required probability = $P\,(A \cap B) = P(A)P\left(\frac{B}{A}\right)$

$$= \frac{5}{26} \times \frac{21}{55} = \frac{21}{286}$$

Example11. 100 and 200 items are produced by two machines A and B every day. Defective items produced by machine A and B simultaneously are 15 and 35. On picking up an item from a floor supervisor of the shop found it to be defective. What is the probability that it is from machine A?

(a) 7/10
(b) 3/10
(c) 1/10
(d) 9/10

Solution: Total number of defective item produce in a day = 15+35 =50

Total number of defective item produce in a day by a machine A = 15

So, the probability that the defective item is from machine A = $\frac{15}{50} = \frac{3}{10}$

Example12. If half of the bolts and half of the nuts are rusted in a bag containing 50 bolts and 150 nuts. And if we choose an item from that bag at random, then find the probability that it is a rusted or a bolt?

(a) 7/8
(b) 3/8
(c) 1/8
(d) 5/8

Solution: Consider that A be the event that the item chosen is rusted

And B be the event that the item chosen is bolt .

Total number of item in a bag is 50+150 =200

Total number of rusted item = 25+75 = 100

$$P(A) = \frac{100}{200}, P(B) = \frac{50}{200}, \text{ and } P(A\cap B) = \frac{25}{200}$$

Now,

The required probability = $P (A \cup B) = P(A) + P(B) - P(A \cap B)$

$$= \left(\frac{100}{200}\right) + \left(\frac{50}{200}\right) - \left(\frac{25}{200}\right) = \frac{5}{8}$$

Example13. If two dice are thrown simultaneously then the probability that the sum is neither 6 nor 8?

(a) 5/18
(b) 13/18
(c) 7/18
(d) 11/18

Solution: Suppose A be the event of getting the sum 6 or 8 . then

A= { (1,5) ,(2,4) , (3,3) , (4,2) , (5,1) , (2,6) , (3,5) , (4,4) , (5,3) , (6,2) }

Now on throwing the two dice total number of outcomes = 6 × 6 = 36

Number of outcomes of getting the sum 6 or 8 = 10

So, the probability of getting the sum 6 or 8 = $\frac{10}{36} = \frac{5}{18}$

Now, the required probability = $1 - p (A) = 1 - \frac{5}{18} = \frac{13}{18}$

Example14. What will be the probability that a leap year will contain 53 Sunday?

(a) 1/7
(b) 5/7
(c) 2/7
(d) 6/7

Solution: There are 366 days in a leap year which contain 52 weeks and 2 extra days , therefore the leap year has 52 Sundays and two extra days. These two extra days can be

1. Monday and Tuesday
2. Tuesday and Wednesday
3. Wednesday and Thursday
4. Thursday and Friday
5. Friday and Saturday

6. Saturday and Sunday
7. Sunday and Monday

That is there can be 7 cases which can happen and in these there are 2 cases where we can have Sunday. Hence, If A be the event of having 53 Sunday in a leap year then

Required probability P (A) = $\frac{2}{7}$

Example15. If we draw 2 cards from a pack of 52 cards then what will be the probability that one of them is a king and other a queen?

(a) 7/663
(b) 655/663
(c) 1/663
(d) 8/663

Sol. Total number of ways of drawing 2 cards from a pack of 52 cards = $52C_2 = \frac{52 \times 51}{1 \times 2} 26 \times 51$

As there are 4 king so number of ways of drawing 1 king from 4 = $4C_1 = 4$

Also there are 4 queens so number of ways of drawing 1 queen from 4 = $4C_1 = 4$

Now the required probability that one of them is king and other a queen = $\frac{4 \times 4}{26 \times 51} = \frac{8}{663}$

Example16. From a pack of 52 cards 2 cards are drawn at random, what will be the probability that either both are black or both are king?

(a) 166/221
(b) 1/221
(c) 55/221
(d) 6/221

Solution: Total number of ways of drawing 2 cards from a pack of 52 cards

$$= 52C_2 = \frac{52 \times 51}{1 \times 2} 26 \times 51 \quad = 1326$$

Suppose, that A be the event that both the cards are black, then

n (A) = $26C_2 = \frac{26 \times 25}{1 \times 2} = 325$ and p (A) = $\frac{325}{1326}$

Suppose, that B be the event that both the cards are king, then

n (B) = $4C_2 = \frac{4 \times 3}{1 \times 2} = 6$ and p(B) = $\frac{6}{1326}$

Suppose, that A∩B be the event that both the cards are black king, then

N (A∩B) = $2C_2 = 1$ and p (A∩B) = $\frac{1}{1326}$

Now,

The required probability = p(A) + p(B) − p(A∩B) = $\frac{325}{1326} + \frac{6}{1326} - \frac{1}{1326} = \frac{330}{1326} = \frac{55}{221}$

Q17. There are 3 black and 4 white balls in a bag. Two balls are drawn one by one without replacement what will be the probability that the second ball drawn is white?

   (a) 4/7
   (b) 3/7
   (c) 1/7
   (d) 6/7

Solution: The probability of drawing a black ball is = $\frac{3}{7}$

And the probability of drawing a white ball is = $\frac{4}{7}$

Now as per question first ball can be either black or white but the second ball must be white.

So, the probability that the second ball is white if the first ball is black = $\frac{4}{6}$

And the probability that the second ball is white if the first ball is white = $\frac{3}{6}$

Now the required probability = p(BW) + p(WW)

           = p(B)p(W) + p(W)p(W)

           = $\frac{3}{7} \times \frac{4}{6} + \frac{4}{7} \times \frac{3}{6} = \frac{24}{42} = \frac{4}{7}$

Example18. There are 4 red and 6 black balls first bag and 3 blue and 2 green balls in second bag. Two balls are drawn. What is the probability that there is one red and one blue ball?

   1. 19/25

2. 17/25
3. 6/25
4. 8/25

Solution: Total number of balls in first bag = 10

Hence the probability of drawing 1 red ball = $\frac{4}{10} = \frac{2}{5}$

Total number of balls in second bag = 5

Hence the probability of drawing 1 blue ball = $\frac{3}{5}$

Therefore,

The required probability = $\frac{2}{5} \times \frac{3}{5} = \frac{6}{25}$

Example19. There are two bags. One bag contains 4 red and 6 white balls, and the second bag contains 6 red and 12 white balls. If one ball is taken out from the two bags then what will be the probability that the ball is red?

(a) 17/30
(b) 19/30
(c) 29/30
(d) 11/30

Solution: Here, first we will select a bag from two bags .

So, the probability of selecting one bag out of two bags = $\frac{1}{2}$

Probability of drawing a red ball from first bag = $\frac{4}{10} = \frac{2}{5}$

Probability of drawing a red ball from second bag = $\frac{6}{18} = \frac{1}{3}$

Since a red ball can be drawn out of any one bag, hence

The required probability of drawing a red ball from one of the bag = $\frac{1}{2} \times \frac{2}{5} + \frac{1}{2} \times \frac{1}{3}$

$= \frac{1}{5} + \frac{1}{6} = \frac{11}{30}$

Example20. Two dice are thrown, what is the probability that either a doublets or a total sum of 7 is obtained ?

(a) 5/6
(b) 1/6
(c) 2/3
(d) 1/3

Solution: On throwing the two dice total number of outcomes = 6 × 6 = 36

Let A be the event of getting a doublet then

A = { (1,1) , (2,2) , (3,3) , (4,4) , (5,5) , (6,6) } , n(A) = 6

And let B be the event of getting a total sum of 7, then

B = { (1,6) , (2,5) , (3,4) , (4,3) , (5,2) , (6,1) } , n(B) = 6

Probability of getting doublet p(A) = $\frac{6}{36} = \frac{1}{6}$

Probability of getting a total sum of 7 p(B) = $\frac{6}{36} = \frac{1}{6}$

Now since the events are mutually exclusive, the required probability = p (A) + p (B)

$$= \frac{1}{6} + \frac{1}{6} = \frac{1}{3}$$

EXERCISE

1. A player draws a card from a pack of 52 cards .what is the probability that it is not a spade?
   (a) 3/4
   (b) 1/4
   (c) 1/13
   (d) 12/13

2. If two coins are tossed together, what is the probability of getting tail on the upper face?
   (a) 1/2
   (b) 3/4
   (c) 1
   (d) 1/4

3. What is the probability of getting an odd number or a prime number in a single throw of a dice?
   (a) 1/6

(b) 1/3
(c) 2/3
(d) 5/6

4. A card is drawn from a pack of 52 cards. What is the probability that it is an ace or a heart?
    (a) 1/13
    (b) 1/4
    (c) 4/13
    (d) 9/13

5. Two dice are thrown simultaneously, what is the probability of getting an even number on one and a multiple of 3 on other?
    (a) 25/36
    (b) 1/6
    (c) 11/36
    (d) 1/36

6. Two dice are thrown simultaneously what is the probability that sum is neither 7 nor 11?
    (a) 1/108
    (b) 7/9
    (c) 2/9
    (d) 1/6

7. There are 4 black, 2 white and 3 red balls in a bag .one ball is drawn out of the bag. What is the probability that it is black or red?
    (a) 2/3
    (b) 7/9
    (c) 1/3
    (d) 2/9

8. From a pack of 52 cards a card is drawn at random. The probability of its not being a heart or an ace?
    (a) 9/13
    (b) 1/4
    (c) 4/13
    (d) 3/4

9. If two dice are thrown simultaneously, then find the probability of getting 2 on at least one die if the sum of 6 is obtained?
    (a) 1/5
    (b) 3/5
    (c) 4/5
    (d) 2/5

10. From a well shuffled pack of 52 cards, a card is drawn at random. What is the probability that it is neither a jack nor a queen?

(a) 2/13

(b) 9/13

(c) 4/13

(d) 11/13

11. If a doctor see a patient in a month of April then what is the probability that he will see the patient on a date which is multiple of 6 or 8?

(a) 7/30

(b) 1/6

(c) 1/10

(d) 23/30

12. Two dice are thrown simultaneously .find out the probability of getting 5 on first die or sum of 6 on the two dice?

(a) 13/18

(b) 11/36

(c) 5/18

(d) 19/36

13. A bag contains 5 brown and 4 white socks. A man draw two socks from the bag . Find the probability that both are of same colour?

(a) 5/108

(b) 18/108

(c) 30/108

(d) 48/108

14. An urn contains 4 white, 5 red and 6 black balls. If 4 balls are drawn out of the urn without replacement then what is the probability that at least one of them is black?

(a) 2/5

(b) 59/65

(c) 4/65

(d) 4/15

15. Four cards are drawn from a pack of 52 cards without replacement. Find out the probability that all of them are king?

(a) $1/52C_4$

(b) 1/13

(c) $4/52C_4$

(d) 12/13

16. From a pack of 52 cards 2 cards are drawn at random. Find out the probability that one of them is a king and the other one is jack?

(a) 1/26

(b) 655/663

(c) 1/13

(d) 8/663

17. A bag contain 5 red , 7 green and 4 white balls .if we draw three balls one after the other without replacement then what is the probability that the balls are white , green , and red respectively?
    (a) 1/24
    (b) 23/24
    (c) 7/24
    (d) 17/24

18. Two tickets are drawn from a bag containing 19 tickets numbered from 1 to 19 without replacement. Find out the probability that both the tickets show even number?
    (a) 7/19
    (b) 4/19
    (c) 8/19
    (d) 15/19

19. There are 8 red and 6 green balls in a bag. Three balls are drawn without replacement then what is the probability that at least two ball are green out of the drawn balls?
    (a) 5/13
    (b) 8/13
    (c) 1/13
    (d) 12/13

20. There are 3 red, 4 blue and 2 green balls in an urn. Three balls are drawn without replacement what is the probability that the three balls have different colours?
    (a) 2/7
    (b) 1/21
    (c) 2/23
    (d) 1/3

    (hint: $n(A) = 3C_1 \times 4C_1 \times 2C_1$)

21. An urn contains 5 white, 6 blue and 4 red balls. If we draw three balls from it with replacement then find out the probability that the first ball is white second red and third blue?
    (a) 2/75
    (b) 8/225
    (c) 1/15
    (d) 117/225

22. A bag contains 5 white and 3 black balls and if a ball is drawn and put aside without seeing its colour. From the remaining balls another ball is drawn. What is the probability that the second ball is black?
    (a) 21/56

(b) 7/56
(c) 35/56
(d) 19/56

23. An urn contains 3 white, 2 black and 4 red balls. Four balls are drawn without replacement then find out the probability that at least three balls are red?
(a) 5/6
(b) 1/6
(c) 1/3
(d) 1/2

24. A card is drawn from a pack of 52 cards and the outcome is noted. Then the card is replaced and shuffled again. And another card is drawn from that pack .what is the probability that both the cards are of same suit?
(a) 1/4
(b) 1/2
(c) 3/4
(d) 1

25. In question number 24, find out the probability if first card is diamond and the second one is red ace?
(a) 103/104
(b) 1/104
(c) 91/104
(d) 57/104

26. In question number 24, find out the probability that both the cards are honour cards?
(a) 16/169
(b) 1/13
(c) 153/169
(d) 12/13

{Hint : honor cards are ace , king , queen or jack }

27. There are 6 nails and 10 nuts in a bag. Half of the nail and half of the nuts are rusted. If one item is chosen, then what is the probability that it is the rusted nut or a nail?
(a) 3/16
(b) 5/16
(c) 11/16
(d) 14/16

28. A box contains 10 goods and 6 defective articles. One article is chosen at random. The probability of its being good or defective?
(a) 1
(b) 49/64
(c) 40/64

(d) 24/64

29. A bag contains 50 bulbs out of which 5 are fused. Three bulbs are drawn at random. Then find the probability that there are 2 goods bulbs and 1 bad bulb?
(a) 99/392
(b) 91/392
(c) 293/392
(d) 301/392

30. Two dice are thrown. What is the probability that the sum is 10 or greater if 5 appears on at least one die?
(a) 11/26
(b) 2/9
(c) 3/11
(d) 1/12

31. A can hit the target 2 times in 6 shot, B can hit the target 3 times in 4 shots and C can hit it once in 4 shots. They fire a volley. Find out the probability that at least two of them hit the target?
(a) 9/16
(b) 17/48
(c) 19/48
(d) 7/16

{Hint: $P(A) = \frac{2}{6}$, $P(B) = \frac{3}{4}$, $P(C) = \frac{1}{4}$ }

32. What is the probability the leap year selected at random contain 52 Sundays?
(a) 2/7
(b) 5/7
(c) 1/7
(d) 6/7

{hint: p(52sunday)=1-p(53 Sunday)}

33. There are 10 boys and 5 girls in a class. Find the probability if 2 boys and 1 girl are selected from them?
(a) 45/91
(b) 46/91
(c) 1/91
(d) 10/91

34. There are 10 girls and 6 boys in a class. If a committee of 3 is chosen than find out the probability of selecting at least one girl?
(a) 3/4
(b) 1/4
(c) 1/28

(d) 27/28

35. Four members are chosen at random from a group of 3 men, 2 women and 4 children. What is the probability that exactly two of them will be children?
(a) 11/21
(b) 10/21
(c) 3/7
(d) 6/7

{Hint: n(A)=$3C_2 \times 4C_2 + 2C_2 \times 4C_2 + 3C_1 \times 2C_1 \times 4C_2$}

36. 3 letters are chosen from 5 consonants and 4 vowels. Find the probability that more than one vowel is selected?
(a) 19/42
(b) 17/42
(c) 25/42
(d) 23/42

37. Ram speaks truth in 25 % cases and shyam speaks truth in 75 % cases. What is the probability of that case where ram speaks truth and Shyam tells a lie?
(a) 1/8
(b) 5/8
(c) 7/8
(d) 3/8

38. Mohan speaks truth in 40 % cases and sohan speaks truth in 60 % cases what is the probability that they contradicts each other?
(a) 75%
(b) 25%
(c) 52%
(d) 48%

39. If in a city 30% of the members read Hindi news paper, 50% members read English news paper and 5 % read both the newspaper. Then how many of the do not read any newspaper?
(a) 75%
(b) 25%
(c) 20%
(d) 80%

40. Amit and Sumit appear for an interview for two vacancies. The probability of Amit selection is $\frac{1}{3}$ and that of sumit's selection is $\frac{1}{4}$. Find the probability that only one of them is selected?
(a) 1/12

(b) 5/12
(c) 7/12
(d) 1/6

41. A mathematics question was given to two students for solving it. The probabilities of solving the question is $\frac{1}{6}$ and $\frac{1}{7}$ respectively. What is the probabilty that the question is being solved if both of them try two to solve the question?
(a) 5/7
(b) 3/7
(c) 1/7
(d) 2/7

42. One bag contain 6 black and 3 white balls and a second bag contain 5 black and 4 white balls. if we draw one ball from each bag ,then find the probability that they are of same colour?
(a) 11/27
(b) 1/3
(c) 14/27
(d) 13/27

43. From the two bags, one bag contains 3 black and 4 red balls and the second bag contain 8 black and 10 red balls. If one of the bag is chosen and a ball is drawn from that bag then what is the probability that it is a red ball?
(a) 71/126
(b) 91/126
(c) 115/126
(d) 7/126

44. There are 4 copper and 3 silver coins in one purse and second purse contain 6 copper and 2 sliver coins. A coin is taken out from any purse then find out the probability that it is a silver coin?
(a) 37/56
(b) 19/56
(c) 4/7
(d) 2/3

45. If three container contain 3 white and 2 black balls , 4 white and 1 black balls and 1 white and 4 black balls respectively . If a ball is drawn out from one of the bag then find the probability that its being white?
(a) 7/15
(b) 1/3
(c) 8/15
(d) 11/15

{Hint: First we will select bag in $\frac{1}{3}$ ways}

46. The probability of a winning a race is $\frac{1}{5}$ and that of B winning a race is $\frac{1}{7}$ what is the probability that none of them wins?
    (a) 11/35
    (b) 1/35
    (c) 4/35
    (d) 24/35

47. There are 12 tickets numbered from 1 to 12. If one ticket is taken out at random than what is the probability of its being a multiple of 3 or 4?
    (a) 1/4
    (b) 1/3
    (c) 1/2
    (d) 2/3

48. A bag contains 15 counters numbered 1 to 15. a counter is drawn and then replaced and then the second counter is drawn find the probability that the first one drawn is odd and the second is even?
    (a) 169/225
    (b) 56/225
    (c) 7/225
    (d) 8/225

49. What is the probability of getting at least one tail if four coins are tossed simultaneously?
    (a) 1/16
    (b) 1/8
    (c) 7/8
    (d) 15/16

50. One bag contains 6 red and 4 black balls and second bag contain 3 red and 5 black balls. One ball is drawn from each bag. What is the probability that one ball is black and one is red?
    (a) 19/20
    (b) 21/40
    (c) 1/20
    (d) 19/40

{Hint: n(A)= $4C_1 \times 3C_1 + 6C_1 \times 5C_1$ }

ANSWERS

1	(a)	11	(a)	21	(b)	31	(c)	41	(d)
2	(b)	12	(c)	22	(a)	32	(b)	42	(c)
3	(c)	13	(d)	23	(b)	33	(a)	43	(a)
4	(c)	14	(b)	24	(a)	34	(d)	44	(b)
5	(c)	15	(a)	25	(b)	35	(b)	45	(c)
6	(b)	16	(d)	26	(a)	36	(b)	46	(d)
7	(b)	17	(a)	27	(c)	37	(a)	47	(c)
8	(a)	18	(b)	28	(a)	38	(c)	48	(b)
9	(d)	19	(a)	29	(a)	39	(b)	49	(d)
10	(d)	20	(a)	30	(c)	40	(b)	50	(b)

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Unit 3
Logical Reasoning

CHAPTER 1: ASSERTION AND REASONING

In these types of questions, an assertion is given which is followed by a reason. An Assertion is an affirmation, a declaration or a strong sentence. The candidate is required to first judge whether the Assertion is true and then decides on whether the Reason is true and in case both Assertion and Reason are true then they have to check whether the reason is the correct explanation of the Assertion.

The following solved examples will help you to get a clear understanding of this question type.

EXAMPLE

Directions (Q.1-5): For the assertion (A) and Reasons (R) below, choose the correct alternative from the following:

- **(a) Both A and R are true and R is the correct explanation of A.**
- **(b) Both A and R are true but is NOT the correct explanation of A.**
- **(c) A is true but R is false.**
- **(d) A is false but R is true.**
- **(e) Both A and R are false.**

Ex.1

Assertion: Forest cutting is undesirable from the point of view of soil erosion.

Reason: Cutting of forests reduces the interception of rain water.

Solution: (a) Here, Reason explains Assertion completely.

Ex.2

Assertion: Alcohol rather than mercury is used in a thermometer to measure a temperature of -60°C.

Reason: Alcohol has a lower freezing point than mercury.

Solution: (a) Mercury freezes at -39°C and alcohol freezes at a point far below -100°C. So, Alcohol is used to measure lower temperature and mercury is used to measure higher temperature.

Ex.3

Assertion: Baking soda is alkaline

Reason: In the stomach baking soda creates acidity.

Solution: (c) Baking soda is alkaline, so that it neutralizes the acidity in the stomach.

Ex.4

Assertion: Mercury is the farthest planet from the sun.

Reason: Mercury is the smallest planet in the entire solar system.

Solution: (d) The farthest planet in the solar system is Pluto but the smallest planet is Mercury.

Ex.5

Assertion: We prefer to wear white clothes in winter.

Reason: White clothes are good reflectors of heat.

Solution: (d) White clothes are good reflectors of heat and are worn in summer and we prefer to wear dark clothes in winter because they absorb the heat and keep the body warm.

EXERCISE

Directions (Q.1-5): For the assertion (A) and Reasons (R) below, choose the correct alternative from the following:

- (a) **Both A and R are true and R is the correct explanation of A.**
- (b) **Both A and R are true but r is NOT the correct explanation of A.**
- (c) **A is true but R is false.**
- (d) **A is false but R is true.**
- (e) **Both A and R are false.**

1. **Assertion:**
   One should not take medicines without consulting a doctor.
   Reason:
   Taking medicines without consulting a doctor is dangerous because only doctor knows the actual composition of different compounds in a medicine and only he can suggest the possible side effects of taking that medicine.

2. **Assertion:**
   Madhya Pradesh is the largest state in India.
   Reason:
   Some of the leading Car manufacturing companies of the world are Japanese.

3. **Assertion:**
   When the train starts, the passengers inside it falls forward.
   Reason:
   The train always pushes the man forward.

4. **Assertion:**

The price of a stock of a Company is determined on the basis of the demand and supply of the stock.

Reason:

The value of Sensex increases whenever there is a heavy demand for the stocks which form the Sensex.

5. **Assertion:**

Water is very essential for everyone in this world.

Reason:

It is formed using four parts of hydrogen and one part of oxygen.

6. **Assertion:**

Diesel oil is used in diesel cars.

Reason

It is also a cookingmedium

7. **Assertion:**

Copper is good conductor of electricity.

Reason:

If you touch a copper road which is exposed to electric current, you will get an electric shock.

8. **Assertion:**

India's President is appointed on a five year term.

Reason:

Dr. Rajendra Prasad was the first president of India.

9. **Assertion:**

Silver is a bad conductor of electricity.

Reason:

Silver is not used to make electric wires.

10. **Assertion:**

The volume decreases as the pressure increases, if the temperature is constant.

Reason:

If we keep the temperature constant then pressure and volume are proportional to each other.

11. **Assertion:**

Malaria is a parasite borne disease.

Reason:

It is caused by plasmodium infection.

12. **Assertion:**

Kareena Kapoor is the granddaughter of Raj Kapoor.

Reason:

Ranveer Kapoor is the grandson of Raj Kapoor.

13. **Assertion:**
In hard water clothes are not washed properly.
Reason:
Hard water contains many minerals.

14. **Assertion:**
The colour of blood is red and this is because of Hemoglobin.
Reason:
Hemoglobin is a red pigment.

15. **Assertion:**
In India Mahatma Gandhi is known as the Father of the Nation.
Reason:
The name India was coined by Mahatma Gandhi.

16. **Assertion:**
India is a democratic country.
Reason:
What we now call India is the modern version of Bharat.

17. **Assertion:**
Nobel Prize was awarded to Amartya Sen in the field of Economics.
Reason:
Amartya Sen has made an invaluable contribution in the field of developmental Economics

18. **Assertion:**
An iron ball floats on mercury but gets immersed in water.
Reason:
The specific gravity of iron is more than that of mercury.

19. **Assertion:**
We feel comfortable in hot and humid climate.
Reason:
Sweat evaporates faster in humid climate.

