

CATapult Courseware

Module 5

CATapult Courseware **Module 5**

Published by IMS Learning Resources Pvt. Ltd. in the Year 2020

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PREFACE

About this book

While the first four CATapult Modules are more than sufficient for you to build on conceptual clarity for the CAT, CATapult Courseware Module 5 will help you build the requisite conceptual clarity on areas and topics pertaining to other admission tests like XAT, IIFT, SNAP, CMAT, etc. such as Decision Making, specific topics in Logical Reasoning (sequential input-output, symbol based logic, etc.), Visual Reasoning and Data Sufficiency. It will also enable you to practice different types of Verbal Reasoning questions that are not tested in the CAT. Each of these books follows a similar structure for every topic – Concepts, Class Exercise, and Practice Exercises, in that order.

This book has the following:

1. Decision Making - 2 Chapters with Exercises
2. Logical Reasoning - 2 Chapters with Exercises
- 3 Data Sufficiency - 1 Chapter with Exercises
4. Verbal Ability - 2 Chapters with Exercises
5. Visual Reasoning -1 Chapter with Exercises

Each Component has been designed from the following perspective:

| | | | |
|--------------------|--|------------|--|
| THEORY | <i>Concepts, Solved Examples, Concept Builder Exercises</i> | PRE-CLASS | Read through the concepts and solved examples in the corresponding chapter before attending the class. After going through the concepts and solved examples, solve the corresponding concept builders. |
| CLASS EXERCISE | <i>Class Exercise - Concept Level Questions, Application Problems, Challengers</i> | IN-CLASS | This will guide the classroom discussion. The class exercise questions will be solved and discussed in class by expert mentors. You can also get all your doubts solved by discussing them with the mentor. |
| PRACTICE EXERCISES | <i>Mixed-bag problems</i> | POST-CLASS | After the class, solve ALL Practice Exercises. The Answer Key to all the practice exercises is given at the end of the book. For explanatory answers to the Practice Exercises, refer to the separate Explanatory Answers booklet provided. |

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Decision Making

DM-5.1 | DECISION MAKING-1



DECISION MAKING

From a business perspective, decision making means choosing that course of action, from among various alternatives, which benefits the stakeholders the most. Managers spend a substantial portion of their time making decisions. Decision making becomes a greater part of a manager's role as he/she moves up the corporate ladder.

From the moral perspective, decision making involves choosing a course of action that is morally and ethically correct. One can face such complex situations in the course of ordinary life.

Types of decisions

Two types of decisions are taken by managers:

Programmed decisions: are made in routine or repetitive business situations. These decisions have a fairly limited and short-term impact. They are normally taken at the operational or lower levels of management, at certain points of a standard process. In order to establish consistency and to save time, the organization develops rules, procedures or guidelines for taking these decisions. Thus, much thought or dialogue is not required for taking these decisions. In many cases, the managers formulate the decision rules or standard operating procedures so that their subordinates can take these decisions. Programmed decisions would need to be taken for handling technical issues, employee grievances, customer complaints or induction of employees.

Non-programmed decisions: are complex and are made in novel (and thus poorly defined) business situations, where there are no cut and dried solutions available. Customized solutions are developed using judgment, intuition, creativity, business acumen etc. These decisions normally have a long term impact on a large number of organizational members. They are taken at the senior and top levels of management. Non-programmed decisions would need to be taken while developing marketing strategies for new markets, introducing new products, launching IPOs, managing crises or motivating employees.

On the basis of the levels at which they are taken, decisions can also be classified into:

Strategic decisions: impact the big picture.

They determine the long-term direction the business will take. Thus, they are future-oriented and involve the mobilization of a large number of resources. They are made by the top management after taking a multitude of internal and external factors into consideration. The process of arriving at these decisions is long, complex and costly and the final outcome affects most internal and external stakeholders. Of all the three decisions, these involve the maximum risk and uncertainty. Strategic decisions would be involved in: increasing the scale of production, setting up a new plant, exploring new markets, significantly altering the financial mix of the company, establishing the vision or identity for the business etc.

Tactical decisions: are made by the middle management, in line with the strategic decisions made by the top management. Their purpose is to ensure that the goals outlined by the top management are attained in the most efficient manner possible. They enable the institution of vital initiatives that help achieve the overall strategy. After all, a tactic is a plan or procedure for promoting a desired end. While strategic decisions define the 'vision' of a business, tactical decisions define its 'mission'. If strategic decisions answer the question 'what?', then tactical ones answer the question 'how?' While strategies generally remain in place for a long time, tactics change from time to time. Tactical decisions have a shorter-term impact than strategic decisions, but a longer-term impact than operational decisions. Tactical decisions would be involved in: picking an advertising agency for a product, creating incentive structures for various levels in the organizational hierarchy, creating functional departments and divisions, yearly budgeting, setting up a quality control system etc.

Operational decisions: are made by the lower levels of management to make the day-to-day activities of the business progress smoothly. They are made for repetitive and routine situations and have a very short term impact (a day or two). These decisions would be required for: scheduling resources, allocating shelf space, handling employee grievances and conflicts, re-ordering raw material, stocking inventory etc. These decisions are made in real time and are mostly administrative.

Decision making styles

Based on the leadership style a manager adopts, decision making could be done in any of the following manners:

Authoritative: When managers adopt an autocratic or authoritarian style, they maintain complete control over their subordinates. They closely supervise their subordinates' work to ensure that the rules and procedures laid down are being followed. Thus, subordinates have little room to exercise creativity or make suggestions. They fear questioning, let alone criticizing, the manager's perspective. Communication flows mostly from top to bottom under this leadership style. The only relationship these managers have with their team is a strictly professional one. A manager following this style makes unilateral decisions, without inviting participation from his team.

This style could range from 'exploitative authoritative' to 'benevolent authoritative'. Under the former, the manager has very low concern, if at all, for his subordinates and uses fear to make them conform. Under the latter, the manager has some concern for his subordinates and takes their opinions into consideration from time to time. He may even try to improve productivity by establishing an incentive plan.

The authoritative style can prove to be effective, as it normally allows quick decision making and high employee productivity. But at the same time, especially when practiced for a long duration, it reduces employee morale and frequently leads to resentment, absenteeism and attrition. Thus, this style must be selectively adopted. It is suitable for routine and unskilled jobs, crises management, when the manager has all the information and expertise required to solve the problem, when there is paucity of time or when the project is full of risks.

Delegative: If the manager adopts a laissez faire or free reign leadership style, he delegates most of the responsibility (including decision making) to his subordinates. Needless to say, a manager can do this only when he trusts his subordinates' abilities and judgment completely. So if the team members are skilled, experienced, trustworthy and self-motivated, or if outside specialists have been called in for a project, this approach can be successful.

The manager has to carefully monitor performance and give feedback regularly so that his subordinates don't become lax and unproductive. Though he offers his team a lot of autonomy, he still is available for guidance and support, when required. Unless his subordinates request him to do so, or he feels that they are being ineffective, the manager doesn't involve himself in decision making.

This approach increases the confidence levels of the subordinates, helps develop successors and frees up the manager's time for more important tasks.

Participative: Under a participative (also called facilitative or democratic) leadership style, the manager and his team work together to solve problems. The manager invites suggestions and encourages discussion and brainstorming, thus making his subordinates feel involved in the decision making process. Consequently, subordinates' satisfaction and motivation increases. A healthy work environment is created that encourages individual creativity and contribution. This results in high engagement and productivity and an improvement in the subordinates' social skills.

For the success of this style, it is important that the subordinates have all the necessary information and expertise required to solve the problem at hand. As this decision making style is very time consuming, it cannot be used in emergent situations. It is best employed when teamwork is important and high quality output is required. A democratic manager needs to ensure that he isn't losing control by handing out too much of it. He should determine the roles and responsibilities of all his team members clearly, so that there is no conflict or chaos.

Consultative: While following this leadership style, the manager only 'consults' his team members, when he feels they may have more information, better insights or greater expertise. Unlike the participative style, this style doesn't mandate putting up all matters for discussion or deciding the course of action after taking everyone's views into consideration. There is limited upward communication and the subordinates cautiously share their ideas. This style lies somewhere between the authoritative and participative style, as the manager retains the ultimate decision making power.

The decision making process

The following are the steps to be followed while making decisions:

Identifying a worthwhile problem or opportunity for which decisions can be taken: This will give purpose to the decision making. To do this, the manager needs to scan the internal and external business environment carefully.

Diagnosing the problem and defining the problem statement: The former involves understanding what exactly is causing the problem and understanding its magnitude, urgency and impact. It is important that while doing this, symptoms are not confused as being the causes. The latter implies clearly defining the problem so that those involved in solving it can focus on the right areas.

Classifying the problem and gathering relevant data: This involves determining who all will be involved in solving the problem and taking the decision. The problem is classified into the type of decision that needs to be taken, the impact of the decision, the usefulness of the decision, the periodicity of the decision and the important factors and constraints related to the decision. The information required for taking a decision is then gathered.

Developing alternatives: All possible ways in which the problem can be solved need to be identified and analysed. The merits and demerits of each alternative need to be listed.

Evaluating alternatives: All the alternatives identified in the previous step need to be compared for their effectiveness, keeping in mind the risks involved and resources available. Both tangible and intangible impacts of the alternatives must be taken into consideration. If none of the alternatives are found to be practicable or as efficient as required, they should all be rejected and the exercise (step 3 onwards at least) should be repeated.

Selecting the best alternative: The alternative that proves to be the most effective and efficient in solving the problem should be selected. When an alternative has been chosen, automatically a decision has been made.

Implementing the decision: The decision making process will be useless unless the problem is solved as expected. So, the decision needs to be put into action. The people who will implement the decision need to be informed about the course of action to be followed and the necessary resources need to be allocated to them.

Reviewing the decision: Once the decision is implemented, its performance must be constantly reviewed over its lifetime. This feedback will improve the future decision making process. Successful decisions can be repeated where applicable and unsuccessful ones can be modified or discarded. Monitoring is also required to minimize the magnitude of losses that could occur due to an unsuitable decision.

Decision Making in XAT

Decision making questions have been a part of XAT since 2007, but it was in 2012 that the XAT authorities decided to devote an entire section to this area. There are more than 20 questions in this section. Some questions may require calculations or analytical reasoning and are mostly an application of concepts learnt in Quantitative Ability, Data Interpretation and Logical Reasoning. The remaining are pure decision making problems. The shortest cases are a few lines long, while the longest is a page and a half long. Most cases span half a page.

The questions mostly ask for the best course of action that should be followed to achieve a certain goal, given the circumstances of the case. Other question types include the most justified conclusions or the most likely reasons behind certain behaviour. At times, there are cases that list some selection criteria and ask the student to make appropriate selections as per the criteria.

As far as the pure decision making questions are concerned, the decisions required to be made are always non-programmed (obviously) and mostly tactical. Students are required to perform steps 2-6 of the decision making process. The options are created from the view-points of various management styles. Most of the cases present non-business issues. In 2013, only 7 questions were based on business related cases.

Some guidelines for solving this section:

The shortest cases should be tackled first. There are normally 6-7 questions at least, which can be answered after reading less than 10 lines. A student must go through these first as it is a low-risk approach. Even if the question/case turns out to be very confusing or difficult, the realization comes within 2-3 minutes. This is much safer than spending 7-8 minutes reading a long case and then realizing that it needs to be left alone.

The analytical or numerical cases need to be tackled next, as a student can quickly ascertain their level and there are well-defined techniques for arriving at the answers to such questions. The grey area here is minimal.

Preparing for the decision making section in XAT doesn't require studying a lot of concepts or memorizing details. Thus students should prepare for this section only about 6 to 8 weeks before XAT, after they have completed all the other basic reference material.

Ethical perspectives

Some globally accepted ethical perspectives that can guide your decision making are discussed below.

Utilitarianism: This is the view that the moral worth of an action can be determined only by its utility i.e. benefits. English philosopher Jeremy Bentham (1748–1832) is regarded as the founder of the theory. Another important contributor is considered to be the British philosopher John Stuart Mill (1806–1873). They believed that the best decisions are those that result in the maximum possible benefits (as compared to the losses) and that too for the maximum number of people. This view can thus be summed up as:

The greatest good for the greatest number

Other philosophers proposed a variant of utilitarianism, called negative utilitarianism, which involved replacing the principle of ‘maximizing pleasure’ with ‘minimizing pain’.

Kant’s categorical imperative: The German philosopher Immanuel Kant introduced this concept in 1785. He believed that the moral philosophy of his day was based on too many subjective considerations and that in order to be compelling, a moral concept could not be subject to various situational or personal conditions. Thus, he believed in doing what is right, irrespective of the consequences.

The first categorical imperative (rules to be obeyed without exception) he formulated was the following:

‘Act only according to that maxim whereby you can at the same time will that it should become a universal law without contradiction.’

There were two more formulations of the imperative, but it would suffice to remember their essence: what is right for one is right for all. So, a decision maker must ask himself ‘would I want everyone to make the decision I am making?’ If the answer is ‘yes’, then the decision is right, else wrong.

Justice as fairness: In 1971, American philosopher John Rawls introduced this concept, to be applied especially when allocating limited resources. He believed that following utilitarianism could seriously disadvantage minorities. He advocated two principles: the liberty principle and the equality principle.

The former states that certain rights or liberties are more important than others and every person has an equal right to them for e.g. right to vote, freedom of speech and thought, freedom to own personal property, and freedom from arbitrary arrest. No person, organization or government must infringe upon these liberties.

The equality principle states that each society member must get equal opportunity (i.e. offices and positions should be open to all individuals) and that only those social or economic inequalities can be allowed to exist that work to benefit the least advantaged members of the society.

According to him, the best decision could be arrived at by following the 'maximin' rule i.e. the best course of action is that whose worst outcome is better than the worst outcomes of all other alternatives. Thus, the best decision is the one that guarantees everyone a certain minimum level of benefits.

Considerations for decision making

The following aspects need to be considered before taking decisions:

Integrity – The decision maker has to be guided by some ethical perspective.

Impact – The decision maker has to consider the impact the various alternatives will have on various stakeholders. He should then try to choose the alternative that maximizes the positive impact or minimizes the negative impact.

Legality – The decision maker must be conversant with the laws pertaining to the decision he is planning to take. He has to ensure that the course of action he is about to take is completely legal.

Fidelity – If the decision maker has made a promise to someone, he must ensure that the decision doesn't renege on it. That would be perceived as being unethical.

Impartiality – The decision maker must ensure that his decision is not being influenced by any prejudice or bias.

Inputs by others – Taking others' wants, concerns and opinions into consideration usually leads to making better decisions.



CLASS EXERCISE

Directions: Read the following case and choose the best alternative for the questions that follow.

Mohan and Sunidhi are team leaders in different departments of Horizon Ltd. Both joined the company 5 years ago, as sales trainees. They rose through the ranks with their own styles of work and management, which often led to differences of opinion and conflicts regarding sales territories, prospective clients, etc.