20. **Assertion:**
Comets belong to the solar system.
Reason:
All comets come near the sun after regular intervals.

ANSWERS:

1	(a)	11	(a)
2	(d)	12	(b)
3	(e)	13	(b)
4	(b)	14	(a)
5	(c)	15	(c)
6	(c)	16	(b)
7	(b)	17	(a)
8	(b)	18	(c)
9	(d)	19	(e)
10	(a)	20	(c)

CHAPTER 2: STRONG AND WEAK ARGUMENT

In these types of questions, a statement is given which is related to any political, economic or any social issue, which is followed by certain arguments in favour or against the statements. The candidate is required to first analyze the statement and then the arguments in context of the statement. On the basis of their analysis the candidate is required to decide which of the arguments are strong / weak.

Strong Argument: The argument which is important and directly related to the statement.

Weak Argument: The argument which is of minor importance and also may not directly related to the statement.

EXAMPLES

Directions (Q.1-3): In each of the following questions a statement is given which is followed by two arguments I and II.

Give your answer as:

   (a) If only argument I is strong;
   (b) If only argument II is strong;
   (c) If either I or II is strong;
   (d) If neither I nor II is strong and
   (e) If both I and II are strong.

Example1.

Statement:

Should new big industries be started in Delhi?

Arguments:

   I.   Yes. It will create job opportunities.
   II.   No. It will further add the pollution of the city.

Solution: (c) Clearly, new industries are advantageous and it will definitely create job opportunities. It is also disadvantageous for the city, because it adds to the pollution.

Example 2:

Statement:

Should the railways immediately stop issuing free passes to all its employees?

Arguments:

I.   No. The employees have the right to travel free.
II.   Yes. This will help railways to provide better facility.

Solution: (d) The facility of free passes to railway employees is a privilege for them. It is not their right. So, argument I do not hold. Argument II seems to be vague.

Example 3:

Statement:

Should there be reservation in Government jobs for candidates from single child family.

Arguments:

I.   No. This is not advisable as the jobs should be offered to only deserving candidates without any reservation for a particular group.
II.   Yes. This will help reduce the growing population in India as the parents will be encouraged to adopt single child norm.

Solution: (d) The argument I is vague, because the government has already made provisions for reservation of jobs for the economical backward sections, which is must. It is also clear that more reservation would lead to non-recruitment of many more deserving candidates.

Direction (Q.4-5): Each question given below consists of a statement, followed by three or four arguments numbered I, II, III and IV. You have to decide which of the arguments is/are 'strong' argument (s) and which is/are 'weak' argument(s) and accordingly choose your answer from the alternatives given below each question.

Example 4:

Statement:

Should religion be taught in our schools?

Arguments:

I.   No. Ours is a secular state.
II.   Yes. Teaching religion helps inculcate moral values among children.
III.   No. How can one dream of such a step when we want the young generation to fulfill its role in the 21st century.

(a) All are strong
(b) None is strong
(c) Only I is strong
(d) Only II is strong
(e) Only I and III are strong

Solution: (d) clearly, argument I is vague while argument II is strong. Also, teaching religion can in no way hinder the students' capacity to face the challenges of the 21st century.

Example 5:

Statement:

Should all the management institutes in the country be brought under government control?

Arguments:

I.   No. The government does not have adequate resources to run such institutes effectively.
II.   No. Each institute should be given freedom to function on its own.
III.   Yes. This will enable to standardized education for all the students.
IV.   Yes. Only then the quality of education would be improved.
(a) None is strong
(b) Only I and II and III are strong
(c) Only I and III are strong
(d) All are strong
(e) Only III is strong

Solution: (a) Here none of the argument is strong. The government can pool up resources to run such institutes, if that can benefit the citizens. So, I does not hold strong. Also, II, III and IV do not hold.

EXERCISE

Directions (Q.1-3): In each of the following questions a statement is given which is followed by two arguments I and II.

Give your answer as:

(a) **If only argument I is strong;**
(b) **If only argument II is strong;**
(c) **If either I or II is strong;**
(d) **If neither I nor II is strong and**
(e) **If both I and II are strong.**

1.   **Statement:**
     Should all school – going students compulsorily be sent for military training?
     Arguments:
     I.   No. Military training should be provided to only deserving students.
     II.   Yes. This will help them in becoming more punctual and disciplined.

2.   **Statement:**
     Should internal assessment in all the private colleges be abolished?
     Arguments:
     I.   Yes. There will be no favoritism in this process.

II.   No. The teaching faculty will lose control over students.

3. **Statement:**
Should the council of ministers once appointed be kept the same for the entire period intervening two elections?
Arguments:
    I.   No. shuffling of ministers and portfolios is a healthy democratic process.
    II.   Yes. The ministers do not get a hold on their portfolio unless they are kept for a longer duration.

4. **Statement:**
Should we scrap the 'Public Distribution System" in India?
Arguments:
    I.   Yes. Protectionism is over, everyone must get the bread on his/her own.
    II.   Yes. The poor do not get any benefit because of corruption.

5. **Statement:**
Should the government stop spending huge amounts of money on sports?
Arguments:
    I.   Yes. Government can use this money for the upliftment of the poor.
    II.   No. Sportspersons will be frustrated and will not get good exposure.

6. **Statement:**
Should the institution of marriage be abolished in India?
Arguments:
    I.   Yes. It is already showing cracks.
    II.   No. It is necessary to protect our cultural values and for the survival of the society.

7. **Statement:**
Should there be a complete ban on use of all types of chemical pesticides in India?
Arguments:
    I.   No. The pests will destroy all the crops and the farmers will have nothing to harvest.

    II.   Yes. The chemical pesticides used in agriculture pollute the water underground and this has become a serious health hazard.

8. **Statement:**
Should there be compulsory medical examination of both the man and the woman before they marry each other.
Arguments:
    I.   No. This is an intrusion to the privacy of an individual and hence cannot be tolerated

II.   Yes. This will substantially reduce the risk of giving birth to children with serious ailments.

9. **Statement:**
Should non-vegetarian food be totally banned in our country?
Arguments:
I.   Yes. It is expensive and therefore it is beyond the means of most people in our country.

II.   No. India is a democratic country so that nothing should be banned in our country.

10. **Statement:**
Should Public Sector Undertakings (PSUs) be disinvested to the private sector?
Arguments:
I.   No. It is very risky to put them in to private hands.

II.   Yes. The private sector will be able to effectively manage PSUs.

11. **Statement:**
Is buying things on installments profitable to the customer?
Arguments:
I.   Yes. He has to pay less.

II.   No. paying installments upsets the family budget.

12. **Statement:**
Should all the unauthorized structures in Delhi city be demolished?
Arguments:
I.   No. Where will the people residing in such houses live?

II.   Yes. This will give a clear message to general public and they will refrain from constructing unauthorized buildings.

13. **Statement:**
Should India give away Kashmir to Pakistan?
Arguments:
I.   No. It is a beautiful state and earns a lot of foreign exchange for India.
II.   Yes. This would help settle conflicts.

14. **Statement:**
Should income tax be abolished in India?
Arguments:
I.   Yes. It is an unnecessary burden on the wage earners.
II.   No. It is a good source of revenue.

15. **Statement:**

Should there be a ban on cosmetic product advertising?

Arguments:

I.   No. in this advertising world, unless your advertisement is better than the other brands, your product will not be sold.

II.   Yes. The money spent on advertising is very huge and it inflates the cost of the product.

16. **Statement:**

Should our country extend generous behavior and goodwill to our erring and nagging neighbours?

Arguments:

I.   Yes. Goodwill always pays dividend.

II.   No. Our generous behavior and goodwill will be considered as our weakness.

Direction (Q.17-20): Each question given below consists of a statement, followed by three or four arguments numbered I, II, III and IV. You have to decide which of the arguments is/are 'strong' argument (s) and which is/are 'weak' argument(s) and accordingly choose your answer from the alternatives given below each question.

17. **Statement:**

Should all the youngsters below 21 years of age be disallowed from going to Disco and Beer Bar?

Arguments:

I.   No. it is not correct to prevent matured youngsters above 18 years of age who can vote, from having fun.

II.   Yes. The entry fee to such Disco and Beer bar should also be hiked.

III.   No. There is no such curb in western countries.

IV.   Yes. This will help in preventing youngsters from getting into bad company and imbibing bad habits.

(a) Only I is strong

(b) Only I and III are strong

(c) Only III and IV are strong

(d) Only I and Iv are strong

(e) None is strong

18. **Statement:** Should there be any board examinations for class IV Children?

Arguments:

I.   Yes. This will motivate the children to study and get higher marks, and thus more knowledge can be imbibed at a younger age.

II.   No. The children will be forced to study and won't enjoy the process.

III.   Yes. In today's competitive world the children need to be prepared right from the beginning to face such difficult examinations.

IV.   No. This will add pressure on tender aged children and leave very little time for them to play.

(a) All are strong

(b) Only I, II and IV are strong

(c) Only II, III and IV are strong

(d) Only I and III are Strong

(e) Only I and IV are Strong

19. **Statement:**

Should the public Sector undertakings be allowed to adopt hire and fire policy?

Arguments:

I.   Yes. This will help the public sector undertakings to get rid of non-performing employees and reward the performing employees.

II.   No. This will give an unjust handle to the management and they may use it indiscriminately.

III.   Yes. This will help increase the level of efficiency of these organizations and these will become profitable establishments.

(a) None is strong

(b) Only I and II are strong

(c) Only II and III are strong

(d) Only I and III are strong

(e) All are strong

20. **Statement:**

Should the rule of wearing helmet for both driver and pillion rider while driving a motors bike be enforced strictly?

Arguments:

I.   Yes. It is a rule and rules should be followed strictly by all.

II.   No. Each individual knows how to protest his own life and it should be left to his discretion.

III.   No. It is does not ensure safety as only the head is protected and rest of the body is not.

IV.   Yes. It is a necessity as head, being the most sensitive organ, is protected by the helmet.

(a) None is strong

(b) Only I and III are strong

(c) Only I and IV are strong

(d) Only II and IV are strong

(e) All are strong

ANSWERS:

1	(a)	11	(d)
2	(e)	12	(b)
3	(d)	13	(a)
4	(d)	14	(b)
5	(b)	15	(e)
6	(b)	16	(a)
7	(e)	17	(d)
8	(b)	18	(c)
9	(b)	19	(d)
10	(a)	20	(c)

CHAPTER 3: CAUSE AND EFFECT

The cause is the event that makes the other occur and the effect is the event that follows from the cause. The questions based on the cause and effect reasoning is basically designed to analyze the candidate's ability to understand a pair of statements and to correlate them in terms of cause and effect.

The following solved examples will help you to get a clear understanding of this question type.

EXAMPLES

Directions (Q.1-5): In each of the following questions, two statements numbered I and II are given. There may be cause and effect relationship between the two statements. These two statements may be the effect of the same cause or independent causes. These statements may be independent causes without having any relationship. Read both the statements in each question and mark your answer accordingly.

Give your answer as:

  (a) If statement I is the cause and statement II is its effect.
  (b) If statement II is the cause and statement I is the effect.
  (c) If both the statements I and II are independent causes.
  (d) If both the statements I and II are effects of independent causes.
  (e) If both the statements I and II are effects of some common cause.

Ex.1   I. There is unprecedented increase in the number of young unemployed in comparison to the previous year.

II. A large number of candidates submitted applications against an advertisement for the post of manager issued by bank.

Solution: (a) There is a huge increase in the number of unemployed young people, so that a large number of candidates is applying for a single post.

Ex.2   I. The private Engineering colleges have increased the tuition fees in the current year by 100% over the last year's fees to meet the expenses.

II. The Government Engineering Colleges have not increased their fees in spite of price escalation.

Solution: (c) There is no change in the fees of the Government Engineering colleges, but the increase in the fees of the private engineering colleges seems to be policy matters undertaken by the individual decisive boards at the two levels.

Ex.3   I. Jiwaji University has decided to conduct all the annual examination in March/April every year to enable them to declare results in time.

II. There has been considerable delay in declaring results in the past due to shortage of teachers evaluating the answer sheets of the examination conducted by Jiwaji University.

Solution: (C) Here each statement is self-sufficient in itself. Therefore, I and II are independent causes.

Ex.4 I. Many people visited the Akshardhaam Temple during the weekend.

II. Few people visited the Akshardhaam Temple during week days.

Solution: (e) Both the statements I and II are effect of some common cause. Both the events go together and must have happened due to a common cause such as, it being holiday during the weekend.

Ex.5 I. The performance of most of the students in final exam of class XI in the schools run by the Government was excellent.

II. Many teachers of the Government schools left the schools and joined private schools.

Solution: (d) Many teachers of Government schools are leaving their jobs to join private schools and the students of Government schools are performing well in the examinations. They both are effect of independent causes.

EXERCISE

Directions (Q.1-20): In each of the following questions, two statements numbered I and II are given. There may be cause and effect relationship between the two statements. These two statements may be the effect of the same cause or independent causes. These statements may be independent causes without having any relationship. Read both the statements in each question and mark your answer accordingly.

Give your answer as:

(a) **If statement I is the cause and statement II is its effect.**
(b) **If statement II is the cause and statement I is the effect.**
(c) **If both the statements I and II are independent causes.**
(d) **If both the statements I and II are effects of independent causes.**
(e) **If both the statements I and II are effects of some common cause.**

1.   I. Majority of the citizens in the locality belong to higher income group.
     II. The sales in the local super market are comparatively much higher than in other localities.

2.   I. The Government has imported large quantities of Rice as per trade agreement with other countries.
     II. The prices of rice in the domestic market have fallen sharply in the recent days.

3.   I. Most of the Online Educational Portal has made considerable profit during last two years.
II. Now a day's most of the students are very much interested in online education system.

4.   I. There is sharp decline in the production of oil seeds this year.
II. The government has decided to increase the import quantum of edible oil.

5.   I. In India the prices of vegetables have been increased considerably during this year.
II. There was heavy rainfall during this year in India.

6.   I. The Reserve Bank of India has recently put restrictions on few small banks in the country.
II. The small banks in the private and co-operative sector in India are not in a position to withstand the competitions of the bigger in the public sector.

7.   I. There is a sharp decline in the production of oil seeds this year.
II. The government has decided to increase the import quantum of edible oil.

8.   I. The police authority has recently caught a group of thieves in city center area of Gwalior city.
II. The citizens group in the locality has started night vigil in the area.

9.   I. All the schools in the area had to be kept closed for most part of the week.
II. Many parents have withdrawn their children from the local schools.

10.   I. The literacy rate in the district has been increasing for the last two years.
II. The district administration has conducted extensive training programme for the workers involved in the literacy drive.

11.   I. The central government has decided to make all the information related to primary education available to the general public.

II. In the past, the general public did not have access to all these information related to primary education.

12.   I. The farmers have decided against selling their Rabi crops to the Government agencies.

II. The Government has reduced the procurement price of Rabi crops starting from last month to the next six months.

13.   I. The performance of most of the students in final exam of class XII in the schools run by the Government was excellent.

II. Many teachers of the Government schools left the school and joined private schools.

14.   I. There is considerable reduction in the number of people affected by water-borne diseases in City F during this rainy season.

II. The government has opened four new civil hospitals in City F in the beginning of the year.

15.   I. The prices of fruits have been increased considerably during this summer.
II. There is tremendous increase in the temperature during this summer thereby damaging crops greatly.

16.   I. There has been a growth in the incidents of atrocities against women in the city during last year.
II. The police authority has been unable to nab the culprits who are committing crime against women.

17.   I. Rural and semi-urban areas in the state have been suffering due to load shedding for quite some time.
II. If the Government is not able to overcome the power crisis, load shedding will be extended even to the urban areas.

18.   I. The university authority has instructed all the colleges under its jurisdiction to ban use of mobile phones inside the classrooms.
II. Majority of the professors of the colleges signed a joint petition to the university complaining the disturbances caused by cell phone ring-tones inside the classrooms.

19.   I. Most of the steel producing companies in the country have made considerable profit during the last financial year.
II. Many Asian countries have been importing huge quantities of steel from India.

20.   I. There is an increase in water level of all the water tanks supplying drinking water to the city during the last month.
II. Most of the trains were cancelled last week due to water-logging on the tracks.

ANSWERS

1	(b)	11	(b)
2	(a)	12	(b)
3	(b)	13	(d)
4	(a)	14	(c)
5	(b)	15	(b)
6	(b)	16	(c)
7	(a)	17	(e)
8	(e)	18	(b)
9	(d)	19	(b)
10	(b)	20	(e)

CHAPTER 4: STATEMENT, CONCLUSION AND ASSUMPTIONS

Statement and Conclusions:

Conclusion means a fact that can be drawn on the basis of the information contained in a paragraph or statement. Drawing conclusion is something that we all do regularly. In other words conclusion is an inference that follows the given information.

The following solved examples will help you to get a clear understanding of this question type.

Directions (1-2): In each of following two examples, there are given three statements followed by three conclusions numbered I, II, and III. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions carefully and then decide which of the given conclusions logically follows from the given statements, disregarding commonly known facts.

Ex.1 Statements:

Some trees are bulbs.

No bulb is soap.

All soaps are books.

Conclusions:

I.   Some books are bulbs.
II.   No book is bulb
III.   Some trees are soaps.

(a) None follows
(b) Only either I or II follows
(c) Only II follows
(d) Only I and III follow

Solution: (b) some trees are bulbs. No bulb is soap. Since one premise is particular and the other negative, the conclusion must be particular negative and should not contain the middle term. So, it follows that some trees are not soaps. No bulb is soap. All soaps are books. Since the middle term is distributed twice, the conclusion must be particular. Since one premise is negative, the conclusion must be negative. So, it follows that some bulbs are not books. Since I and II involve the same terms and form a complementary pair, therefore, either I or II follows.

Ex.2

Statement:

Fortune favours the brave

Conclusions:

      I.   Risks are necessary for success.

      II.   Cowards die many times before their death.

Solution: (a) Here II is vague with regard to the given statement but according to the statement I follow, because only those who tackle the situations bravely achieve success.

Statement and Assumptions

An **assumption** is something that is taken for granted in the context of the statement. In any conversation if we say something, there are certain assumptions which must be true for the statement to make sense. We can say that Assumption is a fact that can be accepted as true on considering the contents of the given statement.

The main difference between a conclusion and assumption is that, an assumption precedes the information while conclusion follows it.

The following solved examples will help you to get a clear understanding of this question type.

SOLVED EXAMPLES

Directions: In each of the following examples a statement is given which is followed by two assumptions numbered I and II. Consider the statement and decide which of the given assumptions is implicit.

Give your answer as:

    (a) If only assumption I is implicit
    (b) If only assumption II is implicit
    (c) If either I or II is implicit
    (d) If neither I nor II is implicit and
    (e) If both I and II are implicit.

Ex.3: Statement:

Satya's mother instructed him to return home by train if it rains heavily.

Assumptions:

      I.   Satya may not be able to decide himself if it rains heavily.

      II.   The trains may ply even if it rains heavily.

Solution: (b) Satya's mother was concern about his son, so that she has instructed her child, not because Satya himself would not be able to decide. Therefore, I is not implicit. Apart from that, Satya's mother instructed him to take to train journey in case of heavy rains.

Ex.4: Statement:

"You must learn to refer to dictionary if you want to become a good writer."- Ashok advises to Brijesh.

Assumptions:

      I.   Only writers refer to the dictionary.
      II.   All writers, good or bad, refer to the dictionary.

Solution: (d) The given statement does not imply that only writers and nobody else refers to the dictionary. Also nothing is mentioned about the bad writers. So, neither I nor II is implicit.

Ex.5 Statement:

I cannot contact you on phone from Kanpur.

Assumptions:

      I.   Telephone facility is not available at Kanpur
      II.   Now a day it is difficult to contact you on phone.

Solution: (a) Here the statement indicates the impossibility of phone contact from Kanpur. Therefore, I may be assumed. So, fact I is implicit.

EXERCISE

Directions (Q.1-2): In each of the following questions, a statement is given followed by two conclusions numbered I and II.

Give your answer as:

    (a) If only conclusion I follows;
    (b) If only conclusion II follows;
    (c) If either I or II follows
    (d) If neither I nor II follows; and
    (e) If both I and II follows

1. **Statement:**
    The manager humiliated Garvit in the presence of his colleagues.
    Conclusions:
        I.   The manager did not like Garvit
        II.   Garvit was not popular with his colleagues.

2. **Statement:**
    Parents are prepared to pay any price for an elite education to their children.
    Conclusions:
        I.   All parents these days are very well off.

II.   Parents have an obsessive passion for a perfect development of their children through good schooling.

Directions (Q.3-4): In the following two questions, a statement or group of statements is given which is followed by some conclusions. Without resolving yourself, choose the conclusion which logically follows from the given statement(s).

3. **Statement:**
    In the graduate level examination of Jiwaji University, most of the students write in Hindi medium.
    Conclusions:
    (a)   Mostly candidates with Hindi medium appear in the examination.
    (b)   Some candidates of this examination write in Hindi.
    (c)   In this examination no candidate writes answers in medium other than Hindi.
    (d)   All the candidates who appear in this examination write answers in Hindi.

4. **Statements:**
    (i)   None but Management students are members of the Fun club.
    (ii)   Some members of the fun club are married persons.
    (iii) All married persons are invited for lunch.

    Conclusions:

    (a)   All members of the fun club are married persons.
    (b)   All management students are invited for lunch
    (c)   All married management students of the fun club are invited for lunch.
    (d)   All members of the club are invited for lunch.

Directions (Q.5-7): In each of these questions, there are given three statements followed by four conclusions numbered I, II, III and IV. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions carefully and then decide which of the given conclusions logically follows from the given statements, disregarding commonly known facts.

5. **Statements:**
    Some trees are flowers.
    Some flowers are birds.
    No bird is river.
    Conclusions:
    I.   Some rivers are trees
    II.   Some birds are trees
    III.   All flowers are trees
    IV.   No tree is river.
    (a) Only I, II and IV follows.
    (b) Only II, III and IV follow
    (c) Only either I or IV and II follow

(d) Only either I or IV and III follow

6. **Statements:**
Some oranges are grapes.
Some pineapples are grapes.
Some braches are pineapples.
Conclusions:
    I.   Some oranges are pineapples
    II.   Some branches are grapes
    III.   Some branches are oranges
    IV.   All grapes are oranges.
(a) None follows
(b) Only I and II follow
(c) Only III and IV follow
(d) Only I and IV follow

7. **Statements:**
No table is blue
All blue are apples
All apples are milk
Conclusions:
    I.   No table is milk
    II.   No apple is table
    III.   Some apples are blue
    IV.   Some milk is table
(a) Only either I or IV and II follow
(b) Only either I or IV and III follow
(c) Only either I or IV follows
(d) Only either I or IV and II & III follow

Directions (Q.8-10): In each of the following questions two statements are given and these statements are followed by two conclusions numbered I and II. You have to take the given two statements to be true even if they seem to be at variance from commonly known facts. Read the conclusions and then decide which of the given conclusions logically follows from the two given statements, disregarding commonly known facts.

Give your answers as:

(a) If only I conclusion follows
(b) If only II conclusion follows
(c) If either I or II follows
(d) If neither I nor II follows

8. **Statements:**
All the scooters are cars. No car is a bus
Conclusions:

I.   Some scooters are buses
II.   No bus is a car

9. Statements:
Some dogs are cats. Some cats are elephant.
Conclusions:
I.   Some dogs are elephants.
II.   All cats are elephants.

10. Statements:
All bags are papers. All papers are magazines.
Conclusions:
I.   Some bags are not magazines
II.   Some magazines are bags.

Directions (Q.11-15): In each of the following questions a statement is given which is followed by two assumptions numbered I and II. Consider the statement and decide which of the given assumptions is implicit.

Give your answer as:

(f) If only assumption I is implicit
(g) If only assumption II is implicit
(h) If either I or II is implicit
(i) If neither I nor II is implicit and
(j) If both I and II are implicit.

11. Statement:
Vitamin E tablets improve circulation, keep your complexion in a glowing condition.
Assumptions:
I.   People like a glowing complexion.
II.   Complexion becomes dull in the absence of circulation.

12. Statement:
Rahul has invested 50,000 Rs. in the shares of Company B. His recent investment is only a gamble.
Assumptions:
I.   Rahul may incur loss on his investment.
II.   Rahul may gain from his investment.

13. Statement:
Causes of lung cancer due to consumption of liquor are increasing in villages.
Assumptions:
I.   Percentage of people consuming liquor is more in villages.
II.   There are many unauthorized spurious liquor shops in the villages.

14. Statement:

In India, during the year 2006 to 2012 there has been a remarkable increase in the air traffic.

Assumptions:

I.   Now travelling by air has become a status symbol.

II. Large numbers of people are able to afford air travel now.

15. Statement:

Divya has a large collection of novels and she keeps on purchasing new novels to add to his collection.

Assumptions:

I.   Divya has read each and every novel that she has purchased.

II. Divya loves and cares for novels.

Directions (Q.16-20): In each of the following five questions, a statement is given which is followed by three assumptions, decide which of the assumptions is implicit in the statement and choose your answer accordingly.

16. Statement:

An advertisement: Now you can own your home in just Rs. 20,000 per month.

Assumptions:

I.   People aspire to buy their own home.

II. People do not want to buy used homes.

III. Most people can afford to pay Rs. 20,000 per month for a new home.

(a) Only I and II are implicit

(b) Only II and III are implicit

(c) Only I and III are implicit

(d) All are implicit

(e) None of these

17. Statement:

Bombay people were spellbound, mesmerized and got mad when they saw the famous pop-singer Michael Jackson's hi-tech pulsating megawatt performance.

Assumptions:

I.   When a show is accompanied with latest technology, it has a magical effect.

II. Bombay people were never impressed with performance by Indian musicians.

III. Michael Jackson is a super singer.

(a) Only I is implicit

(b) Only II is implicit

(c) Only I and III are implicit

(d) Either II or III is implicit

(e) Only II and III are implicit

18. Statement:

"If you are a civil engineer, we want you as our contractor."- An advertisement by Construction Company ABC.

Assumptions:

I.   Civil engineers are expected to be better performers by a Construction Company ABC.

II.   The Company ABC needs contractors.

III.   Civil engineers may get attracted and apply to Company ABC.

(a) Only I and II are implicit

(b) Only II and III are implicit

(c) Only I and III are implicit

(d) All are implicit

(e) None of these

19. **Statement:**

A Shoe manufacturing company has recently announced a series of incentives to the employees who are punctual and sincere.

Assumptions:

I.   The productivity of the company may increase.

II.   Those who are not punctual at present may get motivated by the announcement.

III.   The profit earned by the company may be more than the amount to be spent for the incentive programmes.

(a) Only I and II are implicit

(b) None is implicit

(c) Only II and III are implicit

(d) All are implicit

(e) None of these

20. **Statement:**

Bill Clinton is the second democrat to be re-elected as president of America, the other being the legendary Roosevelt.

Assumptions:

I.   Clinton has the same qualities that Roosevelt had.

II.   The majority of people in America have faith in Clinton

III.   The election campaign of Clinton's rivals was notimpressive

(a) Only I is implicit

(b) Only II is implicit

(c) Only III is implicit

(d) Either I or III is Implicit

(e) Either II or III is implicit

Answers:

1. (d) Neither I nor II follows.
2. (b) Here, the statement implies that people are inclined towards giving their children good education. Therefore only II follows.
3. (a) Mostly candidates with Hindi medium appear in the examination.

4. (c) All married management students of the fun club are invited for lunch.
5. (c) Only either I or IV and II follows
6. (a) None follows
7. (c) Only either I or IV follows
8. (b) Only II follows.
9. (d) Neither I nor II follows.
10. (b) Only II follows.
11. (e) Both I and II are implicit.
12. (c) Either I or II implicit.
13. (b) Only assumption II is implicit.
14. (b) Only assumption II is implicit.
15. (b) Only assumption II is implicit.
16. (d) All are implicit.
17. (c) Only I and III are implicit.
18. (d) All are implicit.
19. (a) Only I and II are implicit.
20. (b) Only II is implicit.

CHAPTER 5: COURSES OF ACTION

Evaluating courses of action is an important area of logical reasoning. In these types of questions a situation is given in the form of a statement and some courses of action are suggested in the context of given situation.

Generally there are two types of relationship between the given situation and suggested courses of action.

1. **Problem – Solution relationship: -** where the given statement talks about a problem and the suggested courses of action talk about solutions.

   Example:

   Statement:
   Malaria and Typhoid are on rise in Delhi.
   Courses of action:

   I.   Government must increase the number of doctors and medical facilities as soon as possible
   II.   Government must take necessary steps to clean Delhi.

   Solution:

   Here both the courses of action should be undertaken because by increasing the number of doctors and medical facilities the government can control the rise of Malaria and Typhoid and it is also a practical solution. The second course of action is also a practical solution because the city must be cleaned for controlling such type of diseases.

2. **Fact – Improvement relationship: -** where the given statement talks about the fact and suggested courses of action talk about the ways of improvement.

   Example:

   Statement:
   Courts take too long in deciding important disputes of various departments.
   Courses of action:

   I.   Courts should be ordered to speed up matters.
   II.   Special powers should be granted to officers to settle disputes concerning their department.

   Solution:

   Here it is clear that, either the work in the court needs to be speeded up or the system should be reorganized so that the number of problems can be resolved at the lower levels itself and this will provide thespeedy justice to the people. Therefore both the courses should follow.

There are two types of questions that could be asked in CSAT

Type I: - Based on two courses of action

In these types of questions, a statement is followed by two courses of action numbered I and II. The candidate is required to analyze the problem or policy mentioned in the statement and then decides which of the courses of action logically follows.

Directions (Example 1-2): In each of the questions given below is a statement followed by two courses of action numbered I and II. You have to assume everything in the statement to be true and on the basis of the information given in the statement, decide which of the suggested courses of action logically follow (s).

Give your answers as:

- **(a) If only I follows**
- **(b) If only II follows**
- **(c) If either I or II follows**
- **(d) If neither I nor II follows**
- **(e) If both I and II follows**

Example 1:

Statement:

A group of college students was reported to be enjoying at a picnic spot during college hours.

Courses of action:

- I.   The principal of the college should contact the parents of those students and inform them with a real warning for future.
- II.   Some disciplinary action must be taken against those students for the awareness of all the other students.

Solution:

- (e) Students who bunk the classes should be punished so that the other students will not do the same. Also their parents should be well informed about these kinds of activities. Therefore both the courses should follow.

Example2:

Statement:

Every year, at the beginning or at the end of the monsoons, we have some cases of conjunctivitis, but this year, it seems to be a major epidemic, witnessed after nearly three years.

Courses of action:

I.   Precautionary measures should be taken after every three years to check this epidemic.

II.   People should be advised to drink boiled water during rainy season.

Solution:

(b) Since this disease occurs at the end of monsoon season every year. So, precautionary measures every year can work. But the second course of action shall be a preventive measure. So, only course II follow.

Type II: Based on Three courses of action

In these types of questions, a statement is followed by three courses of action numbered I, II and III. The candidate is required to analyze the problem or policy mentioned in the statement and then decides which of the courses of action logically follows.

Example 3: In this question a statement is given which is followed by three courses of action numbered I, II and III. You have to assume everything in the statement to be true and on the basis of the given information given in the statement, decide which of the suggested courses of action logically follow (s).

Statement:

The Company R has rejected first lot of values supplied by Company S and has cancelled its entire huge order quoting use of inferior quality material and poor craftsmanship.

Courses of action:

I.   The Company S needs to investigate functioning of its purchase, production and quality control departments.

II.   The Company S should inspect all the valves rejected by Company R.

III.   The Company S should inform Company R that steps have been taken for improvement and renegotiate schedule of supply.

Give your answer as:

(a) Only I and II follow
(b) Only II follows
(c) II, and either I or III follow
(d) None of these

Solution:

(a) Company S should inspect the rejected valves to ensure if they are really sub - standard. If they are not up to the mark then company A should scrutinize its working thoroughly and remove its lacking.

EXERCISE

Directions (Q.1-10): In each question below a statement is given which is followed by two courses of action numbered I and II. You have to assume everything in the statement to be true and on the basis of the information given in the statement, decide which of the suggested courses of action logically follow(s).

Give your answers as:

    (a) If only I follows
    (b) If only II follows
    (c) If either I or II follows
    (d) If neither I nor II follows

    (e) If both I and II follow.

1. **Statement:**
   Many medical and engineering graduates are taking up jobs in administrative services.
   Courses of action:
       I.   All the professionals should be advised to refrain from taking up such jobs.
       II.   The government should appoint a committee to find out the reasons for these professional taking up such jobs and to suggest remedial measures.

2. **Statement:**
   If the retired professors of a Government Management Institute are also invited to deliberate on restricting of the organization, their contribution may be beneficial to the institute.
   Courses of Action:
       I.   Before calling the retired professors, the management may seek opinion of the employees.

       II.   Management should involve experienced people for the systematic restructuring of the organization.

3. **Statement:**
   The vegetable traders feel that the prices of onion will again go up shortly in Madhya Pradesh.
   Courses of Action:
       I.   Madhya Pradesh State Government should purchase and store sufficient quantity of onion in advance to control prices.
       II.   Madhya Pradesh State Government should make available network of fair price shops for the sale of onions during the period of shortage.

4. **Statement:**
   Some major blunders were detected in the Accounts section of a shoe making factory.
   Courses of Action:

I. An efficient team of auditors should be appointed to check the Accounts
II. A show cause notice should be issued to all the employees involved in the irregularity.

5. **Statement:**
There are so many students in different schools who do not pass in the board examination.
Courses of Action:
I. These schools should be closed down as these have become unproductive.
II. The teachers of these schools should immediately be retrenched.

6. **Statement:**
A very large number of students have failed in the mathematics in the final higher secondary examination due to the misprinting of few questions.
Courses of Action:
I. All the students who failed in Mathematics should be allowed to take supplementary examination.
II. All those who are responsible for this error should be suspended and an enquiry should be initiated to find out the facts.

7. **Statement:**
At least 12 people were killed and large number of people injured when a tourist bus fell from a bridge into the river, because the construction of bridge was very poor.
Courses of Action:
I. That bridge should immediately be reconstructed and strengthened to avoid such accidents.
II. The driver of the tourist bus should immediately be arrested.

8. **Statement:**
There has been an unprecedented increase in the number of requests for berths in most of the long distance trains during the current holiday season.
Courses of Action:
I. The railway authority should immediately increase the capacity in each of these trains by attaching additional coaches.
II. The people seeking accommodation should be advised to make their travel plan after the holiday.

9. **Statement:**
The sale of mobile phones has gone down considerably causing great concern to the company.
Courses of Action:
I. The company should make a proper study of rival products in the market.
II. The price of the product should be reduced and quality improved.

10. **Statement:**
Due to substantial reduction in fares by different airline services, large number of passengers so far travelling by upper classes in trains has switched over to airline services.

Courses of Action:

I.   The railways should immediately reduce the fare structure of the upper classes substantially to retain its passengers.

II.   The railways should reduce the capacity of upper classes in all the trains to avoid loss.

Directions (Q.11-20): In each question below a statement is given which is followed by three courses of action numbered I, II and III. You have to assume everything in the statement to be true and on the basis of the information given in the statement, decide which of the suggested courses of action logically follow(s).

11. Statement:

Numbers of dropouts from the municipal schools have significantly increased after withdrawal of mid-day meal scheme.

Courses of Action:

I.   The government should reconsider its decision of withdrawal of mid-day meal scheme.

II.   The government should close down some of the municipal schools.

III.   The government should carry out a detailed study to find out the reasons for school dropouts.

Give your answer as:

(a) None follows
(b) Only I follows
(c) Only I and III follow
(d) Only II and III follow
(e) All follow

12. Statement:

Besides looks and appearances, it is also important to develop oneself from within.

Courses of Action:

I.   One should not pay attention to fashion.

II.   One should pay attention to fashion.

III.   Books on self-development should be encouraged.

Give your answer as:

(a) Only I follows
(b) Only II follows
(c) Only III follows
(d) Only I and III follow.

13. Statement:

The condition of all the major roads in Delhi has deteriorated due to incessant rain during the last two months.

Courses of Action:

I.   Delhi civic authority should deploy additional traffic staff to regulate the vehicular movement.
II.   Delhi civic authority should immediately make arrangements for repairs of the damaged roads.
III.   Motorists should be alerted at various places by putting up sign boards about the bad patches of the roads to enable them to plan their journey accordingly.

Give your answer as:

(a) Only I and II follow
(b) Only II and III follow
(c) Only I and III follow
(d) All follow
(e) None of these.

14. **Statement:**

In the last two years Indian Airlines is running in losses.
Courses of Action:
I.   It should immediately be control by increasing the fare.
II.   It should be privatized.
III.   It should control its expenditures by removing concessions in fares to all VIP's.

Give your answer as:

(a) Only I follow
(b) Only II follow
(c) Only III follow
(d) All follow

15. **Statement:**

There is an unprecedented increase in the production of rice this year, in our country.
Courses of Action:
I.   The government should immediately lower down the procurement price of rice.
II.   The farmers should be asked to store the excess produces with themselves to be used for future.
III.   The government should make its best efforts to export rice to augment its presence in international market.

Give your answer as:

(a) Only I and II follow
(b) Only II and III follow
(c) Only I and III follow
(d) All follow
(e) None of these

16. Statement:

Nuclear power cannot make a country secure.

Courses of Action:
    I.   We must stop further expenses on increasing our nuclear power.
    II.   We must destroy our nuclear capability.
    III.   We must concentrate on improving our diplomatic relations.

Give your answer as:

(a) Only I follows
(b) Only II follows
(c) Only III follows
(d) Only I and III follow

17. Statement:

In India poverty is increasing because the people because the decision makers who tackle it does not know anything about the poor.

Courses of Action:
    I.   The decision makers should go to the grass root levels.
    II.   A new set of decision makers should replace the existing one.
    III.   The decision makers should come from the poorer sections of the society.

Give your answer as:

(a) Only I follows
(b) Only II follows
(c) Only III follows
(d) Only I and III follow

18. Statement:

It is estimated that about twenty lakh people will visit the city Ujjain during the Kumbh Festival.

Courses of Action:
    I.   The civic authority should monitor the crowd and restrict entry of the people beyond a manageable number.
    II.   The local police authority should be put on high alert to maintain law and order during the festival.
    III.   All the hospitals in the city should be put on high alert in case of any eventuality.

Give your answer as:

(a) Only I and II follow
(b) Only II and III follow
(c) Only I and III follow
(d) All follow
(e) None of these

19. Statement:

There was a spurt in criminal activities in the Bombay during the recent festival season.

Courses of Action:

    I.   The police should immediately investigate into the causes of this increase.

    II.   In future the police should take adequate precaution to avoid recurrence of such situation during festival.

    III.   The known criminals should be arrested before any such season.

Give your answer as:

(a) Only I and II follow

(b) Only II and III follow

(c) Only I and III follow

(d) All follow

(e) None of these

20. Statement:

The meteorological department has issued a notification forecasting less rainfall during next year's monsoon.

Courses of Action:

    I.   The government should immediately set up a water authority for proper management of water resources.

    II.   The water supply authorities should be asked to implement reduction in regular water supply to tackle the situation.

    III.   The farmers should be advised to cultivate alternate crops which require less water during the coming months.

Give your answer as:

(a) Only I and II follow

(b) Only II and III follow

(c) Only I and III follow

(d) All follow

(e) None of these

ANSWERS:

1. (a) Course I would be infringement of the right to freedom of individuals. However if the lacking of the respective fields are detected and removed then it would surely be helpful to retain them in the same field, hence Course II follows.
2. (b)Only course II follows.
3. (e) Both I and II courses of action should follow to prevent black marketing in case of shortage.
4. (e) Both I and II courses of action follows.

5. (d) Here harsh measures as those given in I and II, would not help. Therefore none of the given courses follow.
6. (e) Both the action I and II follow.
7. (e) Since the driver is not responsible for this accident. Also it is impractical to think of the reconstruction of the bridge. Hence both the courses of action do not follow.
8. (a) Only course I follows.
9. (a) Only course I follows.
10. (a) Only course I follows.
11. (c) Only I and III follow.
12. (c) Only III follow, because the given statement stresses on all-round personality development of an individual.
13. (d) All the courses follow.
14. (c) Only III follow.
15. (e) The only solution lies in the III.
16. (c) Only III follow.
17. (a) Only I follow.
18. (b) Only II and III follow.
19. (a) Only I and II follow.
20. (a) Only I and II follows.

CHAPTER 6: BLOOD RELATIONSHIPS, AND

The entire questions in this section are completely based on Blood Relationship. The candidate should have a sound knowledge of blood relation in order to solve these questions.

Blood Relations can be divided into two sides as follows:

Paternal Side Relationships:

1. Father's Father – Grandfather
2. Father's Mother – Grandmother
3. Father's Sister – Aunt
4. Father's Brother – Uncle
5. Children of Uncle – Cousin
6. Children of Aunt – Cousin
7. Wife of Uncle – Aunt
8. Husband of Aunt – Uncle

Maternal Side Relationships:

1. Mother's Father- Maternal Grandfather
2. Mother's Mother – Maternal Grandmother
3. Mother's Sister – Aunt
4. Mother's Brother – Uncle
5. Children of Maternal Uncle – Cousin
6. Children of Maternal Aunt – Cousin

Knowledge of some important relations:

1. Son's wife is called Daughter-in-law
2. Daughter's Husband is called Son-in-law
3. Brother's wife is called Sister-in-law
4. Sister's Husband is called Brother-in-law
5. Husband's Brother is called Brother-in-law
6. Wife's Brother is called Brother-in-law
7. Brother's Son is called Nephew
8. Brother's Daughter is called Niece
9. Sister's Son is called Nephew
10. Sister's Daughter is called Niece

The easiest way to solve the problems based on Blood Relationships would be to draw a tree diagram as follows.

Relation Ships from one generation to next

GENERATION I : Grandfather,Grandmother,Maternal Grandfather, Maternal Grandmother,Granduncle,Grand aunt

GENERATION II : Father, Mother, Uncle,Aunt,Maternal Uncle, Maternal Aunt, Father-in-law, Mother-in-law

GENERATION III : Brother, Sister, Cousin, Wife, Husband, Brother-in-law, Sister-in-law

GENERATION IV : Son, Daughter, niece, nephew, Son-in-law,Daughter-in-law

Generation V : Grandson, Grand daughter

SOLVED EXAMPLES

Example1: P's father's Sister's father is Q. How is Q related to P?

(a) Father
(b) Uncle
(c) Grandfather
(d) Son

Solution: (a) Here P's Father's sister is P's Aunt. Her father is P's father's father. Therefore, Q is grandfather of P.

Example2: Examine the following relationship among members of a family of six persons - A, B, C, D, E and F.

1. The number of males equals that of females.
2. A and E are sons of F.
3. D is the mother of two, one boy and one girl.
4. B is the son of A.
5. There is one married couple in the family at present.

Which one of the following inferences can be drawn from the above?

(a) A, B and C are all females.
(b) A is the husband of D.
(c) D is the granddaughter of F
(d) E and F are children of D.

Solution: (b) It is clear that there are three males and three females in the family. Clearly A, E and B are males. So, C, D, and F are females. Also given that D is the mother of one boy and one girl. So, A and D form a couple having two children, namely B and C. Hence A is the husband of D.

Example 3:

U + V means U is the brother of V,

W – X means W is the father of S,

X ✗ Y means X is the sister of Y,

Y ✗ Z means Z is the mother of Y.

Which of the following means that N is the mother of O?

(a) L + M ✗ N ✗ O

(b) L – M (4537)¹⁵ˣ O ✗ P

(c) N ✗ M ✗ L ✗ O

(d) M + L ✗ O ✗ N

Solution: (d) M + L ✗ O ✗ N means M is the brother of L and L is the sister of O and N is the mother of O.

Direction (Q.4-5): These questions are based on the following information.

(i) A $ B means A is mother of B.
(ii) A # B means A is father of B.
(iii) A @ B means A is husband of B.
(iv) A % B means A is daughter of B.

Example 4: P @ Q $ M # T indicates what relationship P with T?

(a) Paternal grandmother
(b) Maternal grandmother
(c) Paternal grandfather
(d) Maternal grandfather
(e) None of these

Solution: (c) P @ Q $ M # T means P is the husband of Q and Q is the mother of M and M is the father of T. so, clearly P is T's paternal grandfather.

Example 5: If G $ M @ K, how is K related to G?

    (a) Mother-in-law
    (b) Daughter-in-law
    (c) Daughter
    (d) Aunt

Solution: (b) G $ M @ K means G is the mother of M and M is the husband of K. Clearly K is G's daughter-in law

EXERCISE

1.   How is Sohan's father's brother's only sibling related to her?
    (a) Grandfather
    (b) Uncle
    (c) Father
    (d) Cousin

2.   Q is the only son of P who is the only daughter of R. T is the mother of U and daughter-in-law of P. How is U related to P?
    (a) Son
    (b) Daughter
    (c) Grandson
    (d) Cannot be determined

3.   Rohan's father's sister's son's father is related to Rohan as:
    (a) Brother
    (b) Uncle
    (c) Cousin
    (d) Cannot be determined

4.   How is Roshn's daughter-in-law's son's son related to Roshan's wife?
    (a) Grandson
    (b) Great grandson
    (c) Son
    (d) Son-in –law

5.   D, the son-in-law of B, is the brother-in-law of A who is the brother of C. How is A related to B?
    (a) Brother
    (b) Son
    (c) Father
    (d) None of these

Directions (Q.6-10): Read the following information carefully and answer the questions given below it:

There are six persons P, Q, R, S, T and U. R is the sister of U. Q is the brother of T's husband. S is the father of P and grandfather of U. There are two fathers, three brothers and a mother in the group.

6. Who is the mother?
    (a) P
    (b) Q
    (c) S
    (d) T

7. Who is T's husband
    (a) Q
    (b) R
    (c) P
    (d) U

8. How many male members are there in the group?
    (a) One
    (b) Two
    (c) Three
    (d) four

9. How is U related to T?
    (a) Uncle
    (b) Husband
    (c) Son
    (d) Daughter

10. Which of the following is a group of brothers?
    (a) PQU
    (b) PQS
    (c) QUR
    (d) QSU

Directions (Q.11-15): if x$(151)^{78}$ y means x is brother of y,

X – y means x is husband of y,

X + y means x is daughter of y.

11. What does the relation a $\times$ b – c show?
    (a) a is cousin of c
    (b) a is son-in-law of c
    (c) c is wife of c

(d) None of these

12. Which of the following statement does not hold?

(a) P + q × r
(b) P + r + q
(c) P – q + r
(d) None of these

13. If p – q + r × s, then how is q related to s?
(a) Daughter
(b) Niece
(c) Mother
(d) Sister

14. If p × q ⟨4537⟩ᴳᵃr × s then which of the following statement is not necessarily true?
(a) q is brother of r
(b) r is brother of p
(c) s is brother of r
(d) p, q, r are male

15. If the oldest generation in this group is the first generation then what is the present

generation of p in the relation p + q × r + s × t + u × v?
(a) 1ˢᵗ generation
(b) 2ⁿᵈ generation
(c) 3ʳᵈ generation
(d) 4ᵗʰ generation

16. How is sunita's father's father-in-laws's son's only sister related to her?
(a) Siater
(b) Sister-in-law
(c) Mother
(d) None of these

17. Facing a man in the eve, Raghav said, "Your son is my son's uncle." How is the man related to Raghav?
(a) Uncle
(b) Cousin
(c) Grandfather
(d) Father

18. Rani presents a Rajesh as the son of the brother of her mother. How is Rajesh related to Rani?
(a) Brother
(b) Brother-in-law
(c) Cousin

(d) Uncle

19. Raj has two mothers. Ragini is the step-daughter of Sadhana and step-sister of Raj. How is Sadhana related to Raj?
    (a) Grandmother
    (b) Step-mother
    (c) Mother
    (d) Cannot be determined

20. Mrs. Dixit meets a man at a marriage party who is the brother of the sister of her husband. How is the man related to Mrs. Dixit.
    (a) Father
    (b) Father-in-law
    (c) Cousin
    (d) Brother-in-law

ANSWERS:

1	(c)	11	(d)
2	(d)	12	(c)
3	(b)	13	(b)
4	(b)	14	(c)
5	(b)	15	(d)
6	(d)	16	(c)
7	(c)	17	(d)
8	(d)	18	(c)
9	(c)	19	(c)
10	(a)	20	(d)

CHAPTER 7: ARRANGEMENTS

Questions based on Arrangements are one of the most common and important question types in logical reasoning. All the questions in this type involve arranging people or objects in straight lines or around circles, squares or some other geometric shapes.

There are few important points that candidate should keep in mind while solving the questions based on arrangement.

- ➢ Candidate should have the ability to visualize all the geometric shape of the arrangement.
- ➢ Candidate should have the ability to order the clues in the correct order of usage.
- ➢ Candidate should have the ability to understand the indirect clues.