Sunidhi is a good worker. However, she holds back important details about projects from her team, revealing only those details that are required to get work done from her subordinates. Her team members often complain about this and they also feel that she is not approachable. She is also aggressive when it comes to getting her way regarding resource allocation for her projects.

Mohan gets along well with his team and other co-workers. He has a more relaxed approach towards pitching for his projects. He is easily approachable and is very friendly with his teammates. He discusses projects with them in detail and even seeks their inputs to make them feel more involved.

Turf battles between Mohan and Sunidhi occur frequently over allocation of resources (manpower, funds, infrastructure, etc.) for their projects. On one instance, Sunidhi refused to lend a resource she could have spared with not too much of difficulty, for an urgent requirement in Mohan's team. Consequently, Mohan had to urgently recruit a new employee, thereby increasing the company's fixed expenses. Their team-members find their disputes embarrassing and demoralizing.

Their boss tried to get them together so that they could resolve their differences and establish a cordial work relationship. However, Mohan was reluctant to participate, saying he had no personal issues with Sunidhi and that it was up to her to maintain cordial relations. Sunidhi maintains that she is doing what is best for her team and the company.

The matter has been escalated to the national head of sales.

1. What should be the immediate course of action taken by the national head of sales?
 - 1) Transfer Sunidhi to another location.
 - 2) Transfer Mohan to another location.
 - 3) Have a discussion with both of them separately and get to the root of their differences.
 - 4) Establish a setup to ensure that both Mohan's and Sunidhi's requirements are met independently, so that there are no conflicts.
 - 5) Counsel the members of both teams to be tolerant of such disputes, citing the reason that the company is doing very well in spite of these squabbles.

2. If Sunidhi agrees to bury her differences with Mohan and have a professional relationship with him, what should be the ideal response of the national head?
 - 1) Take Sunidhi's word and consider the issue resolved.
 - 2) Call both Mohan and Sunidhi and ask Sunidhi to say it in Mohan's presence. Then ask Mohan to reciprocate and consider the issue resolved.
 - 3) Take Sunidhi's word as an interim measure, observe their conduct for a month and then decide the next course of action.
 - 4) Call Mohan, tell him about Sunidhi's word and ask him to reciprocate.
 - 5) Disregard Sunidhi's word and ask her to display more convincing action.

3. Horizon Ltd. gets a new GM. He challenges the company's sole focus on sales to measure employee performance and makes a suggestion to the Board of Directors to include two new parameters for determining the salaries of employees: adherence to quarterly budgets and quality of relationship with clients. Mohan and Sunidhi, though locked in a dispute, vehemently oppose the new GM's proposal together.

Which of the following would be a likely reason for them to oppose the proposal?

- 1) They consider the proposal as a serious threat to the position of Horizon Ltd.
- 2) They do not feel these parameters are important enough to be considered.
- 3) There is no clarity regarding the relative importance of the three parameters.
- 4) They feel that the budgets laid down are unrealistic and cannot be adhered to.
- 5) They will have to work out of their comfort zones established over the years.

Directions: Read the following case and choose the best alternative for the question that follows.

There are fears among the citizens of a developing nation that doctors may be ordering medical tests that don't need to be performed so they can receive kickbacks from medical testing companies and pathological laboratories. Patients, who trust doctors with their lives, have now started suspecting that even suggestions for having major medical procedures like surgeries etc. could be ruled solely by such commercial interests.

4. What should the government do to stop doctors from indulging in such practices?
- 1) Launch investigations into cases of patients who were made to undergo major surgeries over the last year, to determine whether they were necessary. Then suitably punish the guilty, to send out a strong signal to other medical practitioners to refrain from such practices.
 - 2) Appoint government supervisors in each district to medically investigate future cases where surgeries are suggested and instruct citizens to get their cases examined by these supervisors.
 - 3) Release draft guidelines on treatments of all diseases and circulate them among doctors, mandating the doctors to adhere to them in treating their patients.
 - 4) Appoint government supervisors from whom patients can get a second opinion on any medical treatment suggested by their physician and get the correct advice in case they have been cheated.
 - 5) Pass legislations, which impose harsh penalties on doctors that dupe their patients, to check fraudulent medical practices and set up an efficient implementation mechanism for them.

Directions: Read the following case and choose the best alternative for the questions that follow.

Arvind, an investment banker, is an MBA from IIM-A, working in a top investment bank based out of Mumbai. He works in the Merger & Acquisition (M & A) department of the bank. The work of his team involves liaising with clients for M & A deals, working out the nitty-gritties of such transactions, and getting new business for the company. Arvind is the star performer of the company and the value of business he handles is a large proportion of the total business of the company.

As part of his work, Arvind has to undertake numerous trips within India and at times abroad. He lists out potential mergers through market research and pitches these deals to his boss. Once the pitch is approved, he contacts the potential clients and sets up a meeting to close the deal. His conversion rate for deals is around 60%, and this amounts to revenues worth crores of rupees. The company reimburses travel expenses on actuals and has no policy specifying limits on expenses incurred during travel. Arvind is not known to be thrifty, or even thoughtful, when it comes to spending during such travel. He regularly stays in 5-star hotels, travels business class by air, hires chauffeur-driven sedans, and the like. Given his performance, and the revenue earned for the company, the HR department has been instructed to overlook these indulgences.

But last year, the economy went through a slump and this adversely impacted the M & A market, with very few deals actually going through. Arvind's own conversion rate fell to 20% in this period, although this was attributed to the overall slump. However, Arvind continued to pitch as many deals as before and travel extensively. Thus he incurred the same expenses, but with a much lower output. These expenses began pinching the company, in light of dropping revenues and a gloomy market scenario.

Last month, Arvind's boss, Mr. Hari, informed him of the same and asked him to be more austere while travelling. He also asked him to cut down on unnecessary travel, by undertaking business trips only if a deal is sure to go through. While Arvind was already aware of the need to cut down on expenses, he did not take these instructions in the right spirit. When his travel expenses did not reduce even after a month, his boss was forced to create a travel policy, where in limits were set on reimbursements for stay, food, travel, etc. This was taken by Arvind as a sign that he was no longer valued by the company and he reduced his travel and, hence, expenses. However, his performance levels also reduced. He did not scout for new opportunities with the same zeal as earlier. His productivity reduced and he betrayed a lack of interest in his work.

5. What should Hari's course of action be?
 - 1) Withdraw the travel policy and instruct Arvind to carry on as before.
 - 2) Have a discussion with Arvind and ask him to change his working style.
 - 3) Reprimand Arvind for the drop in performance and convey to him sternly the need for him to shape up.
 - 4) Reflect on his own actions, analyse what could have caused the drop in performance and accordingly take further steps.
 - 5) Incentivize the travel policy by allowing higher reimbursements to employees who are generating higher revenues for the company.
6. Niranjan, Arvind's colleague, has a work profile similar to Arvind's. Niranjan is not as active as Arvind when it comes to scouting for new business, and he does not travel as much as Arvind. His expenses are reasonable. His conversion rate for deals used to be 80%, though the size of his deals was smaller than those of Arvind. During the slump, his conversion rate fell only slightly, to 70%. Hari, who is also Niranjan's boss, praised Niranjan in front of the entire team in a meeting he had convened to convey to his employees the importance of austerity.

What could be the probable outcome of such a step by Hari?

- 1) The team could take this as an insult and the company could see an exodus of employees to other companies.
- 2) The team could take it as constructive criticism and become more austere and disciplined.
- 3) The team could stop putting in the extra efforts required to acquire potentially big clients.
- 4) The team could ignore Hari's words and carry on as usual.
- 5) The team's relation with Niranjan could sour and this could adversely impact the team atmosphere.

7. If you were the HR executive in charge of appraising the M & A team, on which parameters would you measure the performance of each team member?
- 1) The number of deals finalized, the revenue earned and the cost incurred.
 - 2) The volume of new business acquired and the conversion rate.
 - 3) The percentage of deals finalized from potentials identified and pursued.
 - 4) The number of deals scouted for, percentage of deals finalized, and the revenue earned for the company.
 - 5) Revenue earned, costs incurred and the cost to revenue ratio.

Directions: Read the following case and choose the best alternative for the questions that follow.

Southern Peninsula is a developing nation. The nation has a growing middle class with rising income levels. Due to the increase in disposable incomes, the travel and tourism industry of the nation is growing along with the other sectors of the economy.

The aviation industry is considered one of the booming industries in this scenario. Flying has traditionally been very expensive and has generally been considered a luxury. However, the entry of low-cost carriers, owing to the deregulation of the aviation sector, has changed all this. More and more people are now opting for air travel through low-cost carriers. This has forced other airlines to rework their business models, lower their airfares, cut costs, etc. As a result, several airlines, including private and state-run-carriers, have started incurring losses.

The national carrier of Southern Peninsula, National Air, operates the largest number of aircraft in the country. It is a government enterprise. The airline operates on domestic as well as international routes.

Blue Bird Airlines is a private airline, operating on domestic as well as international routes. Its Chairman is Mr. Sanjay – the owner of a conglomerate of highly profitable businesses which include running hotels, manufacturing liquors, managing sports teams, etc. The airline is positioned as a luxury carrier that provides superior services to flyers.

Both these carriers have run into trouble for different reasons.

National Air, being a government run airline, is prone to political interference and bureaucracy. The employees of the organization are a part of various worker unions, which are in turn affiliated to different political parties. Employees go on strike very often for getting various demands fulfilled. The airline is also notorious for poor in-flight service and poor punctuality. Most of its aircraft are old and in need of repairs. Passengers fly by National Air only as a last resort, when they do not get tickets for other airlines.

Blue Bird Airlines, on the other hand, has been one of the best airlines in the country. It has a fleet of the latest aircraft and a loyal customer base. However, the airline started running losses due to competition posed by low-cost carriers. With the government deregulating fuel prices, prices

of aviation fuel rose dramatically. This led to unsustainable losses for the airline. It was unable to pay fuel costs, loan instalments, airport fees, etc. It was even unable to pay employee salaries for six months, which led to unrest among employees. As a result, its employees went on strike, due to which the airline operations came to a halt. The entire fleet of aircraft was grounded. The Civil Aviation Authority threatened to cancel the licence of the airline in three months if it failed to settle all its dues. Due to all this negative publicity, its share prices also dropped to an all-time low. The airline desperately needed an investor to clear all its dues, revive operations and save its licence.

While this was going on, the government was puzzling over how to revive National Air and turn it into a premier airline. The Aviation Minister, Mr. Khan, who had political experience spanning two decades, considered infusing new capital into the ailing airline. However, this proposal was shot down by the Finance Minister Mr. Chatterjee. The reason cited by Mr. Chatterjee was that subsidies and spending on social welfare schemes had already burdened the government's finances and the fiscal deficit was very high. Additional spending could take the fiscal deficit to unsustainable levels, and could prompt global rating agencies to downgrade the country's sovereign credit rating, which could in turn adversely impact the industrial growth due to the resultant rise in the cost of funds.

At this juncture, the central government underwent a major shuffle, with a large number of ministries seeing a change in guard. The Aviation Ministry was handed over to 35-year-old Member of Parliament: Mr. Ajay Sharma. Mr. Khan became the Finance Minister, while Mr. Chatterjee was handed the charge of the Home Ministry.

Oxford educated Ajay belongs to a political family. He is a youthful and dynamic leader, who brings in fresh ideas. However, it was baptism by fire for Ajay, with the aviation sector grappling with problems and two of its major airlines facing severe crises of their own. Ajay decided that his first major task as Aviation Minister would be to find solutions to the problems faced by these two airlines. After a lot of thought, he came up with the idea of merging the two airlines. He started the groundwork for implementing the merger. However Ajay soon realized, that this was easier said than done. National Air was riddled with union problems and its employees would resist any changes, especially those which would require them to change their work style. On the other hand, Mr. Sanjay was averse to merging Blue Bird Airlines with a bureaucratic organization.

Adding to the problem was a major coalition party of the central government, which was in favour of shutting down Blue Bird Airlines.

8. In order to go ahead with the merger of Blue Bird Airlines and National Air, what should be the sequence of steps Ajay should take?
- Engage in a dialogue with the union leaders of National Air and convince them to support the merger.
 - In case the opposing coalition partner disagrees, persuade the government to drop the party from the government.
 - Have a parliamentary discussion to explain the merits of the merger and persuade the opposition to back the proposal.
 - Overhaul the administration of National Air to minimize bureaucracy and thereby persuade Mr. Sanjay to favour the merger.
 - Come up with an alternative plan other than the merger, to revive both airlines.
- 1) A, D, C, E 2) D, A, C 3) E
4) D, A, C, B 5) C, A, D
9. What could be the most likely reaction of the employees of National Air, in case the merger materializes?
- They could give mass resignations to oppose the changes as they would be required to work more.
 - They could go on an indefinite strike to force the government to reconsider the decision.
 - Different employees could react differently as per their respective union's opinions.
 - The employees could accept the decision in light of a lack of other employment opportunities.
 - The employees could go to court to prevent the merger from materializing.
10. Mr. Khan, who is now the Finance Minister, again proposes a capital infusion into National Air. Mr. Khan suggests that Blue Bird Airlines should be asked to sort out its own mess and to find an investor to revive itself. His proposal meets with opposition from the government, for the same reason the earlier Finance Minister opposed it, i.e. rising fiscal deficit. However, Mr. Khan is adamant about the proposal.
- What could be the possible reason for Mr. Khan's insistence on capital infusion into National Air?
- Mr. Khan belongs to the old school of thought and resists any major change, and so insists on maintaining status quo.
 - Mr. Khan has a major stake in National Air, and hence has a vested interest in its success.
 - Mr. Khan is concerned about job cuts in National Air in case the airline goes in for a merger.
 - Mr. Khan belongs to a political party that backs a major worker union of National Air.
 - Mr. Khan wants to keep the airline running as it is the national carrier and hence this is a matter of national pride.

11. Which of the following steps should the Chairman of Blue Bird Airlines take in case the Aviation Minister gives up on the merger?
 - 1) Shut down the airline to free up resources and repay all outstanding dues.
 - 2) Shut down the airline, repay all outstanding dues after selling off all its assets, and absorb the airline's employees in his other businesses.
 - 3) Search for another potential partner to merge the airline with.
 - 4) Have a meeting with the employees to draw up revival plans and implement the most-feasible one.
 - 5) Consult with the CEOs of all his businesses to discuss diversion of financial resources from other businesses to revive the airline.

12. Mr. Sanjay decides it is best to adapt to the changing nature of the aviation industry and convert Blue Bird Airlines into a low-cost carrier. What could be the most likely result of this move?
 - 1) The coalition partner that favoured the closure of Blue Bird Air would threaten to withdraw support from the government.
 - 2) This would reduce the market share of other airlines due to the entry of Blue Bird Airlines in the low-cost carrier segment, and provide more options to flyers.
 - 3) The cabin crew of Blue Bird Airlines would be unable to adapt to the new business model, since it would be used to providing a high level of service.
 - 4) The new Aviation Minister would take Blue Bird Airline's example and consider converting National Air into a low-cost carrier.
 - 5) The brand value of Blue Bird Airline would take a beating because of mismanagement of customers' expectations.

Directions: Read the following cases and choose the best alternative for the question that follows each of them.

13. Shamu has been working for ANC Ltd., for the last ten years, as a security guard. He also doubles up as the Chairman's driver whenever required. Because of his long association with the company and his affable nature, he is quite a favourite with all the employees of the company. A lot of work, such as delivery of confidential documents and deposit of cash in the bank, is entrusted to Shamu by the company's accountant, Mr. Munshi.

Last week, Mr. Munshi noticed that there was a variance of a few hundred rupees in the credit entry in the company's account. He was sure that he had correctly noted down the amount that he had given to Shamu for depositing in the bank. When this happened again, Mr. Munshi decided to take this to the Chairman.

The Chairman called Shamu and asked him for the reason behind the discrepancy in the amounts. After a lot of discussion, Shamu finally confessed to stealing a few hundred rupees when he was asked to deposit money in the bank. After further probing, he explained that his wife had been diagnosed with ovarian cancer and it was becoming difficult for him to make ends meet. Mr. Munshi had rejected his request for a salary increment.

Which one of the following actions should the Chairman take?

- 1) Ask Shamu to return the money immediately and give him one month's notice to look for another job.
- 2) Deduct the amount with interest from Shamu's salary, in instalments, and advise Mr. Munshi to no longer entrust him with any such tasks.
- 3) Ask Shamu to return the money and hand him over to the police.
- 4) Let him off with a warning and convert the embezzled amount to a loan to be paid off with interest in the near future.
- 5) Let Shamu keep the money and increase his salary to accommodate his increasing expenses.

14. Sunita, a junior executive in TSS International, is the only earning member of her family of four (that includes two kids and a husband). A couple of years ago, Sunita's husband had been laid off due to the recession and has not been able to find employment since then. To make matters worse he took to gambling and drinking heavily. This forced Sunita to single-handedly manage both home and office. Sunita, who till now had been a sincere employee and used to turn in quality work, started disappearing during work hours. She also started taking excessive leaves to accommodate the needs of her family. Apart from this, the quality of her work also went down severely. The senior management is considering the option of letting her go, if her performance does not improve within three months. As her manager, you are aware of Sunita's problems, and believe that with a little support and guidance, she can overcome her personal issues and start turning in quality work again.

What would you do to help Sunita?

- 1) Ask Sunita to come in on weekends to complete her pending work or any additional work that may come up from time to time.
- 2) Pass on the critical aspects of Sunita's work to other colleagues to reduce her stress and the mistakes in her work.
- 3) Meet with Sunita and set a flexible work schedule, taking into consideration her personal responsibilities.
- 4) Offer to help Sunita find employment for her husband and also refer him to the company HR for future vacancies.
- 5) Allow Sunita additional time off from work to take care of her personal responsibilities whenever required.

15. Nathulal and Sons is a hundred-year-old family-run wholesale business. They are considered to be one of the most prominent traders in the wholesale market and they sell a larger variety of products than any other trader. Mihir, the eldest son of Sudhir Nathulal (the current head of the enterprise), has recently returned from Harvard after completing his MBA. While studying abroad, Mihir had the opportunity to study similar business enterprises. He observed that most of them operated more professionally, on a much larger scale. Some of these companies operated across nations. On his return, Mihir decides to turn his family-run business in a similar enterprise. He wants to hire younger employees with a business education, to head the critical departments like purchase, marketing and sales. The problem is that his father and uncles are against hiring young, inexperienced MBAs to run the family business. They believe that only many years of experience can make one capable of handling diverse or challenging business situations. They are also of the opinion that Mihir should start working from the lowest level and rise through the ranks.

Which one of the following solutions would help Mihir convince his father and uncles to re-think their decision of not hiring young business graduates to run the business?

- 1) Give his father and uncles the ultimatum that he would take up employment with some other company if they do not hire business graduates to restructure the business.
- 2) Hold a formal meeting with his father, uncles and the other senior members of the enterprise and take them through the business models of MNCs like Wal-Mart and Metro who operate worldwide and hire MBAs to run their vast business.
- 3) Agree to start working as per his father's instructions. He could then gradually introduce more efficient ways of doing things. This would convince the naysayers that a business degree helps.
- 4) Hire a professional consultant who will point out the lacunas in the current setup and suggest that the company needs a fresh perspective, which can be provided by business graduates.
- 5) Ask his father to allow him to hire a few MBAs to run the sales department with him. If there is an improvement in the performance, then he should be allowed to hire more-business graduates.



PRACTICE EXERCISE-1

Directions: Read the following case and choose the best alternative for the questions that follow.

Susan, the western region sales head of a cosmetic giant, has just finished the yearly performance reviews of and career planning for every individual in her eight-member team. Now she is faced with the tough task of nominating team members for the upcoming promotions for managerial positions. While doing this, she has to ensure that the following guidelines, laid down by the management, are followed.

- A. The candidate considered for promotion should have at least five years of total work experience and should have spent at least two years in the company.
- B. The candidate should have a management degree from a premier institute.
- C. The candidate should have cordial relations with other departments and team members.
- D. The candidate should possess leadership traits.

This year, the management is considering two promotions nationally for this position. Each of the other three regions has nominated one candidate for promotion. These candidates fulfill all the conditions laid down by the management.

In Susan's team, except two team members, who are less than a year old in the company, everyone else clears all the criteria laid down by the management, barring the second one. And this is Susan's main problem. Her star performer 'Sahil', who is also the top performer nationally, passes all the other stipulations for promotion and has been with the company for 5 years. Susan has also heard, via the grapevine, that if he is not promoted again this year, he will quit. Not willing to lose a great employee, she considers taking up this issue with the management.

1. In case Susan decides to take up this issue with the management, which of the following would be the most appropriate combination of actions she should take?
 - A. Susan has a meeting with the MD to make him consider changing the promotion guidelines of the company.
 - B. Susan has a meeting with Sahil, to persuade him to enroll for a part time MBA.
 - C. Susan discusses her problem with her counterparts in the other regions.
 - D. Susan presents her case to her boss, VP-Sales, to persuade him to make an exception.
 - E. Susan has a meeting with VP-HR to discuss possible solutions to her problem.
- 1) All of these 2) A, D, E 3) A, B, D, E 4) D, E 5) B, C, D, E

2. In the event the management decides to promote Sahil, what could be the probable reactions of the other employees?
 - 1) The employees from premier institutes might feel that they have lost their competitive edge over the other employees, and would shift to other companies.
 - 2) There might be a change in the performance of other employees like Sahil, who have not been considered for promotions earlier, due their educational background.
 - 3) All the employees of the organization might demand a change in the promotion policies.
 - 4) Other members of Susan's team might accuse her of favouritism and hold back support to Sahil, once he is promoted.
 - 5) Sahil might not be accepted by his peers from the premier management institutes in the managerial grid, thus creating friction in the working environment.

3. Despite Susan's persuasion, the management decides to stick to its policies and does not even consider Sahil's candidature for the upcoming promotions. Which of the following would be the best option(s) for Susan to keep Sahil from quitting and maintain his motivation towards his work?
 - A. Offer him more responsibilities within his current role.
 - B. Offer him a new role which would enable him to acquire new skills.
 - C. Persuade him to take up a part-time management course, which would make him eligible for promotions in the future.
 - D. Transfer him to another region with the same responsibilities.
 - E. Nominate him for the 'Employee of the year award'.

1) B, C 2) C, D, E 3) C, E 4) B, E 5) A, C

Directions: Read the following case and choose the best alternative for the questions that follow.

Vinod is a young accounts officer with ABS Ltd, a spare parts manufacturing company. He oversees the bills payable and account settlement for the vendors who provide the raw materials. In the past four years that Vinod has been on the job, he has never had a problem with the accounts of any of the vendors that he manages, and he has maintained cordial relations with all the vendors. Recently, an old vendor – M/s Tolaram & Co., was selected to provide aluminum sheets to the manufacturing facilities of ABS Ltd., across the country. Earlier, the account of M/s Tolaram was managed by Suresh – the head of the accounts department. Once M/s Tolaram's tender was passed, its account was transferred to Vinod.

While going through the first bill for aluminum sheets received from M/s Tolaram, Vinod found that it had been inflated by almost 20% of the agreed upon rate. When Vinod looked at the earlier bills, he found that they had also been inflated and had been approved by Suresh. Vinod checked to see if any revisions had been made in the original contract. This had not happened. He then went to Suresh, his immediate boss, to ask how he could have passed the inflated bills.

To his surprise, instead of replying, Suresh curtly instructed Vinod to pass the bills as the account belonged to the son-in-law of Ramesh Sahu – a very influential person on the Board of Directors. Vinod was shocked. He had never encountered such a blatantly corrupt practice before. He held the bill for a couple of days, trying to weigh the consequences of clearing the bill against those of taking it to the senior management.

4. What should Vinod do?
 - 1) Make an appointment with Ramesh Sahu; bring to his notice the malpractices carried on by the firm owned by his son-in-law, and seek to sort out the matter without further delay.
 - 2) Call a meeting of all the directors of the company and inform them of the discrepancies in the bills being received from M/s Tolaram.
 - 3) Keep quiet, and continue to pass on the bills without comment, so that his job does not get endangered.
 - 4) Make a proposal to the senior management to increase the contract rates of M/s. Tolaram, considering that the inflated rates are being paid anyway.
 - 5) Bring the discrepancies to the notice of Suresh's boss. Then take further actions as per his guidance.

5. Assuming you are consulted by the company for a solution to curb such malpractices in the future, what would be your response?
 - 1) Contracts should not be granted to relatives of anyone associated with the company.
 - 2) The accounts handled by the employees should be rotated frequently so as to ensure that they are not able to build a rapport with any vendor.
 - 3) The final authority to approve all payments should be given to the Chairman of the company.
 - 4) The company should have multiple checks before the bills are passed and have them regularly audited by a third party.
 - 5) The company should procure its raw material requirements in a single order every year. This will eliminate the need for having contracts with vendors.

6. Who is guilty of wrongdoing?
 - 1) Only Suresh
 - 2) Only M/s Tolaram
 - 3) Only Ramesh Sahu
 - 4) All of the above
 - 5) Cannot be determined

Directions: Read the following case and choose the best alternative for the questions that follow.

Ravi Iyer is the General Manager of a luxury resort in South India. Meenal Shetty is the Restaurant and Food Services manager of the resort. She reports to Ravi. Two years ago, Meenal noticed a decline in room service business, the highest margin portion of her operation. This decline coincided with an increase in sales of pizza delivery and carryout firms, as well as an increase in the number of empty pizza boxes from these firms being left in guest rooms in the resort. Her immediate response was to install a pizza oven in the kitchen and offer room service pizza to guests. The effort met with modest success, though it was well below her expectations. Questionnaires completed by departing guests revealed that they found the quality of the resort's pizza poor.

Focusing on this problem, Meenal improved the resort's pizza until blind taste tests judged it at least equal in quality to the products of the two major pizza delivery competitors in the region. However, sales did not improve in spite of these measures, convincing Meenal that the problem was a perceived mismatch between the hotel's image and guests' expectations of pizza makers. Guests simply did not seem to believe that the traditional South Indian restaurant at the resort could make a high-quality, authentic pizza. Based on this conclusion, Meenal presented the following proposal to Ravi:

"Sales of room service pizza are stagnant due to guests' misperception that our product is lower in quality than that of our competitors. This can be addressed if we dissociate our pizza from the resort name. Therefore, to capture more room service pizza business, we should create an 'Authentic Italian Pizza' image for our guest room delivery service by:

- Preparing 'Authentic Italian Pizza' brochures for each guest room, complete with a phone number with a prefix different from that of the resort. The number will reach a special phone in room service, which will be answered as 'Authentic Italian Pizza, enjoy hot, mouth-watering pizza from old, family recipes.'
- Using special 'Authentic Italian Pizza' boxes for delivering room service pizza to guests.
- Issuing 'Authentic Italian Pizza' hats and jackets to room service personnel for use in pizza delivery. Room service waiters and waitresses will wear these garments to deliver pizza. They will change to their regular uniforms for other deliveries."

7. In the above scenario, which of the following is most critical from Meenal's perspective?
- 1) Sales of 'Authentic Italian Pizza'
 - 2) Customer satisfaction with 'Authentic Italian Pizza'
 - 3) Sales of the resort's restaurant.
 - 4) Profitability of the room service business.
 - 5) Revenues from the room service business.

8. Which of the following could be the likely reason, apart from those perceived by Meenal, for the failure in increasing the sales of the resort's pizza in spite of her efforts to improve the quality of the pizza and bring it on par with those of competing brands?
 - 1) The aggressive marketing of the competing brands against the resort's food.
 - 2) The taste of the restaurant's pizza, which did not match up to that of its competitors.
 - 3) The resort's room service menu, which did not have a separate section for pizzas in it.
 - 4) Lack of variety of pizzas offered by the resort's restaurant compared to its competitors.
 - 5) Pizza delivered by 'Authentic Italian Pizza' not being as hot as expected.

9. Ravi, the General Manager, feels that it is ethically inappropriate to mislead customers by following Meenal's suggestion and creating a false brand. However, he agrees with Meenal's analysis of the situation. Which of the following is the most ethical way to establish a separate identity for the resort's pizza?
 - 1) Accept Meenal's proposal, but add an unobtrusive sentence at the bottom of the promotional brochure, in fine print, indicating that 'Authentic Italian Pizza' is a registered trademark of Hospitality Enterprises (the parent company of the resort).
 - 2) Accept Meenal's proposal and include the resort's name in the brochure, i.e., 'The Resort's Authentic Italian Pizza'.
 - 3) Establish 'Authentic Italian Pizza' as a separate, visible part of restaurant operations, offering pizza delivery to rooms, as well as seating facilities for guests and consumers in general.
 - 4) Accept Meenal's proposal as an interim measure to boost sales and establish the 'Authentic Italian Pizza' brand, and, in the meanwhile, create a separate 'Authentic Italian Pizza' outlet in the resort.
 - 5) Bar the entry of food from outside delivery companies, restaurants and other vendors into the resort's premises.

Directions: Read the following case and choose the best alternative for the questions that follow.

Meera, a brand manager with Peelo Potato Chips Ltd. has been concerned about the profitability of the various items in her line of potato chips. According to her potato suppliers, the recent drought caused a 35 percent reduction in the potato crop compared to the previous year, resulting in a 25 percent hike in potato prices to large buyers like Meera's company. Potatoes account for almost all of the content of her chips (which also consist of vegetable oil, one of three different flavouring spices, and salt); plus there are packaging costs. To hold the line on margins, which of late had been slim at only about 5 percent due to fierce competition from several other local and regional brands, Meera would need to raise potato chips prices by about 15 percent. Her most popular 30 gm size, priced at Rs.10.00 would be available for Rs.11.50.