Directions (Ex.1-5) Read the following information and answer the questions that following information and answer the questions that follow.
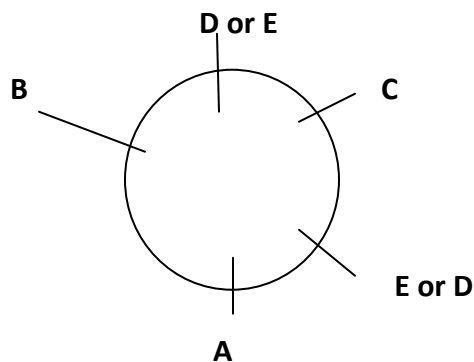
A, B, C, D and E sit around a table.

A sits two seats to the left of C and B sits two seats to the right of C.

Ex.1 If D sits in between B and C, who sits to the immediate right of A?

(a) E
(b) D
(c) B
(d) C

Solution: (a) The sitting arrangement should be as follows:

D or E

B   C

E or D

A

If D sits between B and C, then from the above diagram it is clear that E is to the immediate right of A.

Ex.2 If D is not sitting next to B, who is sitting between B and D.

(a) A

(b) C
(c) E
(d) Cannot be determined

Solution: (a) If D is not sitting next to B, then A is between B and D.

Ex.3 Which of the following cannot be the correct seating arrangement of the five persons in either the clockwise direction or the anti-clockwise direction?

(a) A, C, B, D, E
(b) C, B, D, A, E
(c) D, C, A, B, C
(d) A, B, C, D, E

Solution: (d) we can see that in the above diagram option (d) is not possible in any case.

Ex.4 If a new person F joins the group such that the initial conditions for the seating arrangement should be observed and also a new condition that F does not sit next to A, D or E be satisfied, then who will be the next neighbor of A (one or either side)

(a) D and E
(b) B and C
(c) C and D
(d) None of the above

Solution: (a) The new sitting arrangement is as follows:
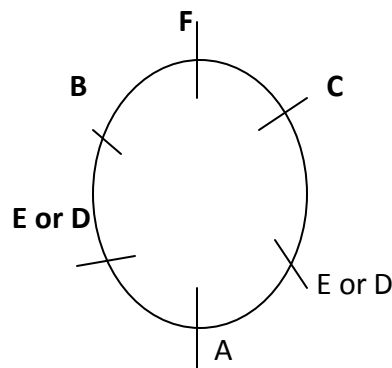
As we can see that the neighbours of A will be E or D.

Ex.5 If a new person F joins the group such that the initial conditions for the seating arrangement should be observed and also a new condition that F does not sit next to C be satisfied, then which of the following statements is true?

(a) F sits to the immediate right of D
(b) F sits to the immediate left of D
(c) F sits to the immediate left of A.
(d) None of the above

Solution: By creating a new diagram, we can observe that F sits to the immediate left of A.

EXERCISE

Directions (Q.1-4): Four boys A, B, C and D and four girls P, Q, R, and S are sitting around a dinner table. No two boys sit adjacent to each other.   D is two places to the right of A but adjacent to S, who is two places to the left of P, who is adjacent to B, who in turn not opposite to A.

1. Who is sitting opposite to D?
    (a) Q
    (b) R
    (c) A
    (d) C

2. ___ is sitting opposite to S.
    (a) Q
    (b) R
    (c) P
    (d) Cannot be determined

3. If each person exchanges their seats with the person sitting opposite to them, then who sits to the immediate left of B?
    (a) Q
    (b) P
    (c) C
    (d) D

4. Who sits five places to the right of C?
    (a) A
    (b) B
    (c) P
    (d) Q

Directions (Q.5-7)

   I.   Six management students P, Q, R, S, T and U are sitting along the sides of a hexagonal table for playing a game. They are not necessarily in the same order.
   II. S is exactly opposite to R and is between P and Q.
   III. U, who is sitting exactly opposite P, is to the immediate right of Q.

5. Who are the people sitting next to S?
    (a) P and U
    (b) P and Q
    (c) T and U
    (d) Cannot be determined

6. Who is sitting opposite to U?
   (a) P
   (b) Q
   (c) R
   (d) S

7. Who sits five places right to the S?
   (a) U
   (b) Q
   (c) P
   (d) R

8. Three of the following are alike in a certain way on the basis of sitting positions and so form a group. Which is one that does not belong to that group
   (a) PSQ
   (b) QUR
   (c) TPS
   (d) URP

Directions (Q.9-10): A, B, C, D and E sit on a long bench. C does not sit next to A or E. A and E have three persons sitting between them

9. Who is sitting in the middle of the bench?
   (a) B
   (b) C
   (c) D
   (d) None of these

10. Who are sitting at the extreme ends of the bench?
    (a) A & E
    (b) B & D
    (c) C & E
    (d) D & E

Directions (Q.11-15) Refer to the following statements and answer the questions:

Seven students Priya, Ankit, Raman, Sunil, Tony, Deepak and Vickey takes a series of tests. No two students get similar marks. Vickey always scores more than Priya. Priya always scores more than Ankit. Each time either Raman scores the highest and Tony gets the least, or alternatively Sunil scores the highest and Deepak or Ankit scores the least.

11. If Sunil is ranked sixth and Ankit is ranked fifth which of the following can be true?
    (a) Vickey is ranked first or fourth
    (b) Raman is ranked second or third
    (c) Tony is ranked fourth or fifth
    (d) Deepak is ranked third or fourth

12. If Raman gets the highest, Vickey should be ranked not lower than:
    (a) Second
    (b) Third
    (c) Fourth
    (d) Fifth

13. If Raman is ranked second and Ankit is ranked first, which of the following must be true?
    (a) Sunil is ranked third
    (b) Tony is ranked third
    (c) Priya is ranked sixth
    (d) None of these.

14. If Sunil is ranked second, which of the following can be true?
    (a) Deepak gets more than Vickey
    (b) Vickey gets more than Sunil
    (c) Priya gets more than Raman
    (d) Priya gets more than Vickey.

15. If Vickey is ranked fifth, which of the following must be true?
    (a) Sunil scores the highest
    (b) Raman is ranked second
    (c) Tony is ranked third
    (d) Ankit is ranked second

Directions for Questions 11-13: Answer the following questions based on the statements given below:

(a) There are three houses on each side of the road.
(b) These six houses are labeled as P, Q, R S, T and U.
(c) The houses are of different colours, namely, Red, Blue, Green, Orange, Yellow and White.
(d) The houses are of different heights.
(e) T, the tallest house, is exactly opposite to the Red coloured house.
(f) The shortest house is exactly opposite to the Green coloured house.
(g) U, the Orange coloured house, is located between P and S.
(h) R, the Yellow coloured house, is exactly opposite to P.
(i) Q, the Green coloured house, is exactly opposite to U.
(j) P, the white coloured house, is taller than R, but shorter than Sand Q.

16. Which is the second tallest house?
    (a) P
    (b) S
    (c) Q
    (d) Cannot be determined

17. What is the colour of the tallest house?

(a) Red
(b) Blue
(c) Green
(d) Yellow

18. What is the colour of the house diagonally opposite to the Yellow colored house?
(a) White
(b) Blue
(c) Green
(d) Red

Directions for Questions 20-22: Answer the questions on the basis of the information given below.

Seven varsity basketball players (A, B, C, D, E, F and G) are to be honored at a special luncheon. The players will be seated on the dais in a row. A and G have to leave the luncheon early and so must be seated at the extreme right. B will receive the most valuable player's trophy and so must be in the centre to facilitate presentation. C and D are bitter rivals and therefore must be seated as far apart as possible.

19. Which of the following cannot be seated at either end?
(a) C
(b) D
(c) F
(d) G

20. Which of the following pairs cannot be seated together?
(a) B & D
(b) C & F
(c) D & G
(d) E & A

ANSWERS:

1	(d)	11	(d)
2	(d)	12	(b)
3	(b)	13	(d)
4	(c)	14	(a)
5	(b)	15	(d)
6	(a)	16	(d)
7	(c)	17	(b)
8	(d)	18	(d)
9	(b)	19	(c)
10	(a)	20	(d)

Unit 4

Data Interpretation and Data Sufficiency

CHAPTER 1: DATA INTERPRETATION

Introduction:

Analyzing data is the major part of our daily routine. It is all, about analyzing of Financial data as in P & L sheet, marketing and sales data, data on productivity, data on performance appraisal, data on each and every thing that we can imagine. In some companies entire department generates and manages every conceivable data that we can imagine.

To collect information from all the amount of data it needs to be presented in a lucid and concise manner. Therefore we use data representation as it immediately provides the overall scenario and it is also sufficient to compute any detailed information.

Strategies:

While studying the DI section one should follow few strategies given below:

1. Solve the graph with which you are most comfortable. For example some are more comfortable with line graph while the other may be with pie chart.
2. The problems with numbers with 2 or 3 digits like 82, 114 etc are easier to solve then the problem with number of 4 or 5 digits like 3457, 52468.
3. In pie charts if sectors are 15% 20% etc then it will be easier calculation then the sectors like 17.5%, 23.6 % etc.
4. We must also look at the number in answer option, if the answers are 12.5 5 6.33% etc then it will be easier to arrive at conclusions.
5. Wider are the choices in answer, easier will be the elimination process and lesser will be the calculation.
6. The answer choice " **Cannot be determined** " makes the question much easier as it becomes **data sufficiency** question and if the question can be answered then only four options are left.
7. Pick the alternative which is the middle one and check if your answer is less than, equal to or greater than this value. Only in this way one iteration will give you the correct answer.
8. The answer choice "**None of these** "on the other hand will make it more difficult as we have to calculate the question to the exact value.
9. It is better to solve a line chart with two lines and 5 points than to solve a table with 5 rows and 6 columns. But this may not be the case always looking at the other factors.

Growth rate and Growth:

Growth and Growth rate are two different terms. Growth refers to just increase in the underlying value, while the Growth rate refers to the percentage increase. For example following table shows the sales and profit of a company A in Rs. Lakhs

	1999	2000	2001	2002	2003
Sales	240	290	320	350	380
Profit	50	55	70	50	40

Here,

Growth during the period from 2000 to 2002 is simple. It is the difference of sales ie 350-290 = 60

But the Growth rate during this period, is the percentage of growth = $\frac{350-290}{290} \times 100 = 20.98\%$

Profit Percentages:

The profit percentage is not $\frac{profit}{selling\ price} \times 100$ but it is $\frac{profit}{cost\ price} \times 100$. For example in above

table the profit percentage of year 1999 is not = $\frac{50}{240} \times 100 = 20.83\ \%$.

But the profit percentage of year 1999 is = $\frac{50}{190} \times 100 = 26.31\%$ as cost price of this year is 190

Also the percentage change in profit percentage, is percent of profit percent of two years with base as previous year profit percent. For example the percentage change in profit percentage in the year 2002 over that in year 2001 is:

$$= \frac{profit\ percent\ in\ 2002 - profit\ percent\ in\ 2001}{profit\ percent\ in\ 2001} \times 100$$

$$= \frac{16.66 - 28}{28} \times 100 = -40.5\ \%$$

Sales of A and B (2000-2004)
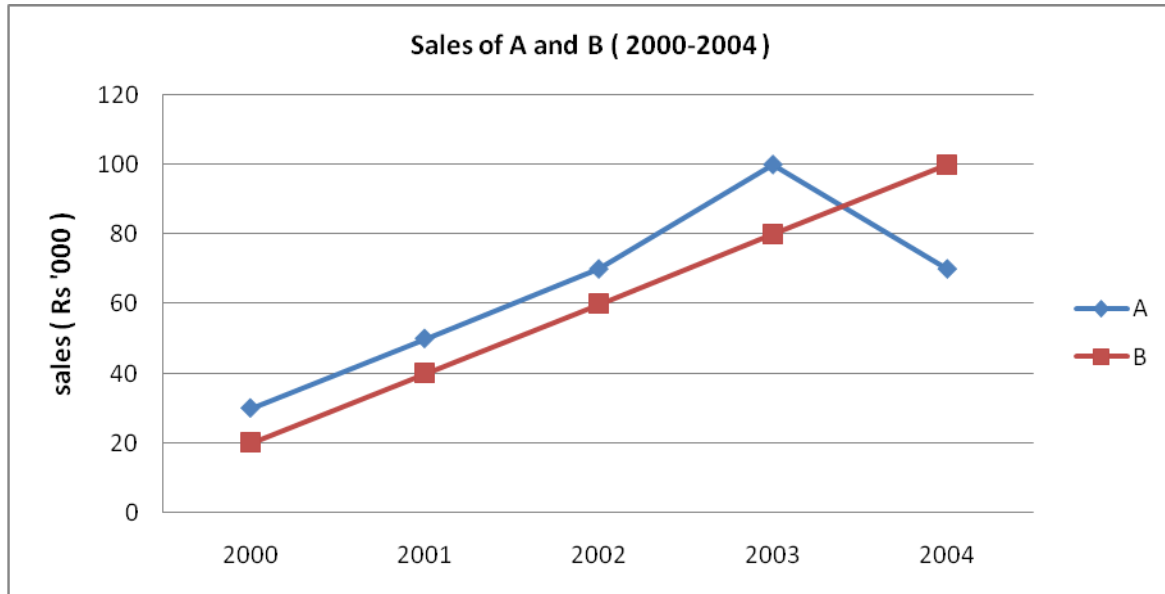
But in line graph growth rate is related to slope of line. There are few points to understand:

1. The slope of each segment is same across all years of company B but still the growth rate is not the same in all years. The same slope simply means the sales grow by a constant amount each year. But the growth rate depends on the base value so in company B it's decreasing from 2000 to 2004.

2. The line representing sales of A in 2002-03 is steeper but 2003 is not the year with highest growth rate of sales of A. The highest growth rate of sale of A is in year 2001.

SOLVED EXAMPLES

Direction (Q.1-5) : Below is the production figures of selected industries represented through a bar diagram
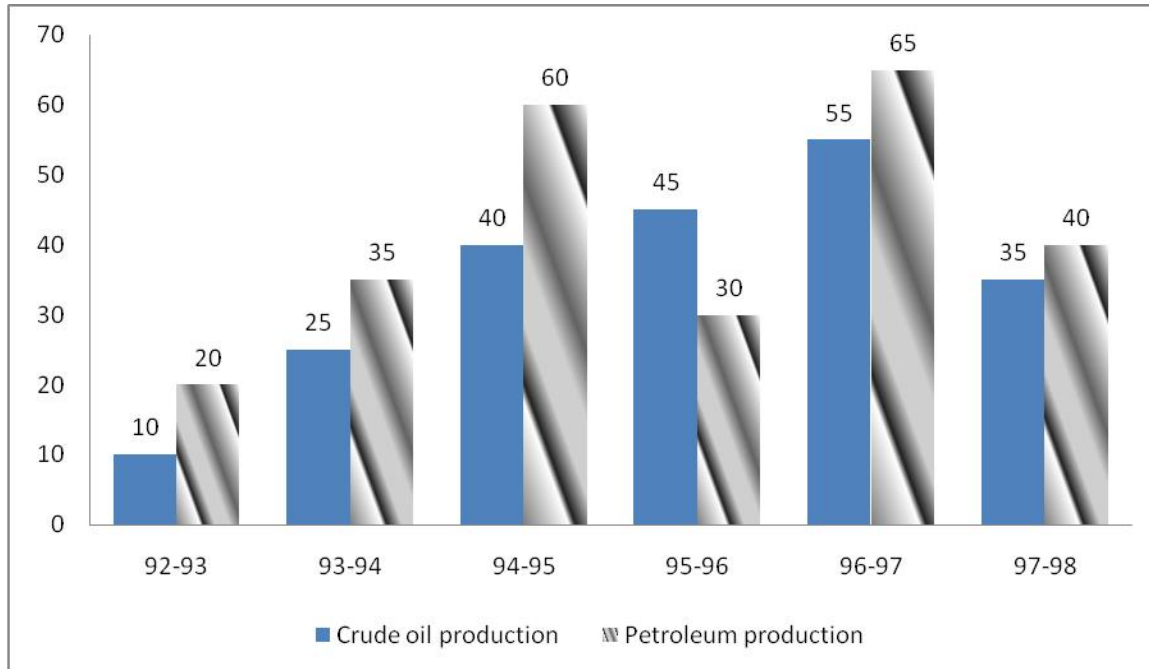
1. What percent is the increase in production of crude oil in 96-97 w.r.t 94-95 is to the increase in production of crude oil in 94-95 w.r.t 93-94?
   (a) 70%
   (b) 80%
   (c) 100%
   (d) 110%

2. What is the percent increase in average production of crude oil up to 96-97 w.r.t average production of crude oil up to 94-95?
   (a) 40 %
   (b) 25 %
   (c) 42 %
   (d) 30%

3. In which of the following years % increase in crude oil production is maximum w.r.t previous year?
   (a) 93-94
   (b) 94-95
   (c) 95-96
   (d) 96-97

4. In which of the following years difference in crude oil production & petroleum products production is minimum?
   (a) 93-94
   (b) 94-95
   (c) 95-96
   (d) 97-98

5. What is the average production of petroleum products?
    (a) 46.6 million tones
    (b) 40 million tones
    (c) 41.6 million tones
    (d) 48 million tones

Solution:

1. (c) Increase in 96-97 w.r.t 94-95 = 55-40 = 15 millions tones.
    Increase in 94-95 w.r.t 93-94 = 40-25 = 15 millions tones.
    Required percentage = 100 %

2. (a) Average production up to 96-97

    $= \frac{10+25+40+45+55}{5} = 35$ millions tones

    Average production up to 94-95

    $= \frac{10+25+40}{3} = 25$ millions tones

    Required percentage $= \frac{10}{25} \times 100 = 40$ %

3. (a)

	93-94	94-95	95-96	96-97	97-98
Increase	15	15	5	10	-20
% increase	150 %	60%	12.5%	22.22%	-36.36%

4. (d)

	92-93	93-94	94-95	95-96	96-97	97-98
Petroleum	20	35	60	30	65	40
Crude oil	10	25	40	45	55	35
Diff.	10	10	20	-15	10	5

5. (c) Average production $= \frac{20+35+60+30+65+40}{6} = 41.66$ milion tones

Directions (Q.6-10) : study the graph and answer the question

Foreign trade in India (in Rs crore)

Chart Title
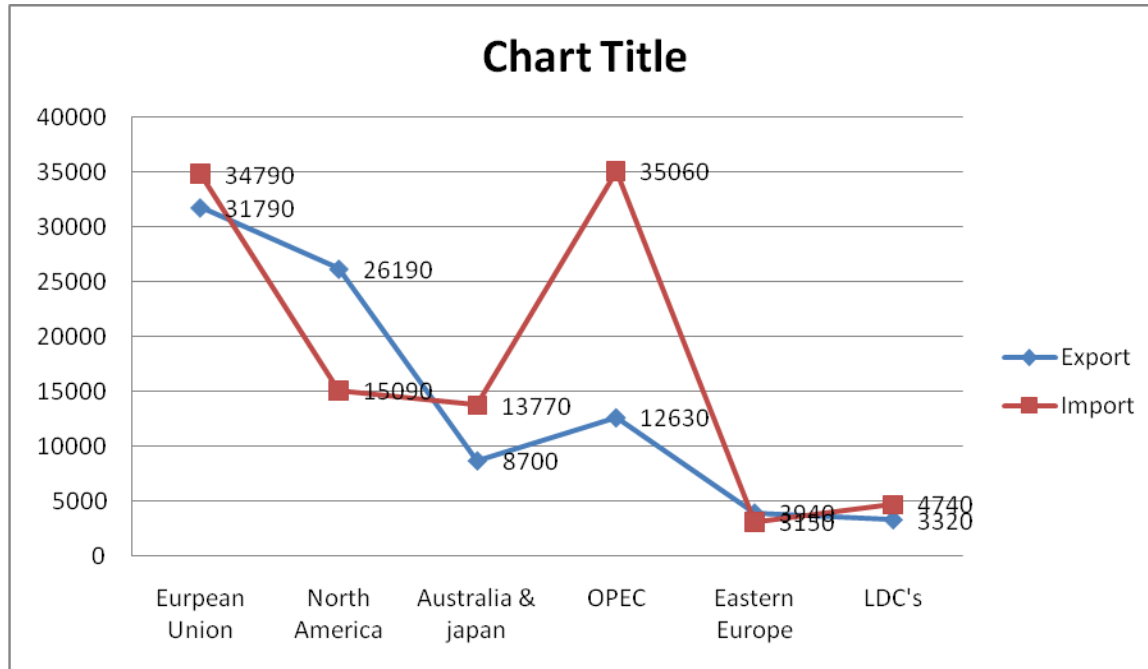
6. What percent is export of OPEC to import from OPEC?
   (a) 33%
   (b) 24.8 %
   (c) 42.6 % 36.04 %

7. Which country has minimum difference of export and import?
   (a) European Union
   (b) LDC
   (c) OPEC
   (d) North America

8. Difference of export to Eastern Europe and LDC is approx to what percent of difference of imports from these?
   (a) 46%
   (b) 52%
   (c) 39%
   (d) 32%

9. OECD includes European Union, North America, Australia & Japan. Export to OECD is what approx percent of total Indian export?
   (a) 77 %
   (b) 52 %
   (c) 48 %
   (d) 62 %

10. An import from OPEC, Eastern Europe & LDC is what approx percent of the total Indian Export?

(a) 35%

(b) (b) 45%

(c) (c)50%

(d) (d)25%

Solution:

6. (d) Required percent = $\frac{12630}{35060} \times 100 = 36.04\%$

7. (b)

EU	NA	LDC	A&J	OPEC
3050	11100	1420	5070	22430

8. (C) Difference in export between EE & LDC = 3940-3320 = 620

   Difference in import between EE & LDC = 4740-3150 = 1590

   Required percent = $\frac{620}{1590} \times 100 = 38.99$

9. (a) Export to OECD = 66680

   Total Indian Export = 86570

   Required percent $\approx 77\%$

10. (c) Required percent = $\frac{42950}{86570} \times 100 \approx 50\%$

EXERCISE

Directions (Q.1-5): Study the table and answer the following question. Number of different types of vehicles coming from different sides on a day is given below.