Meera wondered what would be the appropriate strategy to deal with this unfortunate circumstance. She was very reluctant to raise the price to maintain the margin. Firstly, she feared incurring the bad will of her loyal customers; it wouldn't be perceived as fair by them. Moreover, she was worried about competitive responses; her other larger competitors might be willing to incur a loss in the short-run to keep their customer bases and to attract price-hiking rivals' customers. Meera couldn't afford such a strategy since she was evaluated solely on the basis of monthly net profits. Historical data in this industry revealed another possible competitive manoeuvre in the face of rising ingredient cost: hold the line on prices and package size while reducing the net weight of the package. Meera was concerned that this might be a deceptive practice. She recalled from a Consumer Behaviour course she had taken in college a concept known as the "just noticeable difference." This said that relatively small changes in a stimulus (such as a price hike or content shrinkage) go unnoticed by consumers. Meera felt intuitively that the price increase necessary to maintain margins would be noticed, given the price sensitivity of buyers for snack foods. However, the past industry data suggested that perhaps buyers might not notice the package size reduction needed to sustain profits, which in this case would be around 4gms.

Meera asked her boss, Dinesh, the Marketing Director, about the advisability of reducing the net weight of the potato chips. Dinesh said that this was a practice known variously as "downsizing" and "package shorting." It was a very common practice among packaged goods manufacturers. For instance, he said, candy bar manufacturers are subject to constantly fluctuating ingredient prices, and because there are expected ("fair" or "reference") prices for candy bars, package sizes are frequently adjusted without informing consumers. Rahul, another manager said that was a non issue since marketers have been above board in labelling products accurately as to weight, serving size, price, and quantity. Furthermore, the Food and Drug Administration had no laws against the practice. Dinesh recommended downsizing the potato chips, but he made it clear to Meera that the ultimate decision was up to her. Meera still had her doubts. After all, it would seem that consumers who are in the habit of buying a particular product size generally don't scrutinize the net weight label on subsequent purchases. If this were true, it seemed to Meera that downsizing would be a deceptive practice.

10. Assuming you work for Meera and have been given the task of convincing her to downsize, which one of the following arguments would you present to achieve your goal?
- 1) "Everyone in the industry does it. Our major competitors have already gone ahead with downsizing their most popular packs."
 - 2) "The difference is so marginal (four or five chips) that no one would notice the change. Customers hardly bother about such things."
 - 3) "Your main priority right now should be protecting your job rather than debating the fairness of downsizing to the customer."
 - 4) "The government has been consistently running campaigns to make consumers aware that it is their responsibility to always check the specifications of any product before buying it."
 - 5) "The actual quantity of chips in the pack is never exactly 30 gm. The company has not received any consumer complaints till now."

11. What should Meera suggest to the management?
 - 1) Maintain the price, and incur a short term loss.
 - 2) Increase the price and do more advertising to push the consumer to choose Peelo Potato Chips over its competitors.
 - 3) Downsize and change the packaging just enough to make it look like a new pack.
 - 4) Wait and watch to see what the competitors do and then decide.
 - 5) Downsize and simultaneously introduce new flavours in the brand.

12. Assuming Meera's company decides to implement the price increase of Rs.1.50 on the potato chips, which one of the following advertising campaigns would assist Meera in maintaining the profit levels?
 - 1) Target the kids. Tie up with a cola company and make a joint ad presenting chips and cola as 'the snack of the cool kid'.
 - 2) Buy a spot on any of the popular prime time TV programs and show the protagonist enjoying and endorsing Peelo Potato Chips.
 - 3) Run a TV campaign highlighting the superiority of Peelo Potato Chips over the other brands in general.
 - 4) Distribute free samples of Peelo Potato Chips in theatres, malls, and with magazines.
 - 5) Sponsor for the upcoming cricket tournament and market Peelo Potato Chips as the perfect snack for game time.

Directions: Read the following case and choose the best alternative for the questions that follow.

One month has now passed since a diamond-studded watch was noticed missing from the cases in the jewellery department of J&J retail store. External theft has already been ruled out. Mitesh, the security manager, has been studying the videotapes made by closed-circuit TV that day. Mitesh goes to the HR manager, Suman, to report his findings from the investigation of the missing watch. He tells her his department has studied the tapes and cannot determine who stole the watch but that only one employee, Tarun, who works in the display section, handled the watch that day. Although Mitesh knows that failing a lie-detector test cannot be used to dismiss Tarun, he points out that Tarun was the only one to fail the test when asked if he stole the watch.

Since Mitesh cannot close this investigation without a suspect, he proposes that Suman look through Tarun's employment file to determine if there are any alternative reasons for firing this employee. After diligent examination of Tarun's file, Suman notices that his application and CV do not mention the same details. Under the company's rules, this may be grounds for termination; however, Suman never would have noticed it had it not been for Mitesh's zeal to pin the theft on Tarun. Suman also recognizes that Mitesh's performance is evaluated on the basis of his ability to catch internal thieves. Suman does not think it is fair to let Tarun continue working if he did steal the watch; however, she feels that he is also innocent until proven guilty despite the circumstantial evidence.

13. Considering that the guilty party has not been identified clearly, what should Suman do?
- 1) Ask Mitesh to keep an eye on Tarun while he works.
 - 2) Transfer the employees of the display section to some other department which does not deal with expensive items.
 - 3) Put Tarun through another lie detection test. And take a final decision based on the results.
 - 4) Have a thorough search carried out at Tarun's residence.
 - 5) Install more CCTV cameras covering all angles of the display section.
14. Assuming that Tarun is not guilty, and has found out that the management suspects him, what should he do?
- 1) Resign from his job so as to avoid embarrassment in case the management's suspicion becomes public.
 - 2) Ask for a transfer to a department where he would not have to handle valuable material.
 - 3) Continue as if nothing has happened.
 - 4) Volunteer to do more work and stay overtime.
 - 5) Take a leave of absence from work till the issue is sorted out.
15. Which of the following practices should be implemented to make J&J retail store a more efficient organization?
- A. A professional security agency should be hired for the retail store.
 - B. External theft should not be ruled out without thorough investigation.
 - C. A thorough document and police verification of all new hires should be done.
 - D. Employees and the floor supervisor should take inventory both in the morning and at the time of closing.
 - E. New employees should not be assigned directly to the display section.
 - F. The lie detector test should be done away with.
- 1) A, C, E 2) A, B, D, F 3) C, D, E, F 4) A, B, C, E 5) C, D, F

Directions: Read the following case and choose the best alternative for the questions that follow.

The City College has been looking for an eligible candidate for the post of Assistant Professor-English Literature, for its Masters course, for the past couple of months. Five candidates have been shortlisted by the HR department but the final decision is pending due to a conflict of views between the members of the selection committee. Although the final decision rests with the Principal of the college, he has to take into account the recommendations of the other members of the selection committee and of the senior professors of the English department.

Since the Asst. Professor would be required to work closely with the two senior professors of the English department, their approval is important. They want someone who, along with assisting them as required by the job profile, would also take out some time, after the classes, to help the weak students with their difficulties.

The Principal wants to select someone well-qualified, who could be groomed to take up the position of 'Professor' after a few years. The selection committee desires a candidate who is likely to look at a long-term association with the college so that by the time the senior professors retire, he/she would be trained well enough to spearhead the English department.

The backgrounds of the candidates shortlisted by the HR department are given in the table below.

| Name | Age | Educational Qualifications | Experience | Expected Salary | Remarks |
|--------|-----|---|--|-----------------|--|
| Seema | 34 | Pursuing PhD, M.A. - English Literature, B.A. - English Lit. | 7 years of experience in teaching B.A. - English Literature students | 45000 per month | Is known to have a good rapport with the students of the earlier college. Is a relative of one of the office staff. If selected, this would be her first job change. |
| Rupesh | 30 | Published 2 papers on English Lit., M.A. - English Lit, B.Ed. | 3 years of experience in teaching B.A. - English Literature students | 30000 per month | Has a consistent record of bringing good results for the colleges he has worked with. Is an aspiring author. |
| Kavita | 55 | PhD, M.A. - English Literature, B.Ed. | Took voluntary retirement from the post of Principal of a girls' convent after 25 years of experience. | 55000 per month | Is very well known in the teaching community. Ten years is actual teaching experience, rest is in administration. |

| | | | | | |
|----------|----|---|--|-----------------|---|
| Bijendra | 40 | M.A. - English Lit., B.Ed. | 10 years of experience in teaching B.A. – English Literature students | 35000 per month | Known to be a very good teacher. Lives two hours away so will come only for the lectures. Comes highly recommended by the Board of Trustees. |
| Viraj | 45 | M.A. - English Lit., B.A. – English Lit. | 15 years of experience, out of which 7 years' experience is in running his own coaching classes for 'English in competitive exams' | 40000 per month | Runs one of the most famous coaching centres in the city. A lot of college students are known to be taking his help. Will not discontinue the coaching classes if he joins the college. |
| Neelima | 30 | Pursuing PhD, M.A.-English Lit., B.A.– English Lit. | 1 year of experience in teaching B.A. – English Literature students | 25000 per month | Has been referred by the senior professors of the English Department. Has a very good academic record. |

16. After taking into consideration everyone's preferences, which of the following candidates is the Principal likely to select?

- 1) Seema 2) Kavita 3) Bijendra 4) Rupesh 5) Viraj

17. Without taking into consideration the opinions of the other selectors, which one of the following candidates is most likely to be rejected by the trustees?

- 1) Rupesh 2) Neelima 3) Seema
 4) Viraj 5) Cannot be determined

Directions: Based on the eligibility criteria given in the case, certain inferences have been drawn. Mark the answers to the following questions as:

- 1] i.e. 'Definitely True', if the inference definitely follows from the information provided in the case.
 - 2] i.e. 'Probably True', if the inference appears to be true in the light of the case but cannot be ascertained to be definitely true.
 - 3] i.e. 'Definitely False', if the inference definitely does not follow from the information provided in the case.
 - 4] i.e. 'Probably False', if the inference appears to be false in the light of the case but cannot be ascertained to be definitely false.
 - 5] i.e. 'Data Inadequate', if the information provided in the case is insufficient to decide whether the inference is true or false.
-
18. Viraj is the least preferred candidate of the senior professors of the English department.
 19. After Neelima, Rupesh is the most preferred candidate of the senior professors of the English department.
 20. Bijendra will not be hired as the Asst. Professor.
 21. There would be consensus on the least preferred candidates among all the selectors.
 22. The selection committee would choose Neelima over Viraj.



PRACTICE EXERCISE-2

Directions: Read the following case and choose the best alternative for the questions that follow.

To the Regional Head:

Dear Mr. Singh,

On 5th April, Mr. Nadkarni, a Treasury Manager from the zonal office, handled a customer query regarding opening a savings account. He happened to be visiting the branch on that particular day to meet the Operations Manager. The draft organizational chart and company policy, circulated among all employees of the bank, clearly define who is authorized to open new savings accounts, and treasury managers have no role to play in this. This act of Mr. Nadkarni is demoralizing for employees like me as it undermines our authority.

As such, I would request you to look into the matter and take appropriate action to deter people from zonal offices from interfering in branch matters.

Sincerely,

Avinash More

Branch Manager – Kalavihar Branch

1. Which of the following is an essential point that Avinash overlooked?
 - 1) The regional head would not be empowered to look into such a complaint.
 - 2) Mr. Nadkarni could be a long serving and respected employee of the bank.
 - 3) Mr. Nadkarni only handled a customer query, and did not open an account.
 - 4) Mr. Nadkarni must have been trying to contribute towards the betterment of the branch.
 - 5) Any employee would not do anything that would undermine other employees or company policies.
2. What course of action should the Regional Head follow on receiving the complaint?
 - 1) He should ask Avinash to ignore Mr. Nadkarni's interference for once to maintain a cordial relationship.
 - 2) He should take action against Mr. Nadkarni for ignoring company policy and entertaining a customer.
 - 3) He should ask Avinash to discuss his concerns with Mr. Nadkarni and resolve the issue.
 - 4) He should pacify Avinash saying that entertaining a customer does not amount to undermining a branch manager.
 - 5) He should hold a conference for all employees to explain the company policy, organizational chart and roles and responsibilities.

Directions: Read the following case and choose the best alternative for the questions that follow.

Anamika Pandey had been on a break from work for five years. When she tried to get back to work, she realized that technological advancements had rendered her skills redundant. After a lengthy discussion with her family, she decided to start her own business. In the years that she had been a stay-at-home-mom, she had applied her learning from the workplace to create products of daily use like floor cleaners, dishwashing soap, detergents etc. Of these, liquid dishwashing soap was the easiest to manufacture and required little capital. Capitalizing on this, a few months later, she started her venture 'A.P Ltd.' and launched her first product 'Scrub-clean', a liquid dishwashing soap, packaged in plastic bottles of 5 litres.

For the first few months she concentrated on selling Scrub-clean in her immediate neighbourhood. She soon started getting repeat orders and praise for the quality of the product from her customers. At this point, she decided to widen her reach. She approached the kirana/general stores in other localities to persuade them to sell Scrub-clean in their stores. Within the span of a year, she had sold fifty thousand units of Scrub-clean and earned a profit of Rs.2.5 lakh. Almost all her buyers were housewives.

Encouraged by this result, she decided to pursue a sales target of seventy-five thousand units in the coming year. She also hired two part-time employees to help cover a larger area for marketing, distributing, and collecting repeat orders of Scrub-clean in order to streamline the production and sales. In the second year, she barely managed to meet the sales target and her profitability also declined

3. Which of the following mistakes could Anamika have made that ultimately led to a dip in profitability or stagnant sales?
 - A. She had not negotiated annual rates with vendors who provided her raw materials.
 - B. She had absolutely no sales plan to base her production and distribution activities on.
 - C. She did not offer a choice of a smaller pack to the buyer.
 - D. She had not hired enough people to acquire additional sales.
 - E. She had not taken any customer feedback on the quality of the product.

1) A, C 2) A, B, C 3) B, C, E 4) A, B, D 5) Only B
4. Anamika has her sights set on acquiring new markets and diversifying her buyer base. She has shortlisted a few feasible options. Which one of the following options, if chosen, would yield immediate results and fulfil both of Anamika's goals?
 - 1) Launch a dishwashing bar soap and add to the current product offering.
 - 2) Look into expanding to American and European countries to increase business.
 - 3) Tie-up with hotels and restaurants for bulk orders of liquid dishwashing soap.
 - 4) Provide samples of Scrub-clean with women's magazines to increase consumption.
 - 5) Signup a celebrity to endorse Scrub-clean on television.

5. Assume that the last sentence of the case is negated (but all the other information given in the case is true) and the sales increase by about 20% annually, for the next two years. As per the information given in the case, what is the reason behind the success of this humble product?
- 1) It has a large distribution network.
 - 2) It is a good quality product offered at competitive price.
 - 3) It is a high quality product.
 - 4) It has a very aggressive sales team.
 - 5) It enjoys good word-of-mouth publicity.

Directions: Read the following case and choose the best alternative for the questions that follow.

Cricket is the most popular sport in Cric Land. Appreciable performances and victories in world tournaments over the years have strengthened the appeal of the game in the country. The support for the cricket team in this cricket-crazy country, however, swings between extremes depending on the performance of the team. Recently, a new format of the game was introduced, taking the total of international cricket formats to three.

The Cric Land cricket team started bearing the brunt of playing in the three formats simultaneously, with the players losing form and getting injured frequently due to burn-out. Also with the retirement of some senior players within a short span of time, the team was left with a majority of young and inexperienced players. Some of them had less than a year's experience in international cricket. This forced the Cricket Board to appoint 28-year-old Akshay Sinha, who till then was the captain of the T10 team, as the captain of the Test and ODI teams too. Akshay, who had led Cric Land to triumph in the last T10 World Cup, was an all rounder: right-arm fast opening bowler and right-handed lower order batsman. However, after his appointment as captain, Cric Land lost two consecutive overseas Test series. Once considered invincible at home, its teams started losing tournaments at home as well.

The Cricket Board constituted the G.N. Sinha Review Committee (headed by a former captain of the Indian team – G.N. Sinha) comprising former cricketers. The committee was asked to investigate the problems and chart out a roadmap for Cric Land cricket. After lengthy deliberations, the committee identified the following problems:

- Workload of captaining three formats has taken its toll on Akshay Sinha.
- Fitness levels of players are low due to which players are unable to cope with playing in three formats of the game simultaneously.
- Retirement of senior players in quick succession has created a void in the teams.
- Lack of competitiveness in domestic cricket tournaments has led to a lack of suitable replacements for retired players.
- Quality of domestic pitches is lower than international ones, so the players remain insufficiently prepared for international matches.

The committee recommended splitting the captaincy (i.e. having different captains for the three teams) as an immediate measure. Though the board was not completely convinced of the captainship abilities of any of the players, as the requirement was urgent, it decided to split the captaincy. The following captains were announced.

For the Test team: Akshay Sinha.

For the ODI team: Abhishek Kumar.

For the T10 team: Kishan Singh.

24-year-old Abhishek Kumar had been selected in the ODI team a year ago and in the Test team soon after. 22-year-old Kishan Singh was part of the ODI and T10 teams.

The overall response of the T10 team was positive. But some players of the ODI team were unhappy about being overlooked for captaincy in spite of having given strong performances. The appointment of Abhishek Kumar as the ODI captain was particularly resented by some, as, although immensely talented, Abhishek was less experienced than many other players in the team.

6. What could be the most likely unfortunate repercussion of Abhishek Kumar's appointment as the ODI captain?
 - 1) The overall performance of the ODI team would drop due to a drop in the morale of the unhappy players.
 - 2) Players who were overlooked for captaincy would deliberately underperform to show their non-cooperation.
 - 3) The team would petition the Board to persuade it to appoint someone else as the ODI-captain.
 - 4) One of the retired senior players would be called out of retirement to assist Abhishek in his new role.
 - 5) There would be strife within the team, as some players favour Abhishek and others are against him.
7. After the decision of splitting the captaincy was implemented, it was expected that Akshay Sinha would start performing to his potential and Cric Land would again become the formidable team it once was. However, three months after the decision, his captaincy has not had the desired impact. Also, his decision making has not been as astute as it should be.

What should the Board do to address the problem of Akshay's poor run?

 - 1) Appoint the ODI captain Abhishek Kumar as the captain of the Test team as well.
 - 2) Ask Akshay to give up the role of 'opening bowler' so that he can concentrate more on his captaincy.
 - 3) Persist with Akshay, and appoint a former successful Test captain as his mentor.
 - 4) Appoint a new coach for the Test team.
 - 5) Drop Akshay from the T10 and ODI teams, so that he can concentrate solely on Test cricket.

8. Which of the following steps should the Cricket Board take, to solve the problems pointed out by the review committee?
- Constitute an empowered committee to take decisions related to implementing the solutions.
 - Appoint experienced, full-time physiotherapists for the teams who will tour with the teams.
 - Appoint new pitch curators to overlook the preparation of pitches so that they match international standards.
 - Empower the review committee to make recommendations and execute the same.
 - Make retirement of players conditional, subject to availability of quality replacements.
- 1) A, B, C, D 2) A, B, C 3) B, C, D 4) A, B, E 5) B, C, E
9. Which of the following could be the permanent solution to the problem of poor performance by the players of the Cric Land cricket teams?
- Reduce player burnout by limiting the number of matches played by the teams.
 - Manage the retirement of senior players in such a way that there is always a mix of youth and experience in the team.
 - Limit the number of endorsements that can be taken up by the players.
 - Induct a qualified dietician to manage the players' diets so that they become healthier.
 - Create a pool of talented players and include them in the teams on a rotational basis.

Directions: Read the following case and choose the best alternative for the questions that follow.

Anil Gulati is a manager in a multinational firm in a metropolitan city. He lives with his parents (Mr. Dinesh Gulati and Mrs. Sunita Gulati), wife (Anjali) and 6-year-old son (Rohan). The Gulatis live in their own flat in a suburban area of the city. Anil's office is in the business hub of the city, which is located 20 kilometres away from his residence. Anil uses public transport, and it takes him an hour and a half to reach his office.

Anil has worked with the firm for 3 years now and is due for a promotion in 2 months. His family has started clamouring for a car. Anil also thinks that a car would reduce his commuting time and would make family outings a lot more enjoyable. He takes stock of his financial situation and calculates that he can afford a car which costs between Rs. 5 and 7 lakhs. Though the bigger the car, the greater the room, Anil is willing to compromise on comfort for fuel-efficiency. He wants a car which would minimize his fuel expenses. This is a very important consideration for him as he intends to use the car daily and fuel prices are quite high. His wife wants a comfortable, luxury car with driving aids. His son wants a big car, while his parents, who suffer from arthritis and have been advised by the doctor to keep their legs straight as much as possible, are fine with any car which will allow the whole family to travel together. Anil shortlists the following cars:

| Model | Category | Cost (Rs. In lakhs) | Fuel | Mileage (kmpl)* | Seats | Remarks |
|---------------|-----------|---------------------------|--------|--------------------|-------|--|
| Value Hatch | Hatchback | 4.5 | Petrol | 18 | 4 | Simple, small car with less space and minimum accessories, hydraulic steering, no driving aids, no additional safety features, roll up windows, and 4-speed manual gearbox. |
| Highway Rider | Sedan | 6.25 | Diesel | 15 | 5 | Medium-sized comfortable car, with power steering, 5-speed manual gearbox, automatic braking system, front power windows, leather seats, and ample leg room. |
| Off-Roader | SUV | 7 | Diesel | 12 | 7 | Big sports utility vehicle with maximum space, 6-Speed manual gearbox, automatic braking system, front airbags, and power windows. |
| Eco Sport | Hatchback | 5 | CNG | 18 (kmp kg)** | 4 | Fuel-efficient, small car, less legroom, hydraulic steering, 4-speed manual gearbox, no driving aids, less luggage space, fuel much cheaper than petrol. |
| Luxe Hatch | Hatchback | 6.75 | Petrol | 12 | 5 | Longer hatchback with high-end comfort features, power steering, climate-controlled air conditioning, automatic gearbox that makes the car easier to drive, and surround sound music system. |

* Kilometres per litre, since these are liquid fuels

** Kilometres per kilogramme, since CNG is a gaseous fuel

10. Based on what you know about Anil, what would be his order of preference from the short-listed cars?

- 1) Value Hatch, Eco Sport, Highway Rider, Luxe Hatch, Off-Roader
- 2) Value Hatch, Eco Sport, Off-Roader, Highway Rider, Luxe Hatch
- 3) Eco Sport, Value Hatch, Highway Rider, Luxe Hatch, Off-Roader
- 4) Highway Rider, Eco Sport, Off Roader, Value Hatch, Luxe Hatch
- 5) Eco Sport, Value Hatch, Highway Rider, Off-Roader, Luxe Hatch

11. The prevailing prices of the three fuels are as follows:

Petrol – Rs. 65 per litre

Diesel – Rs. 40 per litre

CNG – Rs. 25 per kilogramme

Anjali is adamant on buying Luxe Hatch since she feels that it is the most comfortable and luxurious car. Anil tries to reason with her and asks her to consider the other options since it is the least fuel efficient car, and would be the most expensive to run. Anil does further research and finds that higher-end versions of the other 4 cars are available at an additional cost of Rs. 75,000. These cars would have added luxury features and driving aids and would retain all features of the models he shortlisted. Also, the lower- end version of Luxe Hatch is Rs. 75,000 cheaper.

Which of the following would be the best alternative for Anil to convince Anjali to change her mind, so that it is a win-win for both of them?

- 1) Persuade Anjali to settle for the higher-end version of Eco Sport, which would have leather interiors and better air-conditioning.
- 2) Persuade Anjali to settle for the higher-end version of Highway Rider, which would have-luxury features and an automatic gearbox.
- 3) Persuade Anjali to settle for the Highway Rider, which is a comfortable car, and also cheaper in the long since it is a diesel car.
- 4) Persuade Anjali to settle for the higher-end version of Value Hatch, which would have a driving aid in the form of a power steering and leather interiors.
- 5) Persuade Anjali to settle for the lower-end version of Luxe Hatch, which would have less luxury features, but would retain its driving aids.

12. The preferences of which two parties are likely to be most similar?

- 1) Anil–Anjali
- 2) Anil–Rohan
- 3) Anjali–Rohan
- 4) Mr. and Mrs.Gulati (Senior)–Rohan
- 5) Mr. and Mrs.Gulati (Senior)–Anjali

13. If Anil takes his parents' wishes and problems into consideration, which of the following will Anil end up buying?

- 1) Value Hatch
- 2) Off-Roader
- 3) Highway Rider
- 4) Luxe Hatch
- 5) Eco Sport

DM-5.2 | DECISION MAKING-2**CLASS EXERCISE**

DIRECTIONS for questions 1 to 4: Read the following case and choose the best alternative for questions that follow.

One of the basic observations regarding people's reaction to outcomes is that losses appear larger than corresponding gains. This asymmetry in the evaluation of positive and negative outcomes is called loss aversion. Loss aversion gives rise to a value function that is steeper in the negative than in the positive domain. An immediate implication of loss aversion is that people will not accept an even chance to win or lose \$X, because the loss of \$X is more aversive than the gain of \$X is attractive. Indeed, people are generally willing to accept an even-chance prospect only when the gain is substantially greater than the loss. Many people, for example, reject a 50-50 chance to win \$200 or lose \$100, even though the gain is twice as large as the loss (Tversky and Shafir 1992a). The example above illustrates loss aversion in decisions involving risky prospects. The principle of loss aversion applies with equal force to riskless choice, between options that can be obtained for certain (Tversky and Kahneman 1991). It entails that the loss of utility associated with giving up a good that is in our possession is generally greater than the utility gain associated with obtaining that good. An instructive demonstration of this effect is provided in an experiment involving the selling of mugs (Kahneman, Knetsch, and Thaler 1990). A class is divided into two groups. Some participants, called sellers, are given a decorated mug that they can keep, and are asked to indicate the lowest price for which they would be willing to sell the mug. A second group, called choosers, are asked to indicate the amount of money that they would find as attractive as the mug. Subjects in both groups are told that, after they state their price, an official market price \$X will be revealed and that each subject will end up with a mug if his or her asking price exceeds \$X, or with \$X if it is more than the subject's asking price.

Notice that the choosers and the sellers are facing precisely the same decision problem: they will all end up with either some money or a mug, and in effect need to decide how much money they will be willing to take in place of the mug. Hence, standard economic analysis predicts identical asking prices for the two groups. The two groups, however, evaluate the mug from different perspectives: the choosers compare receiving a mug to receiving a sum of money, whereas the sellers compare retaining the mug to giving up the mug in exchange for money. Thus, the mug is evaluated as a potential gain by the choosers and as a loss by the sellers. Consequently, loss aversion, the notion that losses loom larger than corresponding gains, predicts that the sellers will price the mug higher than the choosers. This prediction was confirmed by the data: the median price of the sellers (\$7.12) was more than twice as large as the median price for the choosers (\$3.12). The difference between these prices reflects an endowment effect, which was produced, instantaneously it seems, by endowing individuals with a mug.

1. Ramesh has won a bike in a lottery contest. Ramesh went to the lottery office to collect the bike. At the office the manager of the lottery office asked Ramesh to quote a price at which he is willing to sell the bike. The manager also asks another person Ritesh, at what price is he willing to buy the bike. Which of them will quote a higher price?
 - 1) Ramesh
 - 2) Ritesh
 - 3) Both will quote the same price
 - 4) None of them can quote the price
 - 5) Cannot be determined with the information provided in the passage.

2. Ritesh wants to invest his money in one of the several options available to him. Among the following options, which one is Ritesh most likely to choose, based on the information given in the passage?
 - 1) A gain of Rs.400 on winning and loss of Rs.100 on losing in a game where chances of winning are 25%
 - 2) A gain of Rs.1000 on winning and a loss of Rs.100 on losing in a game where chances of winning are 10%
 - 3) A loss of Rs.900 on losing and a gain of Rs.200 on winning in a game where chances of losing are 10%
 - 4) A loss of Rs.180 and a gain of Rs.320 in a game where chances of winning are 50%.
 - 5) All options are equally probable for Ritesh's investment.

3. According to the given passage, Ramesh would agree with which of the following proposals?
 - 1) Exchange his bike which he won in a lottery with a laptop of same price. (It is given that he doesn't know the price of the bike or the laptop and also he doesn't have a laptop or a bike.)
 - 2) Pay Rs.50000 to get a bike of cost price Rs.50000. (He doesn't know the price of the bike.)
 - 3) He will invest in a game where he can win with a probability of 50% the amount for winning and losing are same.
 - 4) He will invest in a game where chances of winning Rs.50000 are 10% and losing Rs.25000 are 20%
 - 5) None of the above.

4. Ritesh can play four games A, B, C and D in which probabilities of winning are 0.2, 0.25, 0.5 and 1 respectively. The gain associated with them are Rs.1000, Rs.800, Rs.500 and Rs.200 respectively. And the losses are Rs.500, Rs.400, Rs. 800 and Rs.1000 respectively. Which game is Ritesh most likely to play? (Assume probability of losing = 1 – probability of winning).
 - 1) A
 - 2) B
 - 3) C
 - 4) D
 - 5) A or B

DIRECTIONS for questions 5 to 8: Read the following case and choose the best alternative for questions that follow.

Hotel Sunrise is well-known for tasty food and good service. The hotel is famous for its Snack items, Lunch items, Chinese, Mughalai and Continental varieties and Desserts. Five expert cooks are the backbone of the kitchen and share the major portion of the responsibility to ensure the smooth delivery of tasty food and service. The manager of this hotel, Vikram, maintains a record of the expertise of his five cooks on the basis of two parameters, the time required to prepare a dish in which the cook is an expert and his probability of meeting the standard of taste for that particular dish.

Abhilash, an expert in preparing Snack items, Chinese varieties and Desserts needs 1.5 hours, 2 hours and 1 hour for preparation respectively. The probability that he will meet the taste standard is 0.8 for Snack items and 0.9 for the other two dishes.