Coming From	Buses	Cars	Tempo	Three Wheeler	Two Wheeler
Supreme Court	350	660	140	320	800
Connaught Place	250	900	350	530	330
Mayur Vihar	690	700	50	490	620
Delhi Gate	880	560	160	520	470
Pragati Maidan	350	750	150	950	430

1. What is the number of vehicles coming from Connaught place?
   (a) 2560
   (b) 2350
   (c) 2360
   (d) 2410

2. What percent more is the no. of buses crossing ITO from Mayur Vihar and Delhi gate to the Pragati Maidan and Connaught Place side?
   (a) 132.33 %
   (b) 124.09 %
   (c) 114.51 %
   (d) 161.66 %

3. What is the approximate average number of cars from all sides crossing ITO?
   (a) 620
   (b) 714
   (c) 657
   (d) 730

4. Average number of tempos from all side is approximate what percent of average numbers of Cars?
   (a) 24.5%
   (b) 23.08%
   (c) 25.10%
   (d) 23.80

5. Number of buses from Pragati Maidan and number of tempos from Connaught place is equal to
   (a) Number of tempos from Delhi gate
   (b) Number of cars from mayor Vihar
   (c) Number of buses from Delhi Gate
   (d) Number of three wheelers from Supreme Court

Directions (6-10): following graph shows the manufacture of motorcycles and scooters in different years in (00). Study the graph and answer the question given below
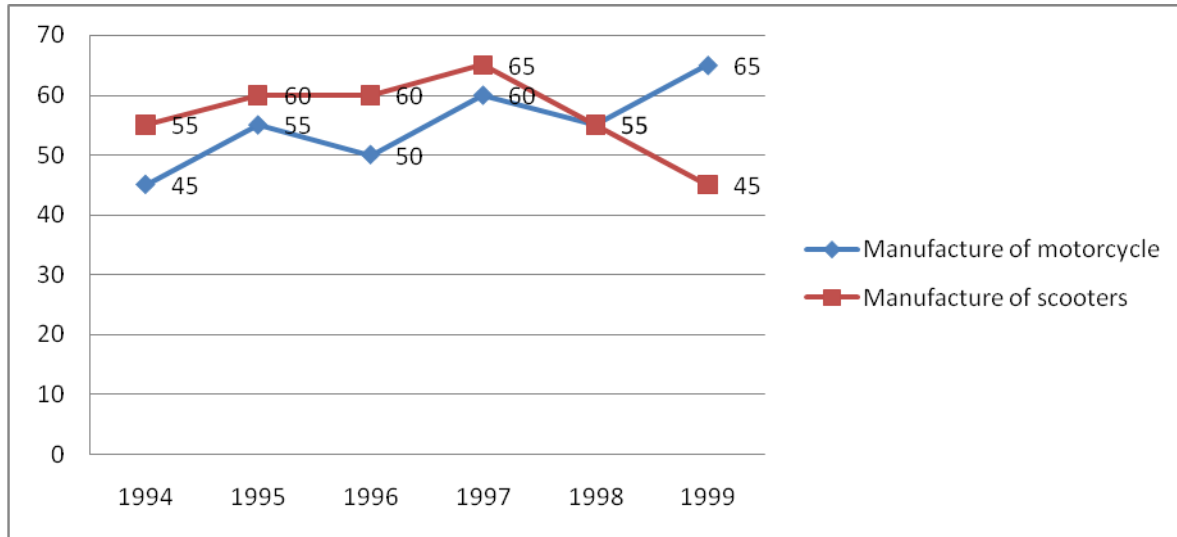
6. The manufacture of scooters is higher than the manufacture of motorcycles in 1996by what percent?
   (a) 7.52%
   (b) 7.63%
   (c) 16.66%
   (d) 7.23%

7. The approx average production of motorcycles over the years is?
   (a) 5166
   (b) 6000
   (c) 6347
   (d) 5890

8. If the production of motorcycles is 8000 in 1996 then what is the production in 1998?
   (a) 8900
   (b) 8800
   (c) 9300
   (d) none of these

9. Which of the statement is true?
   (a) The average production of motorcycle over the years is 5665.
   (b) Percentage of production of scooters with respect to the production of motorcycles is same in 1995 and 1997.
   (c) There is a same % change in production of scooters and motorcycle over the years.
   (d) None of these

10. The percentage decline in production of scooters from 1995 to 1999 is?
    (a) 17.12%
    (b) 16.9%
    (c) 25%
    (d) 23%

Directions (Q.11-15): study the graph and answer the question. Following graph shows the actual and target production of a company over the period (in 000 tonnes).
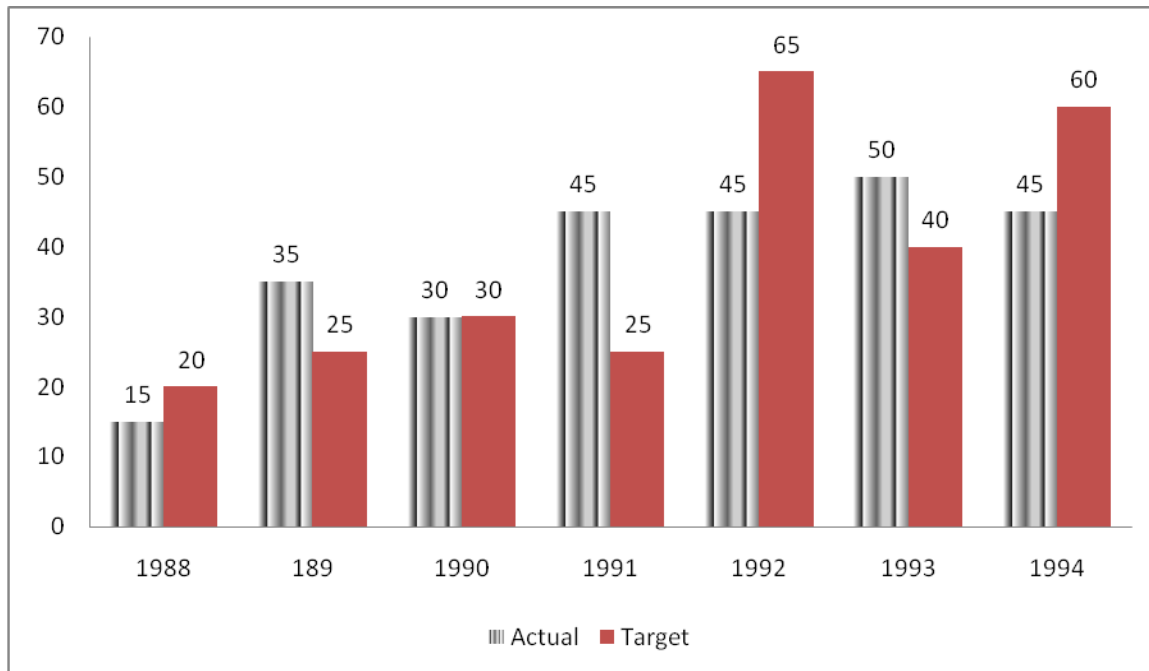
11. What percentages actual production in 1992 to target production in 1988?
    (a) 65%
    (b) 80%
    (c) 225%
    (d) none of these

12. The percentage difference of actual production from target production is minimum in which year?
    (a) 1989
    (b) 1993
    (c) 1991
    (d) 1988

13. The target production in 1989 and 1993 together is what percent of the actual production in 1988 and 1994 together?
    (a) 108.33%
    (b) 0%
    (c) 27%
    (d) none of these

14. The difference of target production is maximum with respect to actual production in which year?
    (a) 1994
    (b) 1988

(c) 1990
(d) 1992

15. The difference between the actual production in 1990 and target production in 1989 is?
    (a) 5000 tonnes
    (b) 10000 tonnes
    (c) 17 tonnes
    (d) none of these

Directions (Q.16-20): Below is the pie chart of the percentage market share of the companies in the detergent market for 2002 and 2003
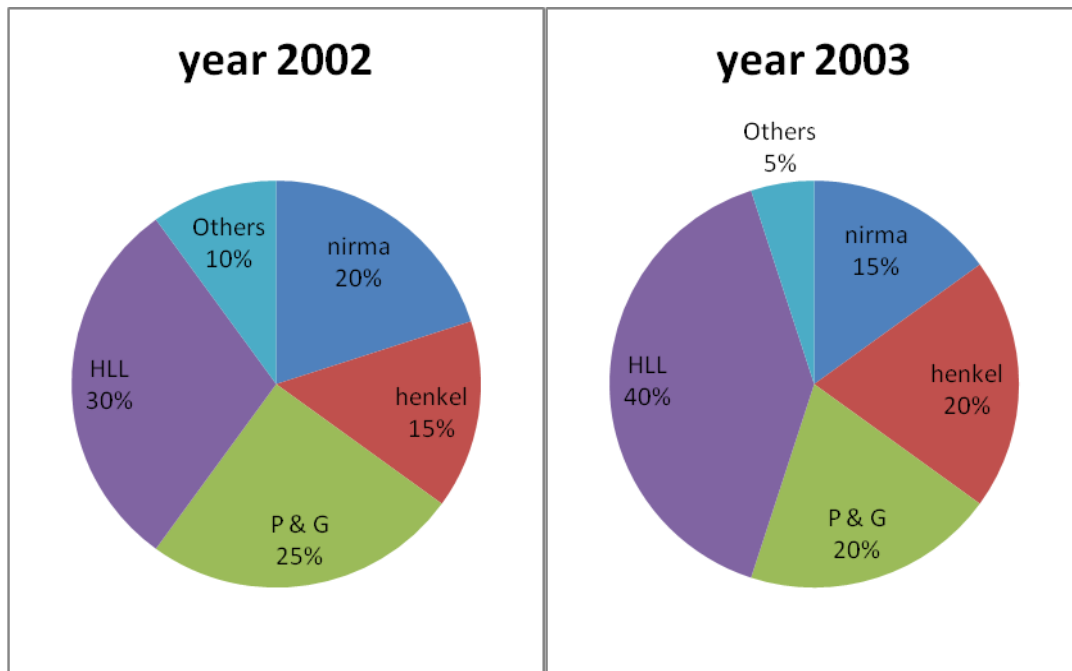
The total size of the market has increased from Rs 150 crore in 2002 to Rs. 375 crore in 2003?

16. What is the percentage increase in sales of the overall detergent market in 2003 over 2002?
    (e) 100 %
    (f) 150 %
    (g) 200 %
    (h) 250 %

17. Which of the following shows the minimum growth in sales in the year 2003 over the year 2002?
    (e) P & G
    (f) HLL
    (g) Henkel
    (h) others

18. What is the approx growth rate of HLL?(d)
    (e) 133 %
    (f) 233 %
    (g) 333 %
    (h) 433 %

{Hint: growth rate of HLL = $\frac{40\% \ of \ 375 - 30\% \ of \ 150}{30\% \ of \ 150} \times 100$ }

19. What is the ratio of sales of P & G in the year 2003 to its sales in the year 2002?
    (e) 5:2
    (f) 3:2
    (g) 2:5
    (h) 1:2

20. If the sales value of all the companies in 2002 would have been higher by 10 %, then the detergent market would have been larger by how much value?
    (e) 15 crore
    (f) 25 crore
    (g) 30 crore
    (h) 10 crore

Directions (Q.21-25): Below is the table of Pizza sale in Delhi (per day)

		N	N-E	N-W	S	W	C	E
Pizza Hut	Veg	150	240	390	500	250	120	100
	Non Veg	230	370	270	430	410	350	120
Domino Pizza	Veg	310	180	210	330	270	250	230
	Non Veg	300	260	400	270	420	330	330
Pizza Corner	Veg	200	320	370	230	310	220	240
	Non Veg	160	100	250	200	390	250	210

N=North, E= East , S= South , W =West , C = Central

21. In Central Delhi non veg pizza lovers are what percent more than veg pizza lovers?
    (a) 36.4 %
    (b) 44.6 %
    (c) 57.6 %
    (d) 44 %

22. How many centre's have Delhi Domino's Pizza sale more than the others?
    (a) 1
    (b) 2
    (c) 3

(d)
(e) 4

23. How many centre have total veg Pizza sale less than the total non veg pizza sale?(D)
    (a) 6
    (b) 4
    (c) 5
    (d) 3

24. Which of the following parts of Delhi Pizza Hut pizza has max sale?
    (a) North
    (b) West-East
    (c) North-East
    (d) South

25. What is the approx average sale of veg pizzas of pizza Corner for all its centre?
    (a) 270
    (b) 293
    (c) 280
    (d) 156

Directions (Q.26-30): The percentage of occurrence of silica and aluminum in the six selected rocks are given below
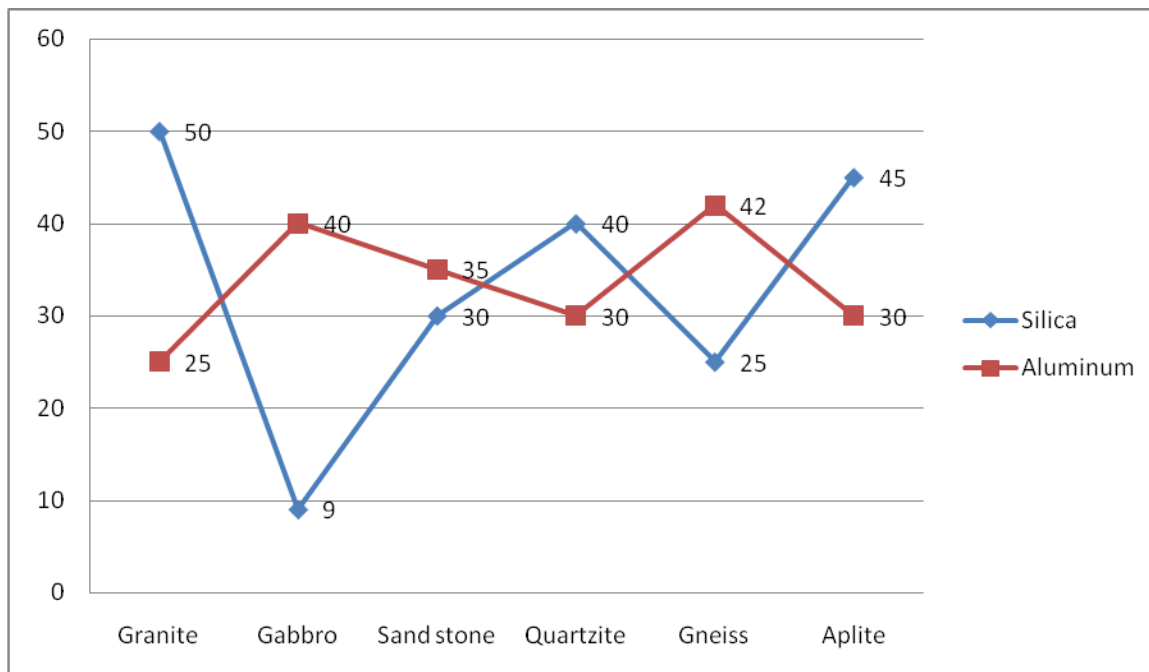
26. Occurrence of silica in gabbro is what percent less than the occurrence of silica in gneiss?
    (a) 64 %
    (b) 59.25 %

(c) 77.08 %

(d) 66.66 %

27. Average silica occurrence is what percent of average aluminum occurrence in the rocks?
    (a) 50.88 %
    (b) 98.17 %
    (c) 98.51 %
    (d) 100.93 %

{ req percent = $\dfrac{average\ of\ silica}{average\ of\ aluminum} \times 100$}

28. In how many stones both silica & aluminum occurrence is more than 35 % each?
    (a) 1
    (b) 2
    (c) 3
    (d) none of these

29. Average aluminium occurrence in Gabbro , aplite and sandstone is what per cent of average silica occurrence in rest of the rocks?
    (a) 83.33%
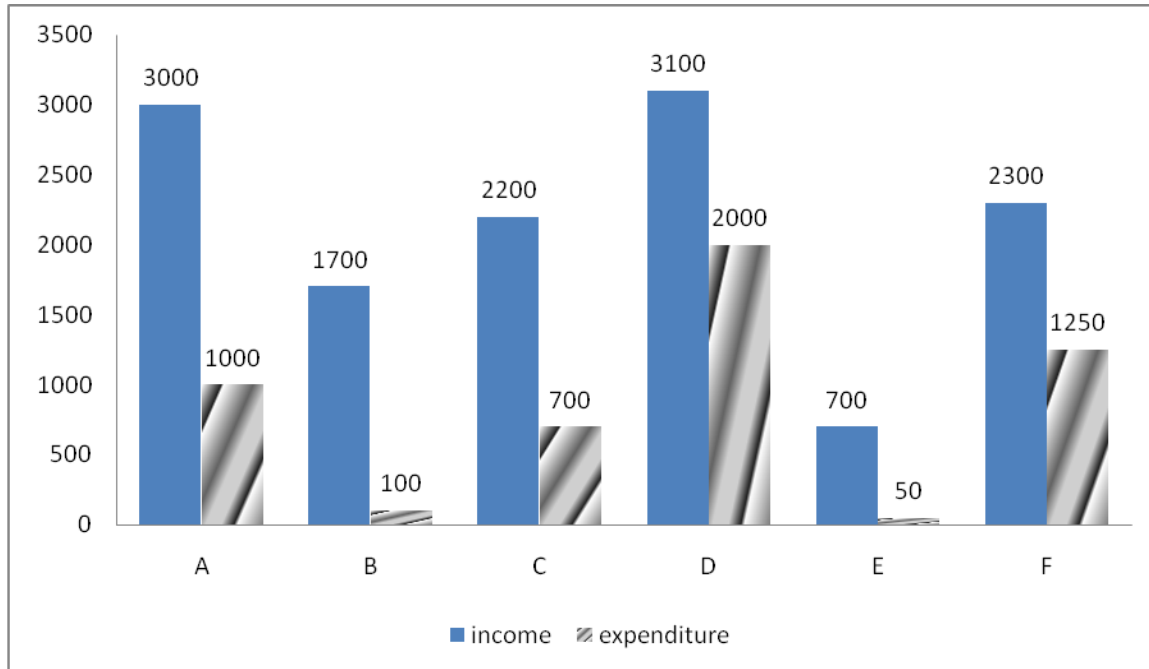   (b) 119.56%
    (c) 91.31%
    (d) 83.63%

30. On a more accurate observation it is found that quartzite contains 79 silica and 41 aluminium. what is the average aluminium content in these stones.(D)
    (a) 188 %
    (b) 119 %
    (c) 102 %
    (d) 190 %

{ Hint : req average =25+40+35+41+42+30/6 }

Directions (Q.31-35): below is the graph of income and expenditure of companies in thousand

31. How many companies have profit more than 40 % of the income?
    (a) 2
    (b) 3
    (c) 4
    (d) 1

32. Which company has maximum percentage profit?
    (a) A
    (b) B
    (c) D
    (d) F

33. The expenditure of companies C is what percent less/more than the expenditure of company F?
    (a) 45%
    (b) 44%
    (c) 46 %
    (d) 50%

34. Which of the following companies has expenditure to income ratio minimum?
    (a) A
    (b) B
    (c) C
    (d) F

35. What is the average profit of all the companies?
    (a) 1.316 lac

(b) 12.55 lac
(c) 1316667
(d) 1.255 lac

Directions (Q.36-40): Below is the Union Budget of 1999 in a pie chart (in degrees)

Income

Expenditure
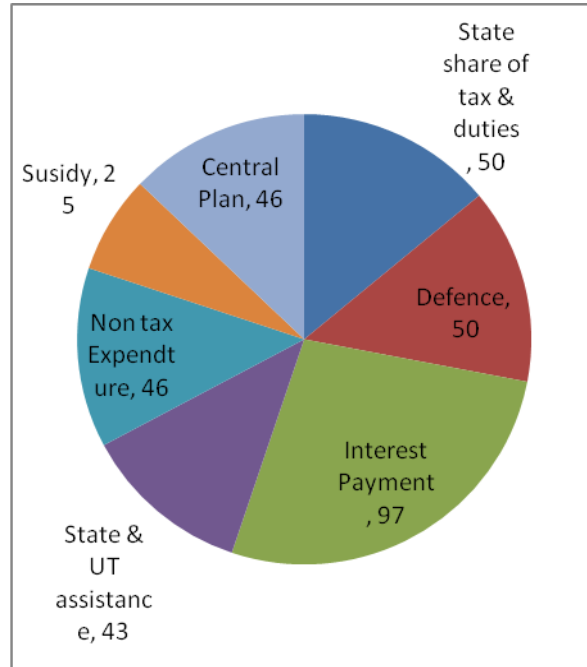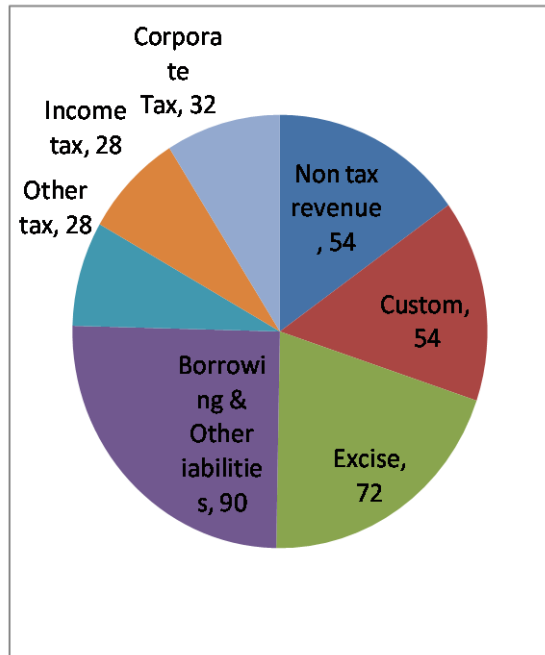
Total Income = 283882 crore = Total Expenditure

36. Find out the income of government from excise and custom?
    (a) 112476.3 crore
    (b) 127740 crore
    (c) 127746.9 crore
    (d) none of these

37. Find out the expenditure of government on defence and subsidies?
    (a) 42253.4crores
    (b) 59142.08 crore
    (c) 99358.7 crore
    (d) 127746.9 crore

38. What percent is the income from income tax is to the income from corporation taxes?

    (a) $(200)^2$%

    (b) $(17)^2$ %

(c) $(21+25)^{2}$%

(d) $(1000-8)^{2}$

39. How much less is the non plan expenditure of State and UT?
    (a) 3052.21 crore
    (b) 3632.42 crore
    (c) 2365.68 crore
    (d) 2125.26 crore

40. Income from borrowing other liability is what percent of expenditure on interest payments?
    (a) 90%
    (b) 92.78 %
    (c) 96%
    (d) 82%

Directions (Q.41-42): The table shows the most preferred game of students of different schools. Answer the question by studying the table

School	Tennis	Football	Hockey	Basketball	Cricket
RKM	210	300	180	150	340
DPS	500	350	270	100	270
APS	330	210	260	380	300
DAV	240	360	300	220	400
BPS	320	390	160	330	400
LMS	210	250	320	240	360

41. The percentages of students of MS who prefer to play hockey are?
    (a) 18.66 %
    (b) 21.25 %
    (c) 23.18 %
    (d) 15.56 %

42. Which of the following school has maximum percentage of students who prefer to play cricket?
    (a) DPS
    (b) RKM
    (c) APS
    (d) DAV

43. The game which is most preferred by students of BPS and DAV together is?
    (a) Tennis
    (b) Football
    (c) Cricket
    (d) Hockey

44. What is the approx average number of students of all schools who prefer to play football?
    (a) 286
    (b) 274
    (c) 341
    (d) 310

45. What is the approx number of students who prefer to play tennis, if 40 % of the students of APS prefer to play tennis?
    (a) 345.33
    (b) 411.62
    (c) 278.21
    (d) 386.10

Directions (Q.46-50): Study the following graph and answer the question given below:
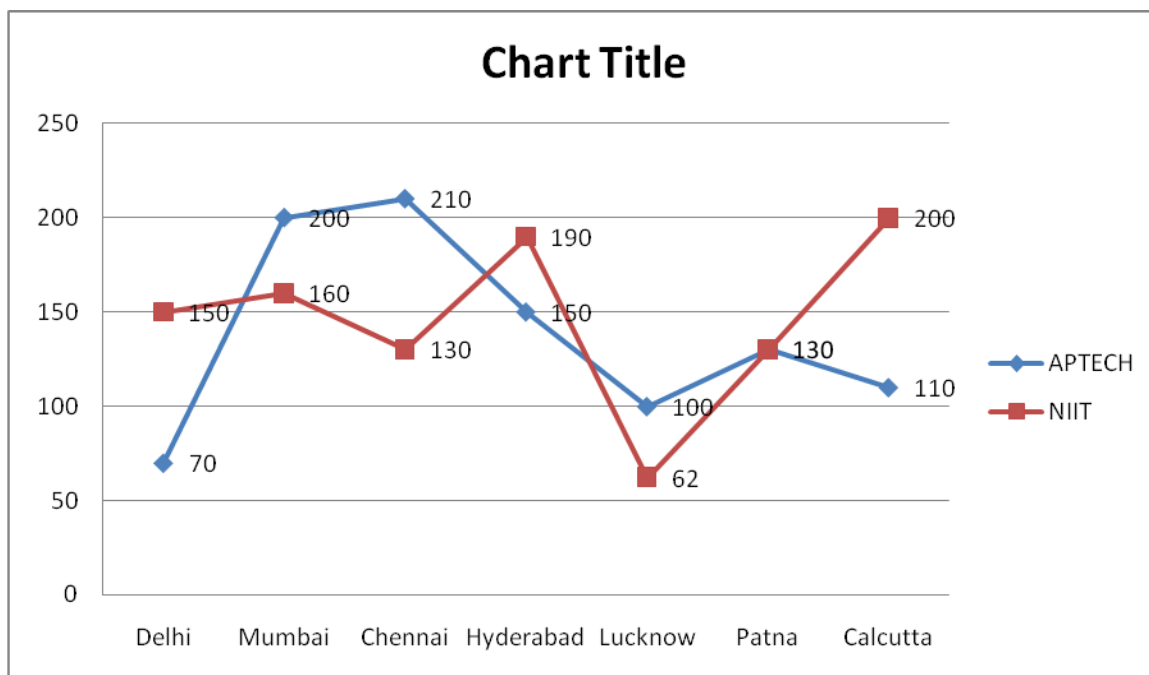
46. How many cities have the least computer centers?
    (a) Delhi
    (b) Hyderabad
    (c) Mumbai
    (d) Chennai

47. Approximately what percent less/ more are the NIIT centers in Chennai than the APETCH centers in Lucknow?
    (a) 31 %
    (b) 22 %
    (c) 34 %

(d) 24 %

48. Approx average numbers of NIIT centre in cities are?
    (a) 130
    (b) 145
    (c) 150
    (d) 160

49. If in Patna the average number of APETCH centers is 180 and the number of NIIT centers is 220 then what is the difference between the total number of APETCH centre and total number of NIIT centers?
    (a) 168
    (b) 120
    (c) 210
    (d) 90

50. Average number of APETCH centers is approx what percent of average number of NIIT centers in these cities?

    (a) $(8)^2$%

    (b) $(1000)^{12}$%

    (c) 10^{35}%

    (d) $(1000)^{12}$%

Directions (Q.51-55): Following graph shows the Growth in sanctions, disbursement and net profits in banking sector (Rs billion). Study the graph and answer the question:
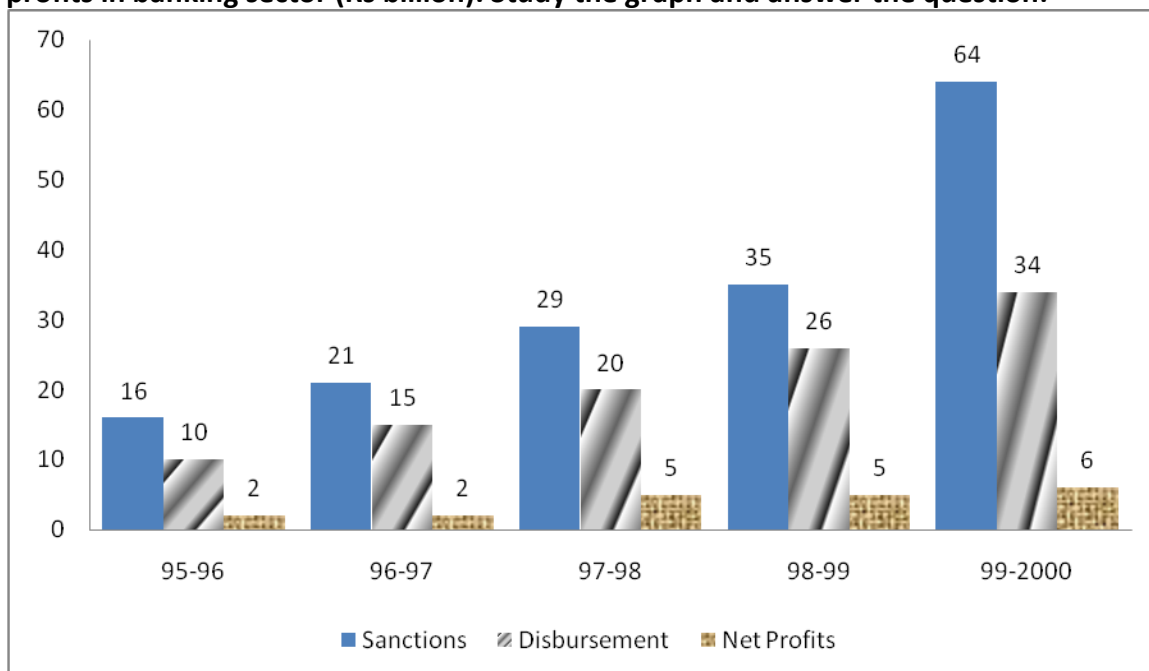
51. What percent is the average disbursement of all years to the average sanctions and net profit together of all the given years?
    (a) 62.63 %
    (b) 58.82 %
    (c) 64.40 %
    (d) 77.02 %

52. The year in which the percent profit was maximum from previous year is?
    (a) 1995-96
    (b) 1996-97
    (c) 1997-98
    (d) 1998-99

53. The year in which the percentage of disbursement was maximum of all the three amounts for all the given years is?
    (a) 1995-96
    (b) 1996-97
    (c) 1997-98
    (d) 1998-99

54. The difference between average of sanctions of the year 1995-96, 1996-97 , 1997-98 and average of disbursements of 1997-98 , 1998-99 and 1999-2000?
    (a) Rs 4.66 billion
    (b) Rs 27.66 billion
    (c) Rs 6.77 billion
    (d) none of these

55. The profit of 1999-2000, sanction of 1997-98 and disbursement of 1998-99 is what percent of profit of 1995-96, sanction of 1999-2000 and disbursement of 1998-99 together?
    (a) 33.54 %
    (b) 45.60 %
    (c) 148.61 %
    (d) 66.30 %

Directions (Q.56-60): Study the graph and answer the question.

Expenditure incurred in publication and sales of books:

Sales

Miscellaneous 5%
Royalty 15%
Advertisement 12%
Printing 20%
Circulation cost 12%
Paper 18%
Repairing & Binding 18%
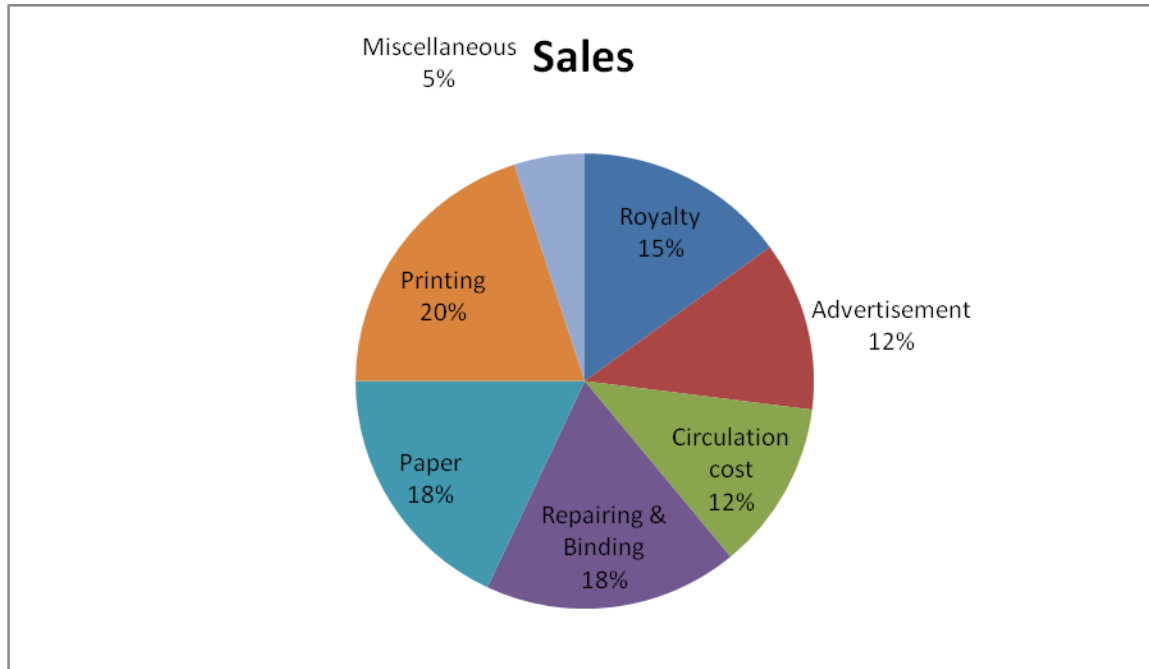
56. Advertisement is what percent of the printing expenditure?
    (a) 155.55%
    (b) 60%
    (c) 5.74%
    (d) none of these

57. If ¼ of the paper cost is Rs 8000 then what is the expenditure on repairing and binding?
    (a) Rs 18000
    (b) Rs 20000
    (c) Rs 32000
    (d) Data inadequate

58. What is the difference between the angle of the sector of paper and that of royalty?
    (a) 75.6
    (b) 10.8
    (c) 36
    (d) none of these

59. The combined cost of printing and royalty is what percent of combined cost of paper and 35 less than cost of advertisement?
    (a) 129.62%
    (b) 121.5%
    (c) 90%
    (d) 79%

60. If the miscellaneous cost is Rs 10000 then what is the ratio of printing cost to royalty?
    (a) 3:5

(b) 4:3

(c) 4:25

(d) 2:1

Directions (Q.61-65): Table shows the attendance of students in 80classes of a semester in different papers. on the basis of table answer the question given below:

Papers	I	II	III	IV	V	VI
Rohit	35	40	60	50	60	65
Kunal	30	75	30	70	65	30
Silpi	75	15	55	50	30	35
Pratik	40	45	40	60	70	70
Ravi	70	65	70	50	50	25
Anil	35	65	60	20	70	40

61. The maximum classes were attended by which of the student?

(a) Rohit

(b) Pratik

(c) Silpi

(d) Ravi

62. Average attendance of students is least in which of the following papers?

(a) I

(b) III

(c) V

(d) VI

63. At least 2/5 attendance is required in each paper to appear in the exam. Number of students that are allowed to appear in the exam are?

(a) 1

(b) 2

(c) 3

(d) 4

64. The average of percentage of classes attended by pratik and silpi are /

(a) 60.93%

(b) 65.32%

(c) 59.32%

(d) 62.42%

65. What percent more/ less classes did kunal attend than Ravi?

(a) 7.42%

(b) 6.25%

(c) 6.32%

(d) 4.51%

Directions (Q.66-70): study the graph and answer the question:

Total nos. of listed firms

BSE values: 2050, 2470, 2600, 2860, 3580, 3790, 3990, 4230
NSE values: 550, 1340, 1970, 3800, 2940, 3020, 3140, 3570

Years: 90-91, 91-92, 92-93, 93-94, 94-95, 95-96, 96-97, 97-98
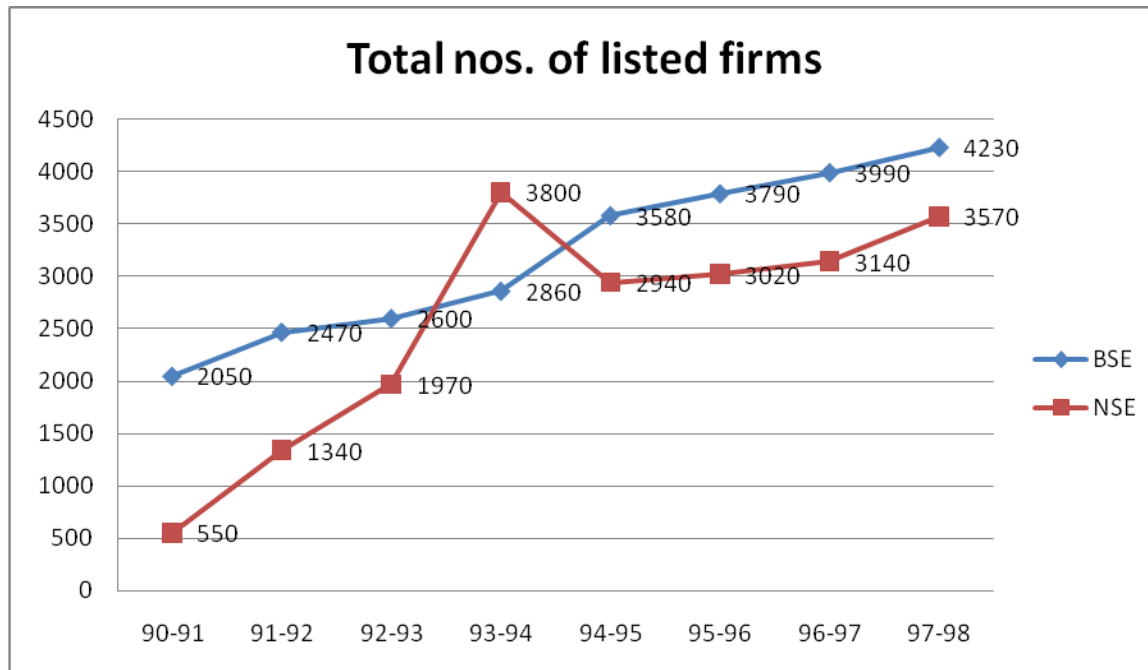
66. In which year the no. of firms listed on BSE is increased maximum from previous year?
    (a) 91-92
    (b) 93-94
    (c) 94-95
    (d) 97-98

67. How many firms listed in BSE increased from 1990-91 to 1997-98?
    (a) 1780
    (b) 2440
    (c) 2180
    (d) 1640

68. If the rate by which no. of firms listed on BSE is increased in 1994-95 over previous year is continued then what is the no. of firms listed in 1997-98?
    (a) 7070
    (b) 7244
    (c) 5757
    (d) 5740

69. Which of the following is true?
    (a) In 1993-94 the no. of firms listed is 60 more than that in 1996-97 on BSE.
    (b) Approx average no. of firms listed on BSE per year during 1991-98 is 280.
    (c) Percentage increase in no. of firms in 1992-93 from previous year is 5.30% approx on BSE.
    (d) None of these

70. The no. of firms increased in 95-96 from previous year on NSE is what percent of no. of firms increased in 93-94 from previous year on BSE?
    (a) 32.32%
    (b) 11.48%
    (c) 70.13%
    (d) 4.37%

Directions (Q.71-75): Study the graph and answer the questions given below:
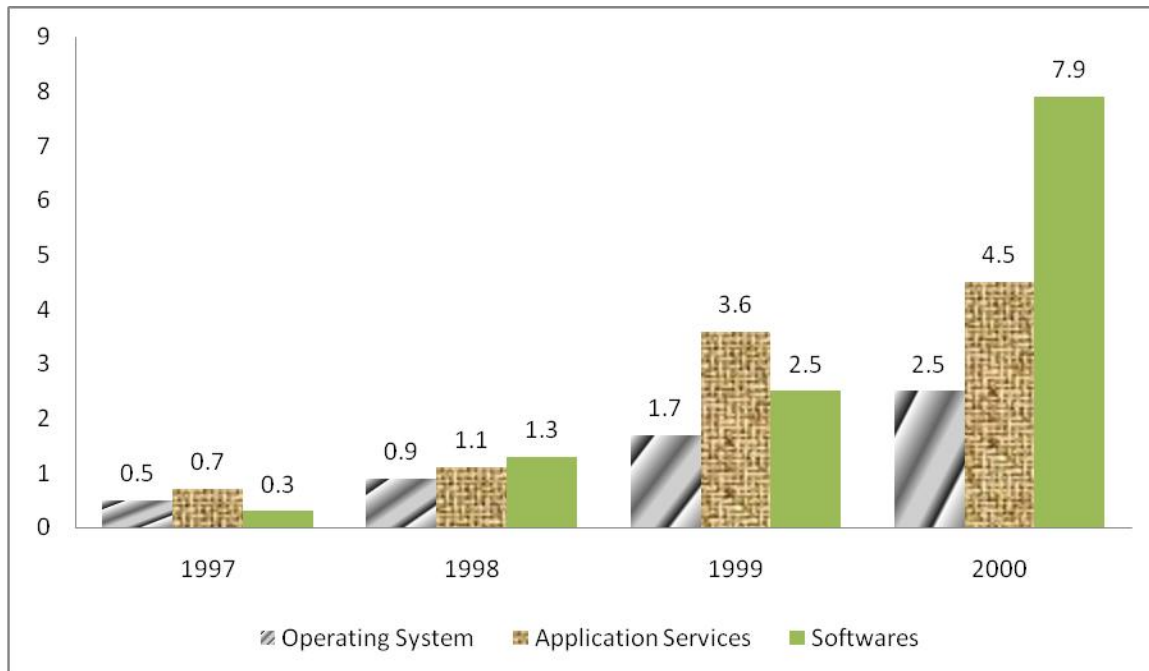
71. What percent are the total revenues collected by Microsoft in 1999 to the total revenue collected in 1997?
    (a) 520%
    (b) 380%
    (c) 480%
    (d) 390%

72. The percent increase in revenues of software in 2000 with respect to operating system of same year is equal to which of the following?
    (a) 216%
    (b) 94%
    (c) 118%
    (d) none of these

73. The increase in revenues from application services in 1999 with respect to 1998 is what approx percent of the increase in revenue from operating systems in 2000 with respect to 1999?
    (a) 250%

(b) 300%
(c) 400%
(d) 200%

74. What is the difference of the average revenue collected from software in these years and the average revenue collection from application / services of Microsoft in these years?
(a) $42.5 milion
(b) $525 million
(c) $ 725 milion
(d) none of these

75. Which of the following is true?
(a) In 1998 revenue collected from applications increased by 226.27 % with respect to previous year.
(b) The average revenues collected from operating system during these years is $5.7 billion.
(c) The revenues collected from software in 1999 are more than 3 times of revenue collected in 1998.
(d) None of these

Directions (Q.76-80): Study the chart and answer the question: the chart shows the amount spent by a country on various sports during 1998-99.
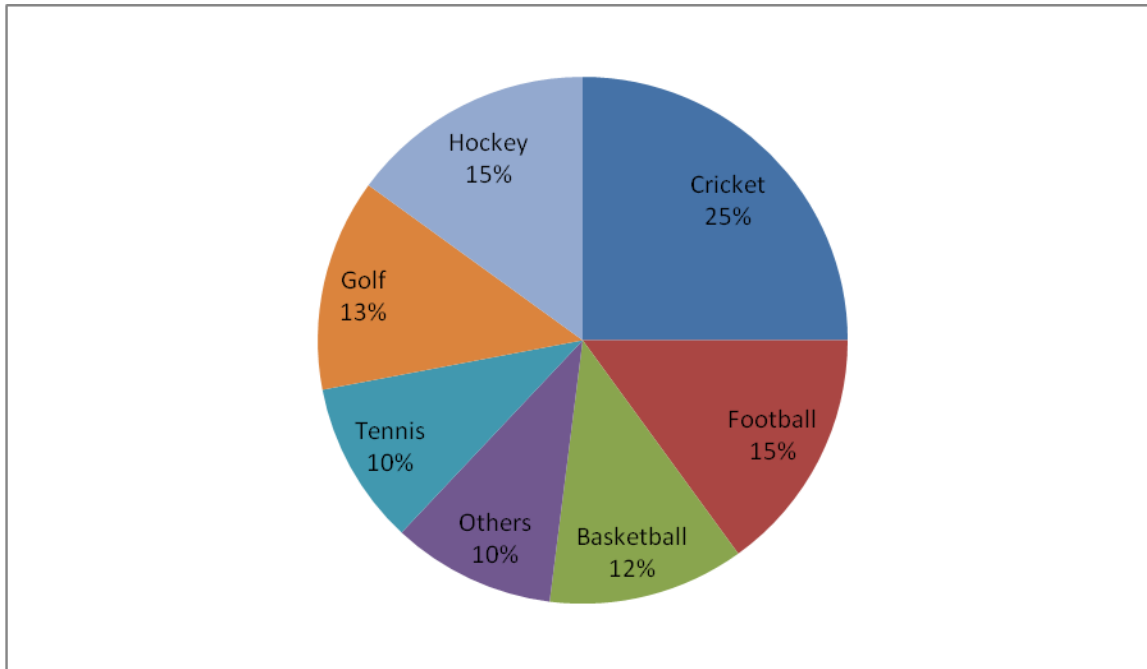
76. The ratio of total amount spent on cricket to that of tennis is:
(a) 5:2
(b) 3:5
(c) 2:5
(d) 10:1

77. How much amount was spent on basketball if the total amount spent on sports dring this year was 12000000?
    (a) Rs. 3000000
    (b) Rs. 1440000
    (c) data inadequate
    (d) none of these

78. Which of the following game is most popular?
    (a) Tennis
    (b) Cricket
    (c) Hockey
    (d) basketball

79. How much more amount was spent on football with respect to tennis and golf?
    (a) Rs 12 lakh
    (b) Rs 15 lakhs
    (c) Rs 3 lakhs
    (d) Data inadequate

80. If Rs 30000 is spent on cricket then this amount is how many times of golf and tennis together?
    (a) 2

    (b) $\frac{25}{2}$

    (c) $\times 1$
    (d) none of these

Directions (Q.81-85): following table shows the marks obtained by 5 candidates in 5 different subjects out of 100 marks. Study the table and answer the question:

Candidate→ Subject↓	A	B	C	D	E
History	75	50	60	60	75
Economics	55	70	60	70	70
Maths	90	50	80	50	60
Sociology	70	55	70	60	80
Geology	90	65	60	50	60

81. Highest marks in maximum subjects are secured by which candidate?
    (a) A
    (b) E
    (c) B
    (d) D

82. Marks obtained by C in maths are what percent more / less than the marks obtained by E in history?
    (a) 6% (less)
    (b) 5.50% (more)
    (c) 6.25 % (more)
    (d) none of these

83. Average marks obtained by different candidates are highest in which subject?
    (a) Economics
    (b) History
    (c) Maths
    (d) Sociology

84. What is the ratio of marks obtained by C in history and Maths?
    (a) 5:2
    (b) 3:4
    (c) 4:5
    (d) 2:1

85. What is the difference between highest and lowest average marks obtained by different candidates?
    (a) 18
    (b) 17.8
    (c) 6.6
    (d) none of these

Direction (Q.86-90): following graph shows the net percentage profit of a company study the graph and answer the question
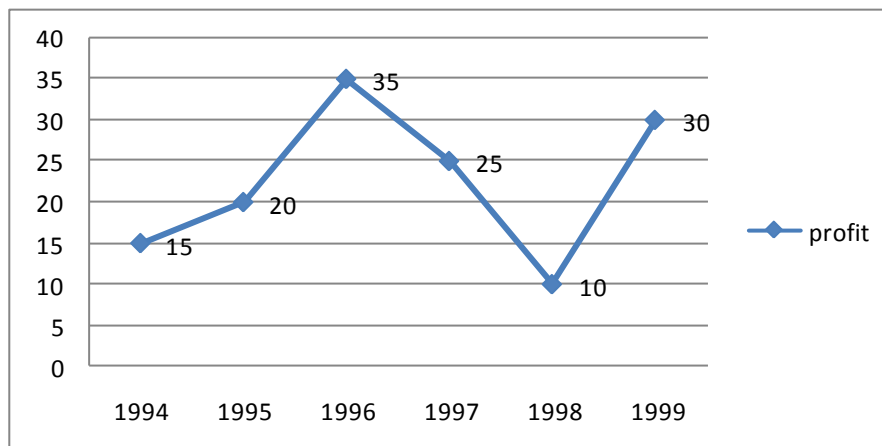
86. What will be the income of a company in 1994 if its expenditure is Rs 25 lakhs in the same year?
    (a) Rs 32.50 lakhs
    (b) Rs 28.75 lakhs

(c) Rs 60 lakhs

(d) Data inadequate

87. If the income of company in 1999 is Rs 66 lakhs then what is the expenditure in the same year?

   (a) 50.76 lakh

   (b) 42 lakh

   (c) 15 lakh

   (d) none of these

88. What is the expenditure in 1995 if the total profit in 1995 is Rs 5 lakh?

   (a) 30 lakh

   (b) 16 lakh

   (c) 45 lakh

   (d) Data inadequate

89. What is the ratio of quantities obtained by difference of the average of % profits from highest and lowest profits?

   (a) 12: 11

   (b) 3:5

   (c) 1:1

   (d) none of these

90. If the expenditure in 1998 is Rs 28 lakh and income in 1996 is Rs 28 lakh then find out the difference of the expenditure of these two years?

   (a) Rs 3 lakh

   (b) Rs 30 lakh

   (c) Data inadequate

   (d) none of these

Directions (Q.91-95): study the bar diagram and answer the question.