Bikash is an expert in preparing Snack items, Lunch items, Mughalai varieties and Continental varieties. He takes 1 hour for Snack items and 3 hours for Lunch items, Mughalai varieties and Continental varieties. His probabilities are 0.7, 0.9, 0.9 and 0.9 for Snacks, Lunch, Mughalai varieties and Continental varieties respectively.

Being a specialist in Snack items, Mughalai varieties and Continental food, Chandrakant needs 1.5 hours for Snack items and has a probability of 0.7 of meeting the taste standard. He takes 3 hours for Mughalai varieties and 2 hours for Continental varieties with probabilities of 0.8 and 0.7 respectively.

David can show his expertise in Lunch items, Chinese varieties and Continental varieties by taking 2, 2 and 3 hours respectively. His probability of meeting taste standards is 0.8 in both Lunch items and Chinese varieties, and 0.9 in Continental varieties.

Ejaz has proficiency in Mughalai varieties and Desserts. His probabilities for Mughalai varieties and Desserts are 0.8 and 0.9 respectively. He needs 2 hours to prepare each of them.

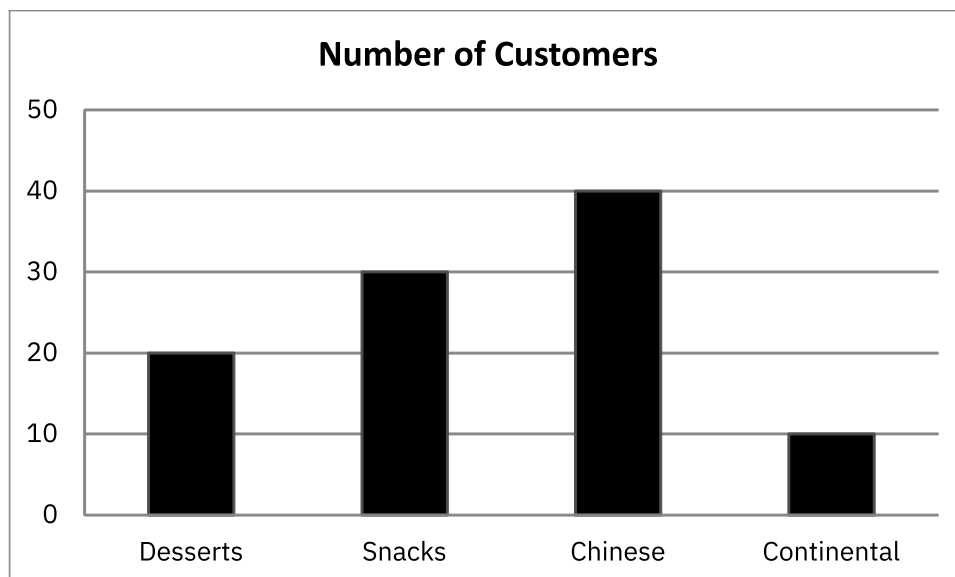
Vikram has set a guideline that no cook will prepare two dishes one after the another. Cooks are supposed to prepare only those dishes in which they have expertise. He has also set a sequence to be followed. The kitchen starts with Snack items, followed by Lunch items. Mughalai, Chinese and Continental varieties should be prepared simultaneously, after the preparation of Lunch items. Desserts are prepared last.

5. Due to health reasons, Abhilash is not going to prepare more than 1 dish. What is the minimum time duration taken to prepare all the dishes if a break of 1 hr is given after 4 hours of cooking?
- 1) 7.5 hours 2) 8.5 hours 3) 8 hours 4) 10 hours 5) 9.5 hours

6. The owner of the hotel has decided that the cooks will work for 8.5 hours. What can Vikram's choice be, if meeting taste standards is given priority?

- 1) III only 2) II only 3) Any of III or IV
4) Any of I or II 5) None of these

7.



The graph indicates the number of customers ordering four types of dishes on a particular Saturday. No other orders are placed and, hence, those dishes are not prepared. When, for a particular dish, the number of customers increases, quick service is given priority, but, whenever the number of customers is comparatively less, taste is given priority.

On one such Saturday, if one of the cooks is relieved, who among the following can that be?

- 1) Chandrakant 2) David 3) Ejaz
4) Either (1) or (2) 5) Either (1) or (3)

8. At the end of the financial year, Vikram has to give a salary hike to each of the cooks. He has tabulated all possible arrangements of the cooks according to the sequence of food items to be prepared and the dishes in which the cooks have expertise. He decided to give the highest raise in salary to the cook whose frequency is maximum in the table. Who, among the following, will get the highest raise in salary?

- 1) Abhilash 2) Bikash 3) Chandrakant 4) David 5) Ejaz

DIRECTIONS for questions 9 and 10: Read the following case and choose the best alternative for questions that follow.

The tag line of the famous children's milk drink was as follows:

**"If you cannot have Asterix's Magic Potion... have BOURNE-VITA
one cup of your favourite drinks "Bourne-Vita" has...
Protein content somewhere between that of:**

- 1 – 2 eggs OR
- 2 – 3 cups of milk OR
- 200 – 300 gm of meat OR
- 4 – 5 bowls of sprouted pulses

Carbohydrate / energy content somewhere between that of

- 1 – 2 bowls of oat meal OR
- 2 – 3 potatoes OR
- 3 – 4 loaves of bread OR
- 5 – 6 bananas"

Note: From the data given in the advertisement, we can interpret that the protein content of 1 cup of "Bourne-Vita" is somewhere between the protein content of 1 egg and that of 2 eggs, and so on.

9. Which of the following, if true, would disprove the claims made by "Bourne-Vita"?
 - 1) 1 bowl of oatmeal has lesser energy content than 3 bananas.
 - 2) 1 potato has lesser energy content than 2 bananas.
 - 3) 1 bowl of oatmeal has greater energy content than 5 bananas.
 - 4) 1 potato has greater energy content than 3 bananas.
 - 5) None of these
10. Assuming the claims made by "Bourne-Vita" to be true, which of the following is definitely a better substitute for 2 cups of "Bourne-Vita"(in terms of both protein and energy content)?
 - 1) 4 cups of milk, 4 bowls of pulses, 1 potato, 3 bananas and 2 loaves of bread.
 - 2) 2 eggs, 250 gm of meat, 1 potato, 3 bananas and 2 loaves of bread.
 - 3) 4 cups of milk, 4 bowls of pulses, 2 potatoes, 2 bananas and 2 loaves of bread.
 - 4) 2 eggs, 250 gm of meat, 2 potatoes, 2 bananas and 2 loaves of bread.
 - 5) None of these.

DIRECTIONS for questions 11 to 14: Read the following case and choose the best alternative for questions that follow.

Four Oil Companies PNGC, Zekos, TOC and Aliance are competing to win an Oil Project at Small Fields. The bidding process is such that the companies are graded on four parameters, i.e., Turnover, Local Employment Opportunities, Experience and Technical Expertise. Based on the grading, a weighted average called Bid Change Factor (BCF) is calculated as

$BCF = [\text{Sum of (Grade Value} \times \text{Parameter Weight) for all four parameters}]/10.$

The actual bid submitted by the companies is then divided by the BCF to calculate the modified bid. Based on the modified bid the project is then handed over to one of the oil companies. The lowest modified bidder wins the project.

Due to a hardware failure, some of the information was lost. But qualitative information about the bid table was still available.

| Grade | Grade Value |
|-------|-------------|
| A+ | 10 |
| A | 8 |
| B | 6 |
| C | 4 |

| Parameters | Parameter Weight |
|--------------------------------|------------------|
| Turnover | 0.1 |
| Local Employment Opportunities | 0.2 |
| Experience | 0.3 |
| Technical Expertise | 0.4 |

| Parameter | Company Name | | | |
|--------------------------------|--------------|----------------|----------------|---------|
| | PNGC | Zekos | TOC | Aliance |
| Turnover | B | | B | A+ |
| Local Employment Opportunities | | | | |
| Experience | A | | A+ | B |
| Technical Expertise | | | | A |
| BCF | | | 0.6 | |
| Actual Bid | | | Rs. 800 Crores | |
| Modified Bid | | Rs. 875 Crores | | |

Qualitative Data:

- No two grades for PNGC are same.
- PNGC and Aliance have obtained the same highest possible grade in Local Employment Opportunities.
- Zekos has received the same grade in all categories.
- BCF for Zekos and Aliance is the same.

- v. Actual bid of PNGC is greater than Rs.600 Crores.
vi. Actual bid of Aliance is greater than Zekos by Rs.50 Crores.
11. Who won the bid?
1) PNGC 2) Aliance 3) Zekos 4) TOC 5) PNGC or Zekos
12. What was Zeko's grade in technical expertise?
1) A 2) B 3) A+
4) C 5) Cannot be determined
13. What was PNGC's BCF?
1) 0.8 2) 0.7 3) 0.66 4) 0.6 5) 0.54
14. Due to a mistake on the part of the bid winner the project had to be handed over to the second lowest bidder. However, he was asked to match the original lowest modified bid. By what amount he had to reduce his actual bid?
1) Rs. 16.67 Crores 2) Rs. 16.33 Crores 3) Rs. 17 Crores
4) Rs. 18 Crores 5) Cannot be determined

DIRECTIONS for questions 15 to 18: Read the following case and choose the best alternative for questions that follow.

Table 1 gives the data about maximum number of companies that can be handled by Placement Committee (Placecom) members per slot.

| Placecom Member | Slot 1 | Slot 2 | Slot 3 | Slot 4 |
|-----------------|--------|--------|--------|--------|
| Anoop | 0 | 2 | 2 | 3 |
| Arun | 2 | 1 | 1 | 1 |
| Debajit | 2 | 1 | 1 | 1 |
| Kavish | 0 | 3 | 1 | 1 |
| Pallavi | 2 | 1 | 1 | 0 |
| Pranav | 2 | 1 | 1 | 1 |
| Shalabh | 0 | 2 | 2 | 1 |

Table 1

- i. A Placecom Member can handle only one company at a time.
ii. A single company is handled by one and only one Placecom Member.
iii. The processes have to run continuously, with out any breaks.

The two tables below give the details about the Dur. and Off. about the different companies.

Note: Dur: Duration of the process in hours.

Off: Number of Offers made on campus.

Company Details

| | Slot 1 | | | Slot 2 | |
|---------------------|---------------|-----|-------------------|---------------|-----|
| Name of Company | Dur | Off | Name of Company | Dur | Off |
| Mitibank | 3 | 1 | Sadbury | 4 | 3 |
| CSBC | 6 | 1 | ITD | 6 | 3 |
| Tandard Bartered | 5 | 2 | Fritannia | 4 | 4 |
| JBN Mro | 3 | 3 | Narico | 3 | 4 |
| Bank of American | 2 | 4 | Beckitt Senckiser | 6 | 3 |
| BICICI Bank | 6 | 3 | Tepsi | 3 | 2 |
| Bindustan Ever Ltd. | 5 | 4 | Boke | 4 | 3 |
| Rocster & Amble | 2 | 5 | Mastrol | 4 | 4 |
| | | | Sian Paints | 7 | 1 |
| | | | Polgate Calmolive | 2 | 2 |

Table 2 (i)

Table 2 : Company Details

| | Slot 3 | | | Slot 4 | |
|------------------------|---------------|------------|------------------------|---------------|------------|
| Name of Company | Dur | Off | Name of Company | Dur | Off |
| Winfosys | 4 | 2 | Mata Motors | 2 | 4 |
| BCS | 2 | 4 | Sitan | 3 | 4 |
| ETS | 4 | 4 | Kata AIG | 2 | 3 |
| Fipro | 3 | 2 | SUTI Mutual Fund | 1 | 1 |
| Mi Flex | 3 | 1 | SIDBIT | 2 | 3 |
| SUTI Bank | 4 | 2 | Prito Lays | 3 | 2 |
| MBI | 2 | 3 | Fair India | 2 | 2 |
| Kitifinancial | 2 | 2 | MICI Paints | 1 | 1 |

Table 2 (ii)

Details of Placement Dates and Slot Timings are given in the table below:

| Slots | Dates | Timings | Days |
|--------------|--------------|-----------------|-------------|
| Slot 1 | 10.03.08 | 9:00am - 5:00pm | Thursday |
| Slot 2 | 11.03.08 | 9:00am - 5:00pm | Friday |
| Slot 3 | 12.03.08 | 9:00am - 1:00pm | Saturday |
| Slot 4 | 12.03.08 | 2:00pm - 6:00pm | Saturday |

Table 3

15. If Debajit handles JBN Mro, Pranav handles BICICI Bank and Arun handles Bank of American, then who handles Bindustan Ever Ltd.?
- 1) Debajit or Pallavi
 - 2) Pallavi
 - 3) Debajit or Pranav
 - 4) Arun or Pranav or Pallavi
16. If Pallavi fell ill on 11th March 2008 and could not attend to any company on that day, then exactly 8 offers could be acquired by which of the following Placecom members on that day?
- 1) Only Kavish
 - 2) Kavish and either Anoop or Shalabh
 - 3) Either Shalabh or Anoop
 - 4) None of these
17. Debajit worked for 15 hours on the first two days, and for only two hours on the last day of placements. The companies that he could have dealt with:
- 1) Bindustan Ever Ltd, Mitibank, Sian Paints and SIDBIT
 - 2) Bindustan Ever Ltd., Narico, Fritannia and MBI
 - 3) Roter and Amble, Sian Paints, SUTi Mutual Fund and MICI Paints
 - 4) Mitibank, Narico, Fritannia and Kitifinancial
18. Which of the following statements is/are true?
- I. If Anoop does not handle Kitifinancial, then it has to be handled by Shalabh.
 - II. Sitan and Prito Lays cannot be handled by Anoop or Pallavi.
 - III. The maximum number of offers that can be delivered by any Placecom member is 21.
 - IV. SUTI Mutual Fund commences its process at 2:00 pm and MICI Paints commences its process at 4:00 pm.
- 1) I, II and III only
 - 2) II and III only
 - 3) II and IV only
 - 4) None of these

DIRECTIONS for questions 19 to 21: Read the following case and choose the best alternative for questions that follow.

The daily demand (in the number of customers) for air travel from city A to city B and from city B to city A each is 1200 customers. The break-down of the demand by time is given in the following table.

| Time Period in which travel starts | % of daily demand |
|------------------------------------|-------------------|
| 6 a.m – 8:59 a.m | 30% |
| 9 a.m – 11:59 a.m | 20% |
| 12 noon – 2:59 p.m | 10% |
| 3 p.m – 5:59 p.m | 15% |
| 6 p.m – 8:59 p.m | 25% |
| 9 p.m – 5:59 a.m | 0% |
| Total | 100% |

The demand for travel from city B to city A is identical to that from city A to city B. Any unmet demand in any time period does not spill over to the next time period.

A certain airline X that flies only between city A and city B has the following costs:

- A surcharge V per passenger, of \$10 to be paid to the Airlines Regulatory Board.
- A fixed cost F of \$7200, per trip made.

The airline owns 2 planes, each with a maximum capacity of 150 passengers. One plane is parked in city A and the other in city B at the beginning of the day. One trip (from city A to city B or city B to city A) takes 1.5 hours. The airline charges a uniform fare of \$100 per passenger per trip. Customer satisfaction index (CSI) is defined as:

$$CSI = 1 - \frac{\text{unmet demand}}{\text{total number of passengers that the airline carries on that day}}$$

19. If the airline wants to make exactly 10 trips (5 each way) per day in such a way that maximizes the profit for the airline, which of the following cannot be the start time for the third flight from A to B?
 1) 9:00 a.m. 2) 1:30 p.m. 3) 3:00 p.m. 4) 4:30 p.m. 5) 10:30 a.m.

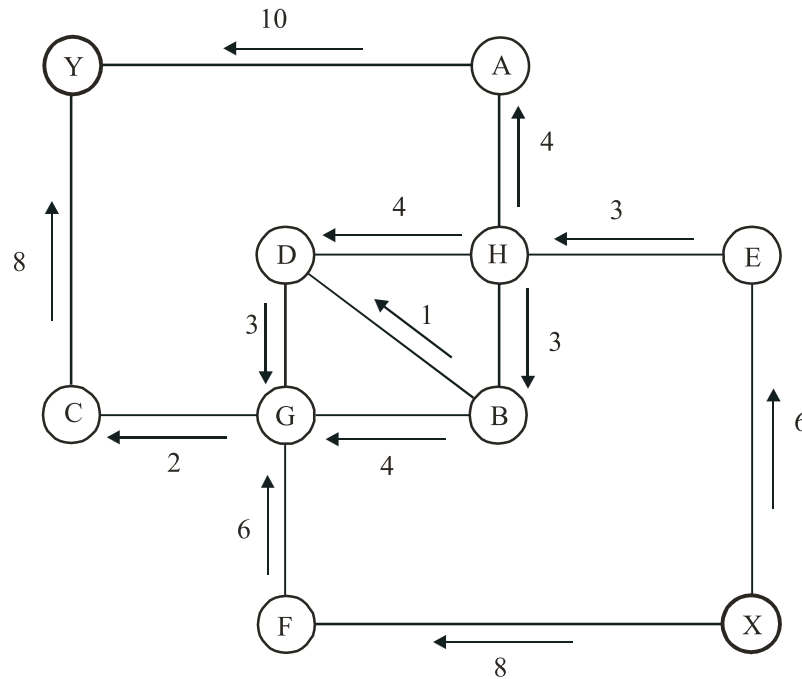
20. If the airline wishes to achieve a CSI of 1.00 by purchasing another smaller aircraft, while making no losses on the smaller aircraft, what is a possible cost structure for the smaller aircraft? Assume that there are only surcharge costs per passenger and a fixed cost per trip while the fare per passenger is the same.
 1) Fixed cost per trip of \$2600 and a surcharge of \$15 per passenger
 2) Fixed cost per trip of \$2700 and a surcharge of \$12 per passenger
 3) Fixed cost per trip of \$2800 and a surcharge of \$7 per passenger
 4) Fixed cost per trip of \$2500 and a surcharge of \$16 per passenger
 5) Fixed cost per trip of \$2600 and a surcharge of \$14 per passenger

21. Let P be the maximum profit possible in the first time period 6 a.m. to 8:59 a.m. Based on new information, it is known that 60% of the demand in the first time period consists of business travellers who will pay \$250 per trip but will not wait beyond 7:00 a.m. Hence, the airline plans to purchase two more planes with a capacity of 150 each. If it has to maintain the same profit P , what is the fixed cost per trip that the airline has to pay for the new planes? Assume the same surcharge of \$10 per passenger.
 1) \$18900 2) \$50000 3) \$55000 4) \$60000 5) \$35000



PRACTICE EXERCISE

DIRECTIONS for questions 1 to 5: Read the following case and choose the best alternative for questions that follow.



The Adventure Cycling Club (ACC) organises an annual celebrity cycling event to raise charity for a noble cause. Each year, the celebrity participants are divided equally into five teams.

- Each of the teams starts from point X, at the same time, and reaches point Y taking one of the five routes as shown in the figure above. No two teams traverse the same route during the event.
- A, B, C, D, E, F, G and H are stopover points, where the participants have to stop for a fixed time as decided by the ACC. The stopover time at each of the points is not necessarily the same.
- The arrows along the route show the direction in which the participants travel along a path connecting two points. The numbers alongside the arrows denote the 'cycling time', i.e., the time taken to cycle along that path. Note that all the participants travelling on a particular path have the same cycling time.
- The time taken by the participants to complete the event is equal to the sum of the cycling time and the stopover time at the various points along their route.

- If the ACC decided to have an equal stopover time of 2 minutes at all points, then what is the difference between the time taken to reach Y by the team that reaches first and the team that reaches last?

- | | | |
|--------------|------------------|--------------|
| 1) 2 minutes | 2) 8 minutes | 3) 9 minutes |
| 4) 7 minutes | 5) None of these | |

2. The ACC decided to regulate the stopover time at the various points in such a way that all the teams reached point Y at the same time. If the stopover time at points C, E, G and H was 2 minutes each, then what was the total time taken by any team to complete the event?
 - 1) 34 minutes 2) 36 minutes 3) 38 minutes
 - 4) 40 minutes 5) 32 minutes

3. Which of the following could be the stopover time (in minutes) at points A, B, D and F, respectively, if the information given in the previous question is true?
 - 1) 6, 0, 2, 7 2) 6, 0, 0, 7 3) 7, 2, 0, 6 4) 7, 0, 0, 6 5) 7, 2, 2, 6

4. Which of the following cannot be the stopover time at points A, B, C, D, E, F, G and H, respectively, if exactly 3 teams reached Y simultaneously?
 - 1) 7, 1, 0, 1, 1, 5, 1, 1 2) 6, 1, 0, 1, 1, 5, 1, 1
 - 3) 7, 1, 0, 1, 1, 5, 2, 1 4) 6, 1, 0, 1, 1, 5, 2, 1
 - 5) 5, 1, 0, 1, 1, 5, 2, 1

5. In a particular year, the travel time along route B-G was reduced to 3 minutes due to improved road conditions. If the stopover timing (in minutes) at points A, B, C, D, E, F, G and H is 7, 2, 0, 1, 1, 5, 1 and 1, respectively, then which of the following statements is true?
 - 1) Exactly 2 out of 5 teams reached Y in 28 minutes.
 - 2) Exactly 4 out of 5 teams reached Y in 32 minutes.
 - 3) Exactly 3 out of 5 teams reached Y in 30 minutes.
 - 4) Exactly 2 out of 5 teams reached Y in 30 minutes.
 - 5) Exactly 3 out of 5 teams reached Y in 32 minutes.

DIRECTIONS for questions 6 to 9: Read the following case and choose the best alternative for questions that follow.

Following is an extract of an article by an investment analyst, Mr. Sharecropper

LET'S GET RICH...

I saw a movie last week, The Pursuit of Happiness, a true story about a guy named Chris Gardner who, after becoming completely broke, decides to try his hand at the stock markets as his last hope. What follows next is the classic, real-life rags-to-riches story. The movie set me thinking. Many of you who might not be my regular readers but might have come to this article after reading the heading could become Chris Gardners and, surely, you need not wait till you are broke to enter the markets. So, this week, I have decided to do away with my usual analysis of the markets and offer a simple do-it-yourself recipe for all of you who might want to invest in stocks but have no idea how to do so.

The first thing that you need to decide is how quickly you want to get rich. Do you want the markets to give you your daily bread? Do you want to make money over the next 3 to 6 months? Or are you looking at investing in the stock markets like you do in property? Depending on which bracket you fall into, you are a Short, Medium or Long-term investor respectively.

Before I list some strategies for buying and selling in each of these investor categories, let's get familiar with some stock market jargon. One of the foremost ratios used to evaluate a company is

called the P/E ratio; it is nothing but the ratio of the Price of a company's share to its Earnings Per Share. The Earnings Per Share, or EPS, is the ratio of the earnings of a company to the number of its shares in the market. Don't worry, you need not calculate these ratios; you can easily find them on websites or in the pink papers.

Apart from these two ratios, which indicate the attractiveness of a company's shares for purchase, you need to track the actual movement of the price of the shares you want to invest in. You need to find out the highest and the lowest prices the shares touched, in the last month, the last quarter or the last year. The frequency of tracking depends on the kind of investor you are - Short, Medium or Long.

Along with the performance of an individual company, you should also evaluate the P/E ratios and EPS values of the sector to which the company belongs, and compare the two. This will give you a more precise picture of the company's performance.

Now that we have learnt the important words in the language of the bourses, let's look at some guidelines to transact in this world. The following are, according to me, the yardsticks for measuring a good BUY.

| Short-term Buy | Long-term Buy |
|---|--|
| I. Company P/E > 1.1 (Sectoral P/E) | I. Company P/E > 1.3 (Sectoral P/E) |
| II. Company EPS > 1.1 (Sectoral EPS) | II. Company EPS > 1.3 (Sectoral EPS) |
| III. Price per share should be less than or equal to the average of the 52-week High and Low | III. Sectoral 52-week High-Low Fluctuation $[(H - L) / H]$ should be between 20% to 30% |
| | IV. The difference between the Company 52 -week High-Low Fluctuation $[(H - L) / H]$ and the Sectoral 52-week High-Low Fluctuation should be within + 5 percentage points. |
| Medium-term Buy | |
| I. Company P/E > 1.2 (Sectoral P/E) | |
| II. Company EPS > 1.2 (Sectoral EPS) | |
| III. Sectoral Quarterly High-Low Fluctuation $[(H - L) / H]$ should be between 10% to 15% | |
| IV. The difference between the Company Quarterly High-Low Fluctuation $[(H - L) / H]$ and the Sectoral Quarterly High-Low Fluctuation should be within + 5 percentage points. | |

For all three views(short/medium/long), a good price to SELL at is a price that is 30% more than the buying price.

Just to give you a better idea of all the numbers and percentages I am talking about, I am giving you a summary of all my investments in the stock market in the past one year. One book with excellent advice on how to invest in the stock markets is The Intelligent Investor by Benjamin Graham. It is endorsed by none other than Warren Buffet, the second richest man in the world who made his fortune by investing astutely in the markets.

Table 1 (Company data)

| Company | Sector | P/E Ratio | EPS | Quarterly | | 52 Week | | Type |
|-------------|-----------|-----------|-------|-----------|------|---------|------|------|
| | | | | High | Low | High | Low | |
| CICIC Bk | Bankex | 17.25 | 26.4 | 450 | 400 | 475 | 380 | S |
| LKB Bk | Bankex | 19.5 | 36 | | 612 | | 600 | M |
| SIB Bk | Bankex | 21 | 32.4 | 750 | 638 | 800 | 615 | L |
| SIXA Bk | Bankex | 18.75 | 30 | 588 | 490 | 594 | 429 | M |
| ITIC Bk | Bankex | 19.5 | 31.2 | 630 | 525 | 650 | 450 | M |
| Dalliance | Oil & Gas | 23 | 36.45 | 1005 | 775 | 1030 | 765 | L |
| AYYOCL | Oil & Gas | 23 | 37.8 | 861 | 735 | 960 | 720 | L |
| HPLC | Oil & Gas | 23.8 | 32.4 | 800 | 680 | 880 | 640 | M |
| PBCL | Oil & Gas | 22.1 | 29.7 | 700 | 600 | 800 | 550 | S |
| Tortoise | Oil & Gas | 25.5 | 33.75 | 960 | 800 | 1000 | 760 | M |
| Porus | Metal | 24.7 | 33.6 | 885 | 705 | 915 | 690 | S |
| STAIL | Metal | 25.65 | 32.2 | 860 | 799 | 920 | 800 | S |
| Arcenal | Metal | 27 | 37.8 | 1050 | | 1120 | 875 | L |
| KMB | Metal | 27 | 39.2 | 1230 | 1060 | 1240 | 950 | L |
| Pital | Metal | 24.7 | 35 | 900 | 780 | 960 | 720 | M |
| Outfosys IT | 24 | 38.4 | 1008 | 900 | 1125 | 900 | S | 3 |
| Dipro | IT | 26 | 51.2 | 1340 | 1206 | 1375 | 1000 | M |
| Nityam | IT | 28 | 38.4 | 1120 | 945 | 1225 | 875 | M |
| VCS | IT | 25 | 44.8 | 1200 | 1050 | 1350 | 900 | M |
| Pati | IT | 27 | 56 | 1600 | 1480 | 1800 | 1420 | L |

Table 2 (Sector data)

| Sector | P/E Ratio | EPS | Quarterly | | 52 Week | |
|---------|-----------|-----|-----------|-------|---------|------|
| | | | High | Low | High | Low |
| Bankex | 15 | 24 | 8100 | 7100 | 8900 | 6400 |
| Oil&Gas | 17 | 27 | 8500 | 7400 | 8700 | 6200 |
| Metal | 19 | 28 | 12000 | 10500 | 12500 | 9800 |
| IT | 20 | 32 | 4100 | 3600 | 4700 | 3500 |

Note: S – Short Term, M – Medium Term, L – Long Term

Additional Information:

For company data:

52 week High/Low: The highest/lowest price (in Rs.) that the share touched in the last 52 weeks

Quarterly High/Low: The highest/lowest price (in Rs.) that the share touched in the last 3 months

For both company as well as sector data, Fluctuation is calculated using the formula $\frac{\text{High} - \text{Low}}{\text{High}} \times 100$

6. Which of the following can be Arcenal's Quarterly low?
 - 1) 810
 - 2) 830
 - 3) 860
 - 4) 880
 - 5) Any of the above

7. Which of the following of Share-cropper's medium-term investments can become a long-term investment?
 - 1) HPLC
 - 2) Tortoise
 - 3) Dipro
 - 4) Nityam
 - 5) None of these

8. Which of the following represents a correct course of action according to Sharecropper's strategies with respect to the following company's shares?

Company : PBN Berlinas
 Sector : Bankex
 P/E Ratio : 19.5
 EPS : 30
 52-Week High : Rs.600
 52-Week Low : Rs.420

Quarterly difference between High and Low was between Rs.50 and Rs.80

 - 1) Buy Short-term
 - 2) Buy Long-term
 - 3) Buy Medium-Term
 - 4) Cannot be determined
 - 5) None of the above

9. For a profit of Rs. 330 per share, which of the following company's shares purchased in the last one year can Sharecropper definitely sell?
 - 1) Dalliance
 - 2) Arcenal
 - 3) Outfosys
 - 4) KMB
 - 5) None of these

DIRECTIONS for questions 10 to 14: Read the following case and choose the best alternative for questions that follow.

Given below is an advertisement of a Movie festival being held at a premier multiplex with the reviews and schedules of all the movies being screened at the festival.

Movie MAGIC at Cine-Labs, Kalina

...a one-of-a-kind movie festival at CineLabs, Kalina

Noon to MidNite - watch your favourite Hindi and English movies at unbelievable prices
select from 18 different movies shown across 5 different screens.

WATCH 5 movies in a day and get a 20% discount on the tickets!!!