Support price of agriculture goods (Rs/ Quintal)
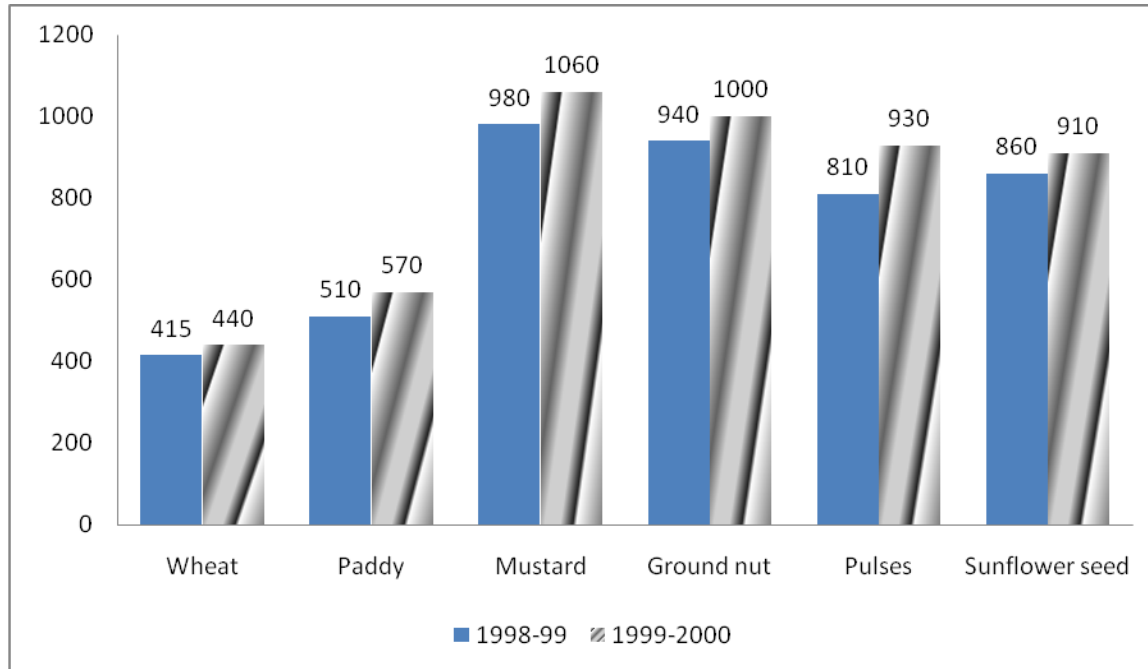
91. Which of the following agriculture good are support price increases by 6.4 % in 1999-2000?
    (a) Paddy
    (b) Mustard
    (c) Wheat
    (d) none of these

92. Percent increase in the support price of which of the following agriculture goods is minimum?
    (a) Pulses
    (b) Mustard
    (c) Sunflower seed
    (d) Groundnut

93. How much more / less is the support price of groundnut than that of mustard in 1998-2000?
    (a) Rs 70 more
    (b) Rs 50 less
    (c) Rs 45 less
    (d) Rs 50 more

94. The average percentage increase in the support price of wheat and paddy together is?
    (a) 8.89%
    (b) 7.27%
    (c) 9.40%
    (d) 6.63%

95. The increase in support price of mustard is what percent of the increase in support price of pulses?
    (a) 49.62%

(b) 50.44%
(c) 44.51%
(d) 66.66%

Directions (96-100): following chart shows the sport club spends Rs 60000 per week in coaching on different sports as shown. Study the graph and answer the questions:
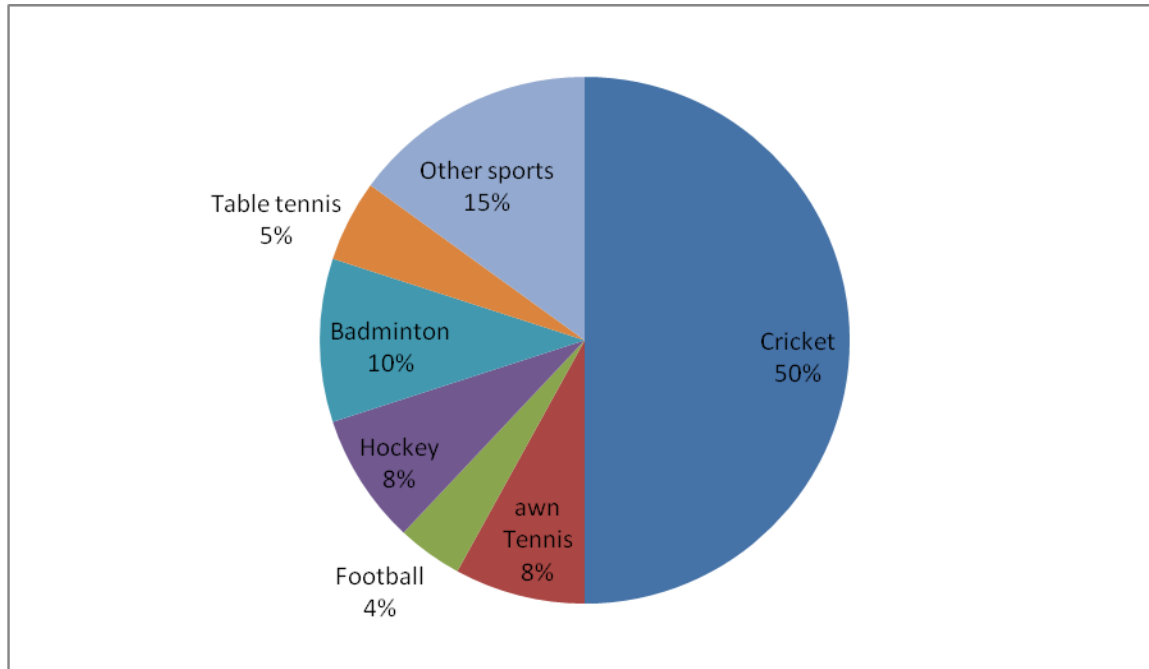
96. What is the coaching cost ratio of badminton to football?
   (a) 2:5
   (b) 5:2
   (c) 2:1
   (d) 1:2

97. The difference of the coaching cost of other sports and table tennis is?
   (a) Rs 6000
   (b) Rs 7000
   (c) Rs 2000
   (d) none of these

98. Coaching cost on lawn tennis and table tennis if taken together is equivalent to what percent of that of cricket?
   (a) 26%
   (b) 19.68%
   (c) 13.33%
   (d) none of these

99. What approx times the average coaching cost on cricket, hockey and football is to that of average coaching cost of rest of the sports?
(a) 0.3
(b) 2
(c) 0.5
(d) 2.5

100. What times is the average cost of football and hockey to that of badminton?
(a) 2
(b) 4
(c) 1
(d) 0.6

Directions (101-105): study the table and answer the question.

For each correct answer 5 marks is awarded and for each wrong answer 2 marks is reduced in an objective exam. In each paper there are 100 questions.

Sub	Mohit		Vivek		RaJesh		Neeru		Lata		Sumit	
	A	W	A	W	A	W	A	W	A	W	A	W
Hist	80	10	75	6	77	7	82	5	73	1	70	2
Pol. Sc.	82	7	8	12	79	8	65	0	95	15	76	4
Geog	65	3	70	4	71	7	68	5	45	2	69	5
Eco	92	12	90	7	86	2	91	7	82	7	87	7

A = Attempted   W= wrong

101. The highest marks in history was secured by which student?
(a) Neeru
(b) Sumit
(c) Rajesh
(d) Vivek

102. Who secured the lowest marks?
(a) Sumit
(b) Lata
(c) Vivek
(d) Rajesh

103. The average marks obtained by sumit in all subjects are?
(a) 1516
(b) 545
(c) 346
(d) none of these

104. Marks obtained by Mohit are what percent of that of Neeru in pol. Sc. And eco together?
    (a) 55.67%
    (b) 101.64%
    (c) 90.92%
    (d) none of these

105. What is the ratio of marks reduced of Rajesh to that of Sumit?
    (a) 17:20
    (b) 29:24
    (c) 17:15
    (d) 4:3

Directions (Q.106-110): following graph shows the movements of BSE and NSE indices. Study the graph and answer the questions.

	5	8	9	10	11	12	15	16	17	18	19
BSE	4600	4200	4500	4350	4250	4100	4150	4200	4200	4200	4100
NSE	1400	1300	1350	1320	1300	1250	1280	1300	1290	1300	1260
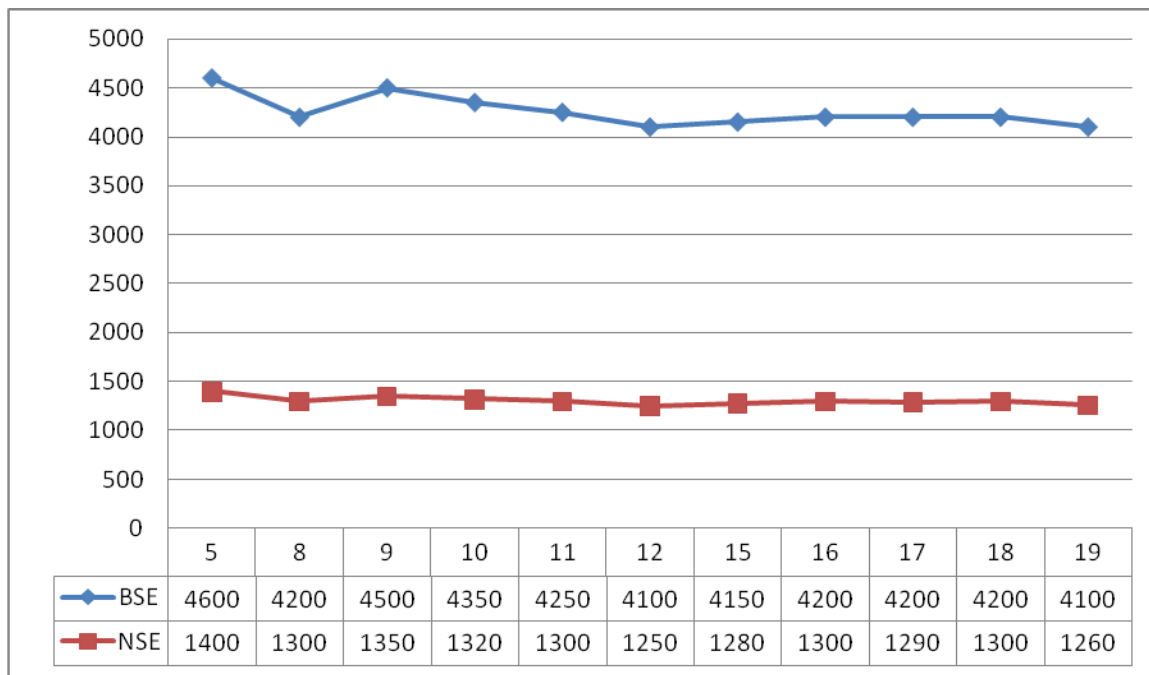
106. What is the ratio of movement of BSE and NSE indices on 17th May
    (a) 3:4
    (b) 1:1
    (c) 140:43
    (d) none of these

107. What is the difference between the difference of highest and least index of BSE and that of NSE?
    (a) 450
    (b) 720
    (c) 120

(d) none of these

108. The approx average movement of NSE index is?
(a) 4350
(b) 1305
(c) 1377
(d) 1659

109. The BSE index was least on which date?
(a) 19
(b) 17
(c) 10
(d) none of these

110. The index of BSE on 5th May is approx how many times to that of NSE index on 15th May?
(a) 0.1
(b) 5
(c) 2
(d) 4

Directions (Q.111-115): study the graph and answer the question.
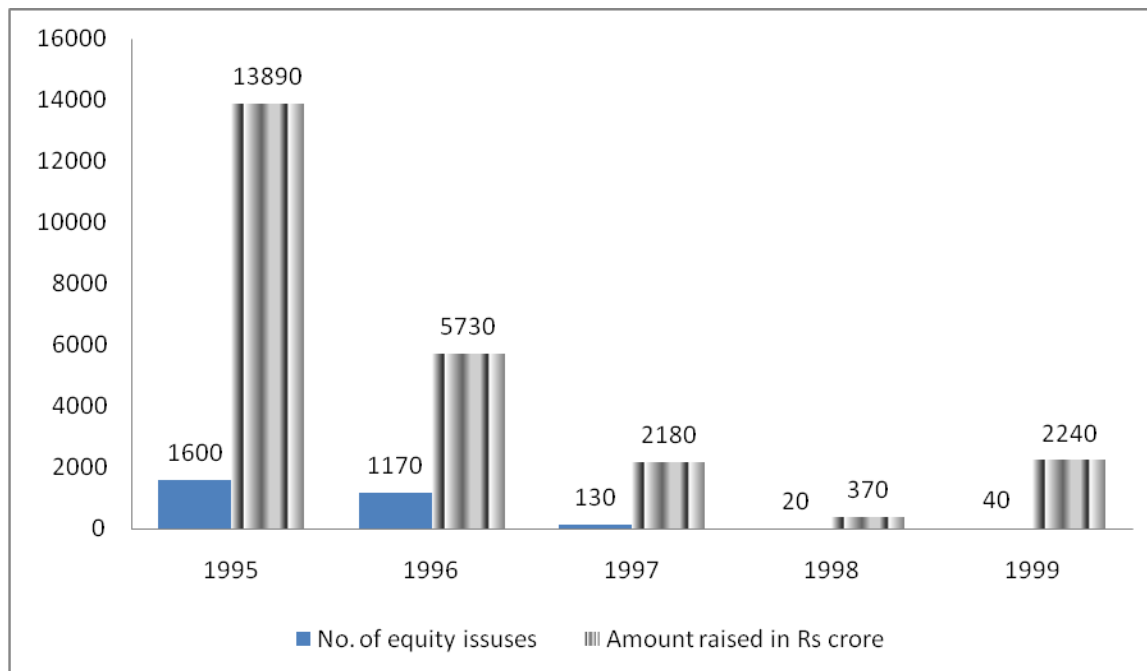
111. The value of per equity issue was highest in which year?
(a) 1999
(b) 1996
(c) 1998

(d) 1997

112.   What is the average value per equity?
        (a) Rs 559 crore
        (b) Rs 110.03 crore
        (c) Rs 20.966 crore
        (d) Rs 8.73 crore
113.   Which year's number of equity issue is square of number of equity issue of 1999?
        (a) 1996
        (b) 1995
        (c) 1997
        (d) none of these
114.   The amount raised in 1998 is what percent of the amount raised in 1995?
        (a) 25.2
        (b) 0.14
        (c) 1.21
        (d) 2.66
115.   The value of per equity issue is least in which year?
        (a) 1997
        (b) 1996
        (c) 1999
        (d) 1998

Directions (Q.116-120): study the graph and answer the following question. The pie chart A indicates the students of different humanities faculty and chart B indicates that of science faculty:

A

Geography 19%

Economics 30%

Pol. Science 21%

History 30%

B

Physics 24%

Maths 30%

Biology 28%

Chemistry 18%
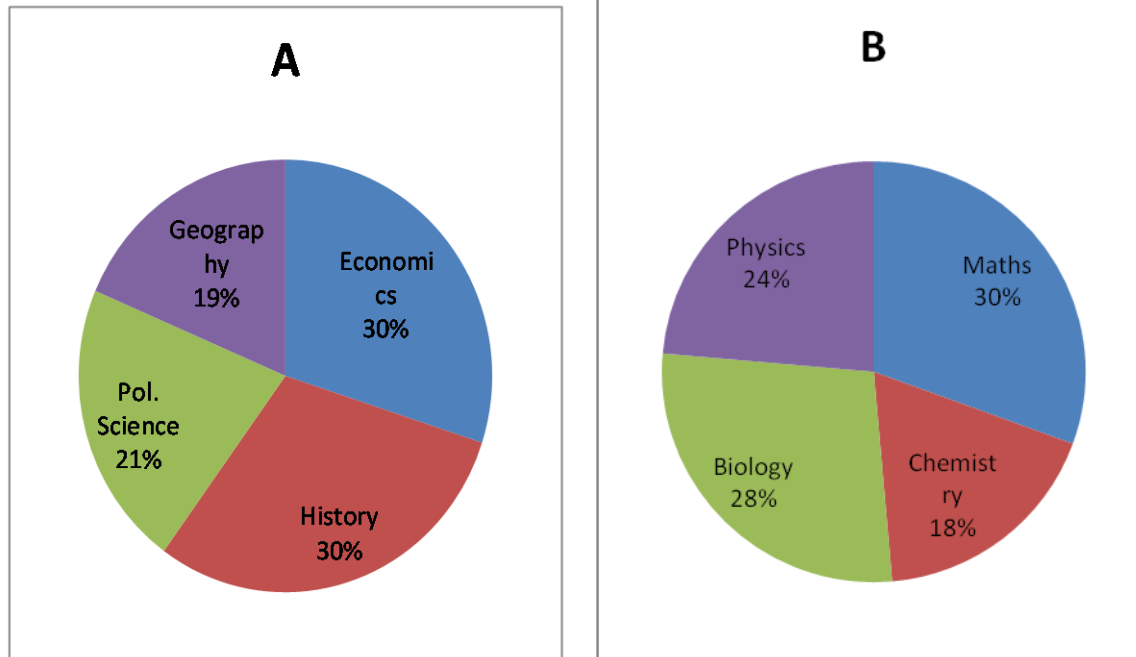
116. What is the ratio of students of geography and that of history if the total no. of students in humanities is 900?
    (a) 310:815
    (b) 810:305
    (c) 13:21
    (d) none of these

117. If the total no. of students in science faculty is 150, then what is approx difference between the students of maths and biology?
    (a) 8
    (b) 4
    (c) 10
    (d) 58

118. No. of students in chemistry is what approx times of economics, If the total no. of humanities students is 550 and that of science is 450?
    (a) 0.5
    (b) 1.2
    (c) 0.76
    (d) 1.7

119. What is the difference between the no. of students in pol. Sc. And that in physics?
    (a) 30
    (b) 319
    (c) Data inadequate
    (d) none of these

120. In question 118 no. of students in Maths is what percent of students of geography?
   (a) 200%
   (b) 135.56%
   (c) 25.71%
   (d) 51.84%

Directions (Q.121-125): following table shows the road distance of major cities (in km). On the basis of table answer the question given below:

	Ahmedabad	Banglore	Calcutta	Chennai	Delhi	Hyderabad	Bhubaneshwar
Kanpur	1170	1850	1010	2050	480	1250	1280
Lucknow	1130	1900	960	2040	570	1330	1270
Madurai	1920	430	2110	480	2540	1000	1690
Mumbai	550	1030	2080	1370	1410	740	1690
Patna	1650	2070	620	2100	1090	1470	860
Nagpur	1000	1030	1220	1170	990	470	830

121. How much km man travels in his whole journey if he starts from Hyderabad and goes to Calcutta via Mumbai and then comes Patna?
   (a) 3440
   (b) 3206
   (c) 2885
   (d) 3180

122. The longest route between Bangalore and Lucknow is?
   (a) Bangalore – Mumbai – Hyderabad – Lucknow
   (b) Bangalore- Nagpur – Bhubaneshwar – Lucknow
   (c) Bangalore – Madurai – Hyderabad – Lucknow
   (d) None of these

123. Which one is the farthest from both Patna and Lucknow among the following cities?
   (a) Bangalore
   (b) Ahmedabad
   (c) Chennai
   (d) Calcutta

124. How many days a man travelled if he travels 450 km per day from Mumbai to Banglore and than Bhubaneswar?
   (a) 10
   (b) 6
   (c) 8
   (d) 15

125. Which of the following is the shortest route if one wishes to go from Kanpur to Mumbai?
   (a) Via Bangalore

(b) Via Calcutta
(c) Via Delhi
(d) Via Ahmedabad

Directions (Q.126-130): following graph shows the campus selection of MBA students from IIMs and DU in various MNCs. Answer the question on the basis of graph:
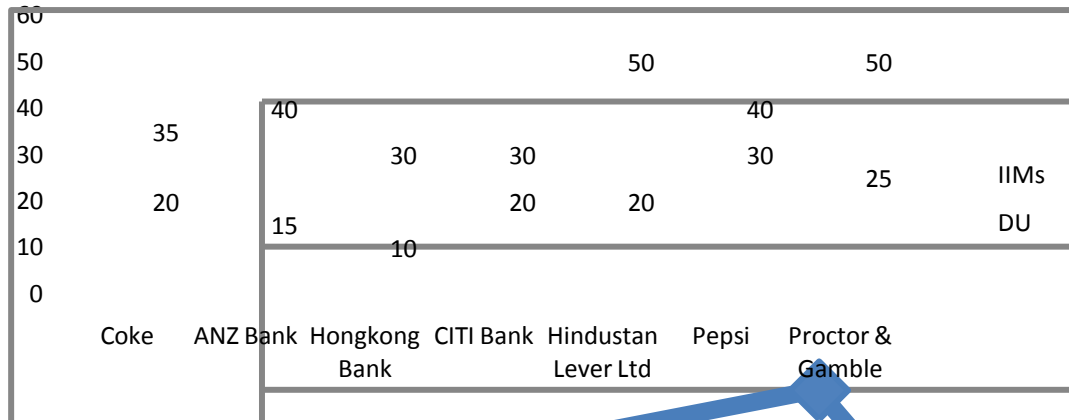
126. What percent of total MBA students from IIMs have joined Banks?
(a) 28.57%
(b) 30.61%
(c) 30.91%
(d) 30.45%

127. The ratio of selected tp the total students of DU is more than the ratio of the selected to the   students of IIMs in how many banks/companies /
(a) 4
(b) 5
(c) 3
(d) 1

128. What percent more or less is the percentage of IIMs students joining Pepsi and Coke together to that of percentage of DU students joining Pepsi and Coke?
(a) 0.56% more
(b) 0.138% less
(c) 3% less
(d) 13.5% more

129. DU students joining Banks and Hindustan lever is what percent of the students joining Pepsi, Coke and Proctor and Gamble?
(a) 126.60%
(b) 11.5%
(c) 107%
(d) 82.9%

130. Out of the total students what percent of students have joined Proctor and Gamble?
   (a) 17%
   (b) 20.45%
   (c) 14.5%
   (d) 18.07%

Directions (Q.131-135): the following graph shows the demand and production of colour TVs of five companies in Feb 2000. On the basis of graph answer the question.
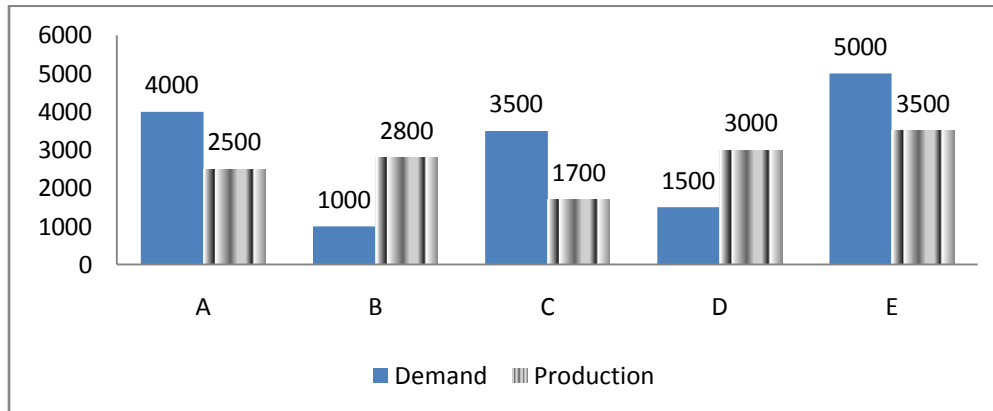
131. If company C desires to meet the demand by purchasing surplus TV sets from a single company, which of the following companies can meet the need adequately?
   (a) B
   (b) C
   (c) E
   (d) none of these

132. The ratio of average demand and average production of five companies taken together is?
   (a) 131:228
   (b) 31:14
   (c) 10:9
   (d) none of these

133. The demand of company B is approx what percent of the demand of company C?
   (a) 32%
   (b) 93%
   (c) 62%
   (d) 29%

134. The production of all companies is approx what percent of the demand of all the companies?
   (a) 9%
   (b) 90%
   (c) 110%

(d) 12%

135. The highest ratio of demand and production is of which company?
    (a) D
    (b) B
    (c) A
    (d) C

Direction (Q.136-140): study the graph and answer the question.

A tehsil showing employment data (total population = 36000)

Literate empoyee, 90

Literate unempoyee, 100

Iliterate employee, 120

Illiterate unempoyed, 50
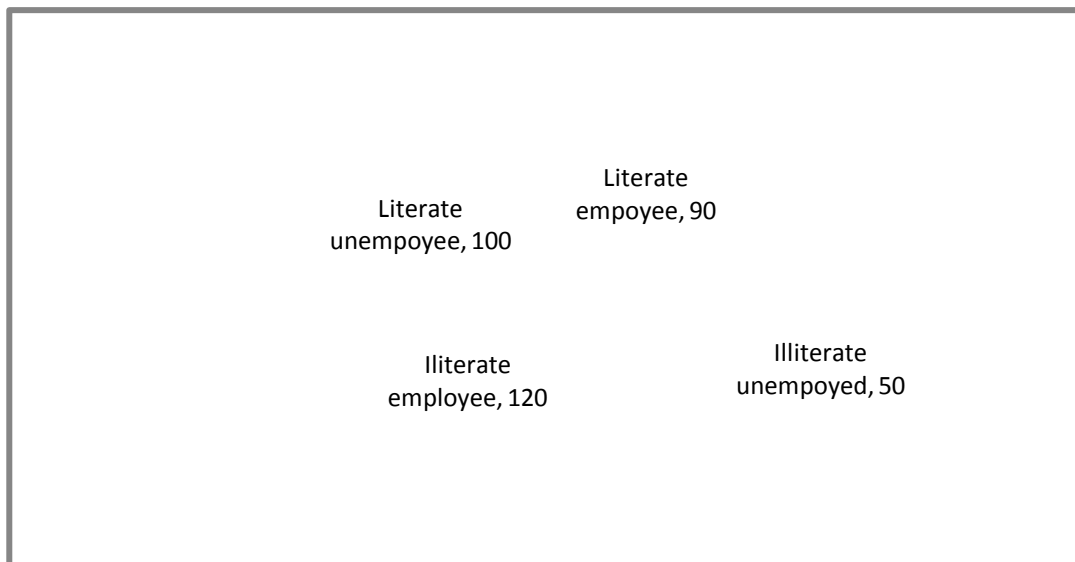
L-employed		Literate unemployed		Illiterate-employed		Illiterate-unemployed	
Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
80%	20%	30%	70%	80%	20%	20%	80%

136. The ratio of urban literate employed to the urban illiterate unemployed is?
    (a) 1: 9
    (b) 36:5
    (c) 5:36
    (d) 1:3

137. The no. of urban literate employed is what times of rural literate employed?
    (a) 4
    (b) 3
    (c) 1.25
    (d) none of these

138. What is the ratio of urban population to that of rural population?
    (a) 53:67

(b) 4:9
(c) 26:19
(d) none of these

139. The population is highest in which of the following?
(a) Urban illiterate unemployed
(b) Rural literate unemployed
(c) Urban literate employed
(d) None of these

140. What percent is the urban literate unemployed is to the rural illiterate employed?
(a) 125%
(b) 25%
(c) 80%
(d) 71.6%

ANSWER

| 1	(c)	21	(c)	41	(c)	61	(d)	81	(b)	101	(a)	121	(a)
2	(d)	22	(c)	42	(b)	62	(d)	82	(c)	102	(b)	122	(b)
3	(b)	23	(b)	43	(c)	63	(b)	83	(d)	103	(c)	123	(c)
4	(d)	24	(d)	44	(d)	64	(a)	84	(b)	104	(b)	124	(a)
5	(b)	25	(a)	45	(a)	65	(b)	85	(a)	105	(d)	125	(d)
6	(c)	26	(a)	46	(a)	66	(c)	86	(b)	106	(c)	126	(a)
7	(a)	27	(c)	47	(b)	67	(c)	87	(a)	107	(a)	127	(c)
8	(b)	28	(d)	48	(c)	68	(d)	88	(d)	108	(b)	128	(b)
9	(d)	29	(c)	49	(d)	69	(c)	89	(c)	109	(a)	129	(a)
10	(c)	30	(a)	50	(b)	70	(d)	90	(d)	110	(d)	130	(d)
11	(c)	31	(c)	51	(b)	71	(a)	91	(d)	111	(a)	131	(a)
12	(b)	32	(b)	52	(c)	72	(a)	92	(c)	112	(c)	132	(c)
13	(a)	33	(b)	53	(b)	73	(c)	93	(b)	113	(b)	133	(d)
14	(d)	34	(b)	54	(a)	74	(b)	94	(a)	114	(d)	134	(b)
15	(a)	35	(c)	55	(d)	75	(d)	95	(d)	115	(b)	135	(d)
16	(b)	36	(d)	56	(b)	76	(a)	96	(b)	116	(c)	136	(b)
17	(d)	37	(b)	57	(b)	77	(b)	97	(a)	117	(b)	137	(a)
18	(b)	38	(a)	58	(b)	78	(b)	98	(a)	118	(a)	138	(c)
19	(d)	39	(c)	59	(a)	79	(d)	99	(b)	119	(c)	139	(c)
20	(a)	40	(b)	60	(b)	80	(c)	100	(d)	120	(b)	140	(a)

CHAPTER 2: DATA SUFFICIENCY

INTRODUCTION:

Data sufficiency questions are associated more with quantitative ability. These questions require maximum clarity of understanding. In DS question we need to decide whether the data given is sufficient to answer the question or not.

Each problem consists of a question followed by two statement I and II. We have to determine whether the information given by the statements is sufficient to answer the question with this we should also rely on our knowledge of mathematics and ordinary facts. These are the five option generally provided in the question paper:

   (a) Statement I alone is sufficient to answer the question.
   (b) Statement II alone is sufficient to answer the question.
   (c) Either statement I or II alone is sufficient to answer the question.
   (d) Both the statement together are necessary to answer the question.
   (e) Neither statement I nor II is sufficient to answer the question

Flow chart for solving DS questions:
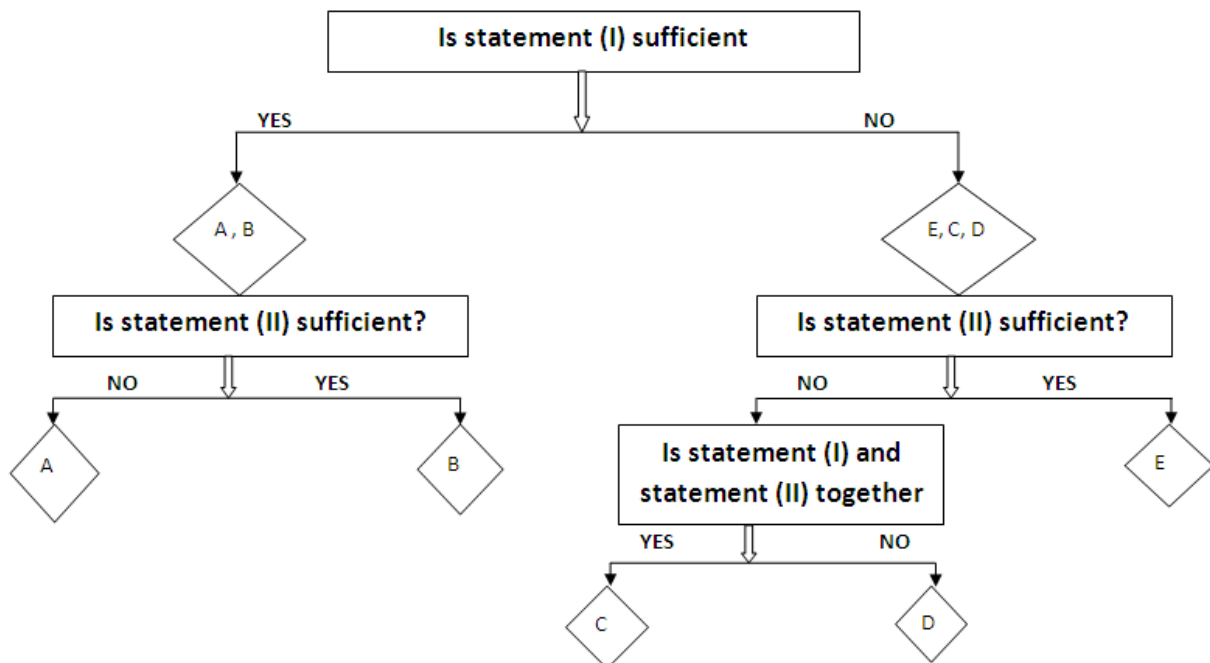
Tricks:

To solve DS questions we should go through the following tricks

1. The given data should provide the unique answer only, then it will be considered as valid.
2. But the unique answer does not mean that it cannot have two different answers from two different statements separately.
3. The statement which simply states a mathematics formula is not sufficient to answer the question.
4. The data is not sufficient if a statement only repeats the information given in the question.
5. Each statement should be treated as a separate statement. The statement I can give us something useful and then may be the same information is given in statement II with some variation, what we generally do is we dump the statement II thinking that we already have the information in statement I and we do not need the statement II. But there is also an option that either of the two statements alone can solve the question. So solve both the statement separately.
6. There is an option that either of the two statements alone can solve the question. Do not choose this option just because one statement is helpful. We positively need both the statement.
7. Do not forget to try both the statement together. In a big rush we often eliminate choice (a) because statement I does not work. Then we eliminate (b) as statement II does not work. And then immediately we mark the option that state that neither of the is sufficient. We forget that there is a choice that state both the statement together is necessary to solve the question.
8. As soon as we come to know that the data is sufficient to answer the question, stop. Do not try to solve these Ds problems till the end as the section is called data sufficiency not problem solving.

SOLVED EXAMPLES

Example1. The remainder when x is divided by 30 is?

I.   X is a multiple of 3.
II.   X is a multiple of 7

Solution: (e) Neither statement I and II a one nor taken together can give us the remainder as in this case remainder will vary with the value of x.

Example2. The average of 3 consecutive odd integers is?

I.   One of the integer is -1
II.   The sum of two of the integers is 4

Solution: (d) From statement I, we get

a-2	a	a+2
-1	1	3

-3	-1	1
-5	-3	-1

So we cannot find the average from statement I only.

Using only II we can say that the numbers are -1, 1-, 3 or 1, 3, 5

Using both the only possibility is -1, 1, 3 and hence the average can be find out

Example3. How many students appeared for the examination?

I.   The passed students are only 40%.
II.   The pass percentage would have been 42% if 10 more students passed the exam.

Solution: (d) Let the total number of student appeared in the exam be x

Statement I gives the information of passed student i.e 40%.

Statement II is also not complete alone.

If both the statement are combined together we get , $\frac{40x}{100} + 10 = \frac{42x}{100}$

$$\Rightarrow \frac{2x}{100} = 10 \Rightarrow x = 500$$

Hence x can be calculated.

Example 4. What is the profit percentage made by the shopkeeper?

I.   Selling price of 50 pens is Rs 60.
II.   Cost price is one third of the selling price.

Solution: (b) statement I do not tell us anything about cost price, hence it is not sufficient alone.

From statement II, CP=$\frac{1}{3}$ SP $(1000)^{11} \div$,

Now the profit percentage = $\frac{SP-CP}{CP} \times 100 = \frac{3CP-CP}{CP} \times 100 = 200\%$,

Hence statement II alone is sufficient to answer the question.

Example 5. Is 1000 the average score in the exam?

I.   The lowest exam score is 720 and highest score is 1330.
II.   Half of those who passed the exam score above 1000 and the other half sores below 1000.

Solution. (e) The highest and lowest scores do not tell us anything about other scores hence statement I is not sufficient to answer the question alone. Statement II is very tempting but if out of two student who give the exam one scores 1300 and the other scores 500. The average is not 1000. So statement II also is not sufficient alone. The two statements taken together also cannot give our answer. Hence neither of the statement are sufficient to give the answer is correct.

Directions(Q6-10): The following questions is followed by three statement A , B and C .You have to decide which statement is / are sufficient to answer the question and choose the choice given below accordingly:

Example6. The rate of simple interest at which Mohan has taken money from money lender is?

A.   Money Lender gives Rs20000 to Mohan and Shyam in the ratio 3:2.
B.   The difference of the interest returned by them after 2 yrs is Rs 1600.
C.   The interest paid by Mohan after 3 yrs is equal to interest paid by Shyam after 2 yrs.
(a)

Solution. (a) Let x and y be the rate of interest of Mohan and Shyam of one year.

From A $\Longrightarrow$ Mohan 's & Shyam 's money are Rs 12000 and Rs 8000 respectively.

From B $\Longrightarrow$ [12000$\times$ 2x – 8000 $\times$ 2 y]= 1600

From C $\Longrightarrow$ 12000 $\times$ 3x = 8000 $\times$ 2y

Hence all the three statement are required to solve the question

Example7. What is the age of Raju ?

A.   Father's age is six times of Raju's age.
B.   His brother is 30 years younger than his father.
C.   10 years ago the ratio of his father's and brother's age was 3:1
(a) Only B and C
(b) Only A and C
(c) Either A and C or B and C.
(d) A, B and C together.
(e) None of these.

Solution :(d) let the age of his brother be x

From B= his father = x+30

From A = raju's age = $\frac{x+30}{6}$

From C $\Rightarrow \frac{x+20}{x-10} = \frac{3}{1} \Rightarrow x + 20 = 3x - 30 \Rightarrow 2x = 50 \Rightarrow x = 25$

Raju's age = $\frac{25+30}{60} = \frac{55}{6} \approx 9\ yrs$

Hence A, B and C together are necessary.

Example8. In how many days can Ramu alone finish the entire work, if Ramu works for 8 days and eave the job?

  A. 6 days are taken by Ramu and Sohan to finish the work together.
  B. Sohan is twice as god as Ramu.
  C. It takes 12 days for Sohan to finish the remaining work.
    (a) Only A and B
    (b) Only B and C
    (c) Any two of them
    (d) A , B and C together
    (e) None of these

Solution: (c) Let Ramu alone can finish the work in x days

∴ Work done by Ramu in 8 days = $\frac{8}{x}$

∴ Remaning work = $\frac{x-8}{x}$

From A $\Rightarrow$ Ramu +Sohan = 6 days

From B $\Rightarrow$ Sohan: Ramu = 2:1

From C $\Rightarrow$ Sohan finished $\frac{x-8}{x}$ in 12 days

From A and C $\Rightarrow \frac{\frac{12x}{x-8} \times x}{\frac{12x}{x-8}+x} = 6 \Rightarrow 12\ x^2 = 24x + 6x^2 \Rightarrow 6x = 24 \Rightarrow x = 4$ days

From B $\Rightarrow$ we get that Sohan alone can finish the work in $\frac{x}{2}$ days

From B and C $\Rightarrow \frac{12x}{x-8} = \frac{x}{2} \Rightarrow 24x = x^2 - 8x \Rightarrow x = 36$ days

From A and B $\Longrightarrow \dfrac{\frac{x}{2} \times x}{\frac{x}{2} + x} = 6 \Longrightarrow$ x= 18 days.

Hence any two of them can find the answer.

Example9. The ratio of length and breadth of a rectangle should be?

   A. Rectangle's area is 50 times the breadth of a rectangle.
   B. 160m is the perimeter of a rectangle.
   C. 240 square m is the area of the rectangle.
   (a) Only A
   (b) Only A and B
   (c) Only B and C
   (d) Any two of them
   (e) A , B and C together

   (f) **Solution (d):** From A$\Longrightarrow$LB = 50 B $\Longrightarrow$ L= 50

   (g) From B $\Longrightarrow$ 2(L+B) $\Longrightarrow$ 160 $\Longrightarrow$ L+B= 80

   (h) From C $\Longrightarrow$ LB = 240 m^2
   (i) With the help of any two L: B can be find out.

Example10. The height of a right angled triangle is?

   A. 16 cm is the perimeter of a rectangle.
   B. 12 square cm is the area of a triangle.
   C. The breadth of a rectangle is equal to the base of the triangle and the area of the triangle is equal to area of rectangle.
   (a) Only A
   (b) Only B
   (c) A , B and C together
   (d) Any two of them
   (e) None of these

Solution: (c) From A $\Longrightarrow$ l+b = 16/2= 8 cm

From B $\Longrightarrow \dfrac{1}{2} \times$ b$\times$ h = 12 cm^2

From C $\Longrightarrow$ l $\times$ b = 12

From A and C $\Longrightarrow$ x = either 6 or 2 and b = either 2 or 6 .

From B if b= 2 $\Rightarrow \frac{1}{2} \times b \times h = 12\ cm^2 \Rightarrow \frac{1}{2} \times 2 \times h = 12 cm^2 \Rightarrow$ h= 14 cm

From B if b= 6 $\Rightarrow \frac{1}{2} \times b \times h = 12\ cm^2 \Rightarrow \frac{1}{2} \times 6 \times h = 12 cm^2 \Rightarrow$ h= 4 cm

Hence A, B and C together are necessary.

EXERCISE

Directions (1-5): the following questions are followed by two statement I and II. You have to decide which statement is / are sufficient to answer the question and choose the choice given below accordingly:

   (a) Statement I alone is sufficient to answer the question.
   (b) Statement II alone is sufficient to answer the question.
   (c) Either statement I or II alone is sufficient to answer the question.
   (d) Both the statement together are necessary to answer the question.
   (e) Neither statement I nor II is sufficient to answer the question.

1. What are the value of integers A and B where A<B?
   I.   The product of A and B is 8.
   II.   A and B are both negative.

2. If x<y<z are even integers, are they consecutive even integers?
   I.   Z-x = 4
   II.   Y is the average of x and z

3. Ram made 10 deposits to his saving account. Then what was the total deposit?
   I. $90 was the average of the deposits.
   II. $120 was the largest deposit and $50 was the smallest deposit.

4. In a class 70 kg is the average weight of students. Then the number of students in the class is?
   I.   80 kg and 60 kg are the heaviest and lightest members of the class.
   II.   If we remove the heaviest and lightest members from the class the average weight of the student does not change.

5. Find out the value of A and B?
   I.   5:1 is the ratio of A and B and A is positive.
   II.   The ratio of 3A and B is 20:6 and B is positive.

Directions (Q.6-9): The following questions is followed by three statement A , B and C .You have to decide which statement is / are sufficient to answer the question and choose the choice given below accordingly:

(a) A ,B and C together are necessary.
(b) A , B and C even together is not sufficient..
(c) Only A & B together are sufficient.
(d) Either A & B together or B & C together or C & A together are sufficient..
(e) Either A & B together or B & C together are sufficient.

6. The sum of two pairs of number is 130 each then what is the sum of smaller number?
   A. The difference of larger numbers is equal to difference of smaller numbers.
   B. Four times the difference between the numbers of one pair is two less than the difference between the numbers of other pair.
   C. The difference between the smaller of one and larger of other is equal to the difference of larger of first and smaller of second.

7. What is the age of elder?
   A. The sum of ages of two is 60 yrs.

   B. Four years ago the inverse of their ages are in ratio $\sqrt{?}$.
   C. After 3 yrs younger's age is six years less then elders.

8. The volume of the smallest spheres is?

   A. By melting the sphere of volume $384\frac{5}{8}$ cubic cm three spheres are made.
   B. The radii of two spheres are 4 cm and 2 cm.
   C. The sum of diameters of 3 spheres is 24.

9. The share of P in profit earned by P, Q and R together is?
   A. 30% profit is earned by the end of two years.
   B. Amount invested by Q and R together is equal to that of P.
   C. P, Q and R invested the total amount of Rs 40000 for a period 2 years.

10. 8 men and 10 women can do a work in 15 days. In how many days 10 men and 4 women do the same work?
    A. 15 men and 30 women can do the same work in 5 days.
    B. Work done by 3 men is equal to 4 women.
    C. 8 mens can do one third of the same work in 25 days.

Directions (Q.11-15): the following questions are followed by two statement I and II. You have to decide which statement is / are sufficient to answer the question and choose the choice given below accordingly:
   (a) Statement I alone is sufficient to answer the question.
   (b) Statement II alone is sufficient to answer the question.
   (c) Either statement I or II alone is sufficient to answer the question.
   (d) Both the statement together are necessary to answer the question.
   (e) Neither statement I nor II is sufficient to answer the question

11. If some of the students and teachers put up a tent then how many hours will it take?
    I.   There are 8 boys and 5 teachers.

II.   A boy can put it up in 5 hrs and a teacher alone can do it in 8 hr.

12. Certain job is finished by Shyam in how many days?
    I.   Shyam is thrice as efficient as mohan.
    II.   Mohan is one third efficient as Shyam and can finish the job in 20 days

13. Is g greater than h?
    I.   (g+4) is greater than (h+3)
    II.   The square of g is greater than the square of h.

14. How many books are there on the self?
    I.   If 5 more books are placed on the self, the total number of books on the self will be more than 30.
    II.   If 6 books are removed, the shelf will contain less than 19 books.

15. What is the salary of A, if he saves 40 % of his income after tax?
    I.   Rs 60000 are tax exempt.
    II.   Tax incurred by A is 10% of his income.
          {Hint: nothing about expenditure and the rate of tax is mentioned}

Direction (16-20): The following questions is followed by three statement A , B and C .You have to decide which statement is / are sufficient to answer the question and choose the choice given below accordingly:
   (a) A, B and C together are necessary.
   (b) Either A & B together or A & C together are necessary.
   (c) Either A or B or C is sufficient.
   (d) Only A & B together are sufficient.
   (e) None of these is sufficient.

16. The middle number out of three numbers is?
    A.   Sum of the three numbers is 190.
    B.   The ratio of 2nd and 3rd number is 3:4 and that of 1st and 2nd is 4:5.
    C.   Middle number is 25% greater than the 1st number and lesser by the same percent from 3rd number.

17. In how many days will x y and z together will finish the work?
    A.   The work done by x is one third as much as done by y and y does one third as much as of x and z together does in a day.
    B.   It takes 75 days for y to complete the whole work.
    C.   Together x and z do the whole work in 30 days.

18. Who will get maximum money?
    A.   Shyam divides two sums of his money among his three sons Ram, Mohan and Raju.
    B.   The 1st sum divides in the ratio 5:3:2 and second sum in ratio 3:4:2 and second sum is two third of the 1st sum.
    C.   The 1st sum is Rs 50000.

19. What will be the time taken by two trains to cross 600m long platform?
    A. Their speeds are 80km/h and 85 km/h and they were running in opposite direction.
    B. The lengths of the train are 200 m and 220.
    C. The train will cross each other in 15 seconds.

20. What is the amount?
    A. The CI is Rs 8.5 more than its SI in two years, if annual rate is 8%.
    B. The Si of the amount in 3 yrs is Rs 900 , if annual rate is 10%
    C. The CI of the amount in 2 yrs is Rs 520 if annual rate is 9%.

Directions (21-25): The following questions is followed by three statement A , B and C .You have to decide which statement is / are sufficient to answer the question and choose the choice given below accordingly:
    (a) Only A & B are sufficient.
    (b) Either A or C is sufficient.
    (c) Either A & B together or A & C together are necessary.
    (d) A ,B and C together are necessary
    (e) None of these is sufficient.

21. To complete the remaining work in 8/3 days, after how many days 6 men join the work?
    A. 6 men started working together.
    B. It takes 9 days to complete the work by 10men.
    C. It takes 4 days to do the work by 14 men.

22. The second pipe will fill the tank in how much time?
    A. It takes 10 hrs for both the tanks to fill the pipe together.
    B. One pipe takes 6 hrs less to fill the tank than the other
    C. The tank is filled in 7 hrs if a third pipe can fill the tank I 16 hrs if it is open with the two pipe simultaneously.

23. If the population of males and females increases with constant rate in a city then what will be there ratio after 3 yrs?
    A. The ratio of population of males and females is 5:4 in a city at present.
    B. The population of females increases by 5% in one year and that of males increases by 10%.
    C. The ratio of population of males and females becomes 65:42 after one year.

24. What is the amount of money?
    A. It becomes 6000 after some period at the rate of 4% of CI and it becomes Rs 4500 at the rate of 2% of CI.
    B. At the rate of 13/2 % of S.I. the money doubles in 10 yrs.
    C. The money becomes Rs 9000 at the rate of 36% of C.I in 2 yrs.

25. Who is the youngest among the three students Ram, Shyam and Harish?
    A. The sum of their ages is 60 yrs.
    B. After 3 yrs Shyam will be as old as Harish at present.

C. 7 years ago the sum of the ages of Shyam and Ram was 24.

Directions (26-30): The following questions is followed by three statement A , B and C .You have to decide which statement is / are sufficient to answer the question and choose the choice given below accordingly:

26. What time will a train take to reach Delhi from Patna?
    A. A 200 m long train crosses a pole in 10 seconds.
    B. It takes 5 seconds o crosses another train.
    C. The train leaves Patna at 10:30 for Delhi whose distance is 1200 km.
    (a) Only A
    (b) Only B
    (c) Only C
    (d) A and C only
    (e) A, B and C together are necessary.

27. The average wages of 30 workers is?
    A. The supervisor salary is 80% of the average wages of 30 workers.
    B. 10000 is the paid salary of supervisor.
    C. The supervisor's salary and total wages paid to 30 workers is Rs 20000.
    (a) Only A
    (b) Only B
    (c) Only C
    (d) Either A or C
    (e) A, B and C together are necessary.

28. What will be the difference of ages of son and father after 10 years ?
    A. The ratio of father's age to the son's age after 12 years is 5:3.
    B. Father's present age is thrice the age of son present age.
    C. The difference between the father's age and son' age 10 years ago was equal to son's present age.
    (a) Only A or B
    (b) Only B or C
    (c) Only C or A
    (d) Only C
    (e) A or B or C only

29. The length of the plot is?
    A. The breadth of the plot becomes 10 less than the length if the breadth is increased by its twice.
    B. The length is 3 times the breadth.
    C. A ground of 300 sq meters occupies on fourth of the total area of plot.
    (a) Only A
    (b) Only B
    (c) Only C

(d) Either A or B or C
(e) None of these

30. What is the length of second train if a train crosses another train in 40 seconds?
   A. Speed of first train is 50km/h.
   B. 115 m is the length of first train.
   C. Speed of first train is 6:5of the second train
      (a) Only A and B
      (b) Only B and C
      (c) A, B and C together
      (d) Only A and C
      (e) Data inadequate

{Hint: Directions of trains are not known}

ANSWER:

1	(d)	11	(d)	21	(c)
2	(a)	12	(b)	22	(a)
3	(a)	13	(b)	23	(c)
4	(e)	14	(d)	24	(b)
5	(b)	15	(e)	25	(d)
6	(b)	16	(b)	26	(b)
7	(d)	17	(b)	27	(d)
8	(e)	18	(a)	28	(b)
9	(a)	19	(d)	29	(d)
10	(d)	20	(c)	30	(e)

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