Watch a movie with your best friend and enjoy a whole lot of freebies!!!

| Schedule... | | | | |
|-----------------------|------------------------------|-------------------------------|-----------------------|------------------------------|
| Screen 1 | Screen 2 | Screen 3 | Screen 4 | Screen 5 |
| Ratatouille | French Kiss | Dilwale Dulhaniya Le Jaayenge | Underdog | Andaaz Apna-Apna |
| High School Musical 2 | Kabhi Khushi Kabhi Gam | Hum Saath Saath Hain | Scary Movie 5 | Kung-fu Hustle (Chinese) |
| Golmaal | Ratatouille | Scary Movie 5 | Dhoom 2 | Saawariya |
| Om Shanti Om | Matrix 4 – The New Beginning | Underdog | High School Musical 2 | Matrix 4 – The New Beginning |
| Shutter (Thailand) | Om Shanti Om | The Ring | Saawariya | Saw 3 |

| review | | | ...hindi |
|-------------------------------|---------|------------------|-----------|
| Title | Genre | Show Timing | my TAKE |
| Kabhi Khushi Kabhi Gam | Drama | 2:00 PM | * * * |
| Hum Saath Saath Hain | Drama | 3:00 PM | ½ |
| Dilwale Dulhaniya Le Jaayenge | Drama | 12:00 PM | * * * * |
| Saawariya | Romance | 5:00 PM, 9:00 PM | * * * ½ |
| Om Shanti Om | Romance | 7:00 PM, 9:00 PM | * * * * ½ |
| Dhoom 2 | Action | 4:00 PM | * * * |
| Golmaal | Comedy | 4:00 PM | * * * * |
| Andaaz Apna-Apna | Comedy | 12:00 PM | * * * |

| review | | | ...english |
|------------------------------|----------|-------------------|-------------|
| Title | Genre | Show Timing | my TAKE |
| Underdog | Children | 12:00 PM, 8:00 PM | * * * |
| Ratatouille | Children | 12:00 PM, 5:00 PM | * * * * |
| High School Musical 2 | Children | 2:00 PM, 7:00 PM | * * 1/2 |
| Shutter (Thailand) | Horror | 10:00 PM | * * * * 1/2 |
| Ring | Horror | 10:00 PM | * * * * |
| Saw 3 | Horror | 10:00 PM | * * * 1/2 |
| French Kiss | Romance | 12:00 PM | * * * |
| Kung-fu Hustle (Chinese) | Action | 3:00 PM | * * |
| Matrix 4 - The New Beginning | Action | 7:00 PM, 8:00 PM | * * * * 1/2 |
| Scary Movie 5 | Comedy | 2:00 PM, 6:00 PM | * |

Additional information:

All English movies have a two hour duration whereas all Hindi movies have a three hour duration. Assume that everyone wants to watch as many movies as they can.

Assume that nobody repeats a movie unless stated otherwise.

Assume that everyone watches a movie from start to finish.

The time taken to move from one screen to the other is negligible.

Sample interpretation of myTAKE: Underdog has 3 stars while Shutter (Thailand) has $4\frac{1}{2}$ stars.

10. Udit and Unmesha plan to see 3 English movies and 2 Hindi movies in the day. However, they want to make sure that they watch the most critically acclaimed movies. They judge this by adding up the number of stars the movies have got in the (myTAKE) ratings and maximizing this sum. Given that the first and the last movie they saw were English movies, which of the following movies will definitely be in their final list?

- 1) Sawariya
- 2) Matrix 4
- 3) Golmaal
- 4) Kabhi Khushi Kabhi Gam
- 5) None of these

11. Toby and his girlfriend Tanaaz are very excited about this One Day Film Festival. However, there's a small issue. Tanaaz has agreed to come with Toby on the condition that they will watch all the three Romantic movies. Also, Tanaaz cannot see a few movies as she is following a special diet prescribed recently in Testing Tribune. According to this diet, she 'must' have lunch at 2 p.m., which will take up half an hour. So without upsetting his girlfriend, which is the only non-romantic movie that Toby can manage to watch?

- 1) High School Musical 2
- 2) Kung-fu Hustle
- 3) Golmaal
- 4) Hum Saath Saath Hain
- 5) Underdog

12. Puneet has just realized that he's a cradle snatcher. Even at the age of 23, his girlfriend Pragati can not think beyond movies in the 'Children' genre. Adding to his misery, she says she wouldn't mind repeating a movie as long as it's a kiddie movie. If the only non-children movie that they saw was Hindi, then which of the following movies did they definitely see twice?
- 1) Underdog
 - 2) Ratatouille
 - 3) High School Musical 2
 - 4) Both (2) and (3)
 - 5) None of these
13. Grenada is nervous. She can't follow much of Hindi movies and yet she doesn't want Ganesh to find this out on their first date. She's somehow convinced her Movie-freak boy friend that she'll be the one to plan the movies. Knowing that Ganesh hates watching two movies from the same genre, she plans to watch English movies from all different genres. Which of the following movies will they definitely not see?
- 1) Underdog
 - 2) Ratatouille
 - 3) Kung-fu Hustle
 - 4) Both (1) and (3)
 - 5) None of these
14. Grenada's ex-boyfriend Deepak is there as well. He plans to watch 5 movies including a part 2, a part 3, a part 4 and a part 5 starting with an English movie that has no sequels. He's promised himself that in his ex-girlfriend's memory, he'll watch at least one Hindi movie. Also, he hates changing screens. So what is the least number of times that he'll need to change screens?
- 1) 0 times
 - 2) Once
 - 3) Twice
 - 4) Thrice
 - 5) 4 times

DIRECTIONS for questions 15 to 17: Read the following case and choose the best alternative for questions that follow.

1 - 2 - 3 . . stop

3rd Nov 2007, New Delhi.

Prime Minister Manmohan Singh must be a worried man. What, a year ago, seemed like a landmark nuclear deal between India and the U.S that would be the high point and legacy of his tenure as PM has now turned into an impasse that might end up bringing down his government. When the deal was first discussed, the UPA coalition government led by Dr. Singh was one-year old and going strong. The Congress and its motley group of supporters comprising of the Left Front and the regional parties RJD, TRS, DMK and BSP, had managed to, at times, sort out and, at other times, put aside differences in order to achieve their common goal of keeping the nationalist BJP out of power and to pursue their idea of rebuilding a secular and economically equitable India. But this larger solidarity looks like crumbling to pieces due to the hugely divisive debate that the nuclear deal with the U.S has generated. The government does not need the Parliament to approve the deal but going ahead with it will jeopardize its remaining in power since the Left, which has been vociferous in its opposition to the deal, has threatened to withdraw its support. In that eventuality, the Prime Minister has to cobble together another coalition, drawing support

from the most unlikely of quarters. Given Dr. Singh, it is hard to tell whether he has been pulling his hair out.

| | |
|------------------|----------|
| UPA | INC |
| | NCP |
| NDA | BJP |
| | JD-U |
| Left Front | CPI |
| | CPI(M) |
| | CPI-M(L) |
| "UPA (regional)" | BSP |
| | DMK |
| | RJD |
| | TRS |
| "NDA (regional)" | BJD |
| | SS |
| | SP |
| | TDP |

Table 1 : parties in a group

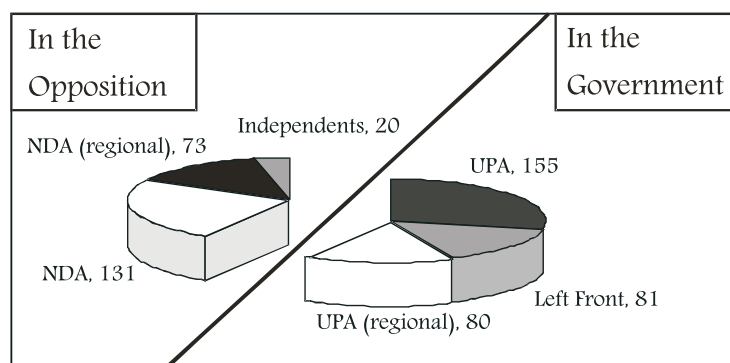


Chart 1 : Seat Distribution in Lok Sabha (Group-wise)

| Group Leaders - Seats Tally | | |
|-----------------------------|-----|-----|
| UPA | INC | 140 |
| NDA | BJP | 101 |
| Left Front | CPI | 29 |
| UPA (regional) | BSP | 21 |
| NDA (regional) | BJD | 22 |

Table 2 : Single-largest party of each group

Additional Information:

There are 540 seats in the parliament. The government needs to have the support of 271 seats to get a simple majority and stay in power.

There are no parties other than the ones mentioned in Table 1. The group leaders mentioned in Table 2 are the single largest parties in their respective groups.

No two parties (excluding the independents) except one pair have an equal number of seats in the parliament.

15. Which of the following cannot be the number of seats that CPI-M(L) has in the Lok Sabha?
- 1) 24 2) 28 3) 25 4) 26 5) None of these
16. Which of the following statements is definitely true?.
- 1) If RJD has 20 seats then TRS has 19 seats.
2) If DMK has 19 seats then TRS has 20 seats.
3) If SS has 18 seats then SP has 17 seats.
4) Both (2) and (3).
5) None of these
17. If the Left Front withdraws its support to the government, then support from which of the following combinations will definitely keep the UPA government in power?
- 1) SS and SP 2) SP and TDP
3) SS and TDP 4) TDP and 20 Independents
5) Cannot be determined.

Logical Reasoning

LR-5.1 | LOGICAL REASONING-1



THEORY

CODES

Introduction

A code is a rule for converting a piece of information (for example, a letter, word, or phrase) into another form or representation, not necessarily of the same sort. Decoding is the reverse process of converting data, which has been sent by a source, into information understandable by a receiver. This chapter introduces you to some basic methods of encoding and decoding.

Methods of Encoding & Decoding

Letter Coding

Here the letters in a word are replaced by certain other letters according to a specific rule to form its code. It is required to detect the common rule.

SOLVED EXAMPLES

1. In a certain language, if 'MADRAS' is coded as 'NBESBT', how is 'BOMBAY' coded?

1) CPNCBX 2) CPNCBZ 3) CPOCBZ 4) CQOCBZ

A.

| | | | | | | |
|----|---|---|---|---|---|---|
| | M | A | D | R | A | S |
| +1 | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| | N | B | E | S | B | T |

Clearly, each letter in the word 'Madras' is moved one step forward to obtain the corresponding letter of the code. So, in 'BOMBAY', B will be coded as C, O as P, M as N, B as C, A as B and Y as Z. Thus, the code becomes CPNCBZ. Hence, (2).

2. In a certain code 'SIKKIM' is written as 'THLJJL'. How is 'TRAINING' written in that code?

1) SQBHOHOH 2) UQBHOHOF 3) UQBJOHHO 4) UQBJOHOH

A.

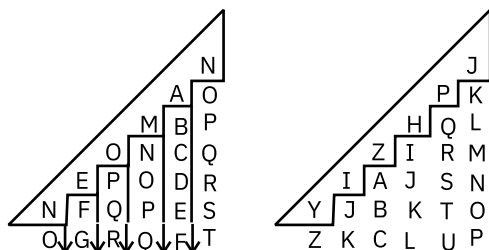
| | | | | | | | | | | | | | | | | | |
|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|
| | | | H | | | J | | | | L | | | | | | | |
| +1 | ↑ | S | -1 | ↑ | I | +1 | ↓ | K | -1 | ↑ | K | +1 | ↓ | I | -1 | ↑ | M |
| | | T | | | | L | | | | J | | | | | | | |

Clearly, the letters in the word 'SIKKIM' are moved alternately one step forward and one step backward to obtain the letters of the code. So, in 'TRAINING', T will be coded as U, R as Q, A as B, I as H, N as O and so on. Thus, the code becomes UQBHOHOF. Hence, (2).

3. If in a certain language 'NEOMAN' is coded as 'OGRQFT', which word will be coded as a 'ZKCLUP'?

1) YJBKTD 2) XIAJSN 3) YIZHPJ 4) YIAQKJ

A.



Hence, (3).

Number Coding

4. If 'SPAIN' is coded as 68512 and 'FRANCE' is coded as 795243, then how is 'AFRICA' coded?

1) 578915 2) 579145 3) 579235 4) 579845

- A. Looking at the common letters A and N we can see that A is coded as 5 and N is coded as 2. Clearly the letters are coded as shown:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S | P | A | I | N | F | R | C | E |
| ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 6 | 8 | 5 | 1 | 2 | 7 | 9 | 4 | 3 |

Since A is coded as 5, F as 7, R as 9, I as 1 and C as 4.

Hence, 'AFRICA' is coded as 579145. Hence, (2).

5. If S = 38, Z = 52 and ACT = 48, then 'BAT' will be equal to:

1) 39 2) 41 3) 44 4) 46

- A. In the given code A = 2, B = 4, C = 6, Z = 52

Now, ACT = 48 = 2 + 6 + 40 = A + C + T

∴ BAT = B + A + T = 4 + 2 + 40 = 46. Hence, (4).

6. If 'MACHINE' is coded as 19-7-9-14-15-20-11, then how will you code DANGER?

1) 10-7-20-13-11-24 2) 10-7-20-16-11-24
3) 13-7-20-9-11-25 4) 13-7-20-10-11-25

- A. Putting A = 7, B = 8, C = 9 X = 30, Y = 31, Z = 32 we have,

MACHINE = 19-7-9-14-15-20-11

Similarly, DANGER = 10-7-20-13-11-24. Hence, (1).

7. In a certain code, '3456' is coded as 'ROPE', '95526' is coded as 'APPLE', then how is '54613' coded?

1) RPPEO 2) ROPEA 3) POEAR 4) PARED

- A. Looking at the common numbers, 5 is coded as P and 6 is coded as E. Clearly then, the numbers are coded as follows:

| | | | | | |
|---|---|---|---|---|---|
| 3 | 4 | 5 | 6 | 1 | 2 |
| R | O | P | E | A | L |

Hence, '54613' is coded as 'POEAR'. Hence, (3).

Numbers by Letters

The numbers are coded as letters (or sometimes as symbols like *, #, etc). Mathematical Operations like addition, subtraction, multiplication or division are carried out on these coded numbers. Using basic number logic, one can decode the letters or symbols.

SOLVED EXAMPLES

8. In the mathematical addition below, each letter represents a different digit. What is the value of A?

$$\begin{array}{r} 2 \ A \\ + \ B \ 2 \\ \hline D \ 2 \ C \end{array}$$

- A. As two numbers of two digits are added, the maximum carry can be 1. So value of D must be 1. Also the addition $2 + B$ generates a carry that implies the value of B is 9 and there is carry over from the previous operation i.e., $A + 2 = C$. To generate a carry, value of A can be 8 or 9. But it cannot be 9 as in that case A and B will have same value.

Hence, $A = 8$. Also $C = 0$ and the operation is $28 + 92 = 120$.

9. In the multiplication between numbers 'PQ' and 'QP' below, each letter represents a different digit. What is the value of T?

$$\begin{array}{r} P \ Q \\ \times Q \ P \\ \hline Q \ R \\ S \ P \ Q \ R \\ \hline S \ T \ R \ R \end{array}$$

1) 5 2) 4 3) 3 4) 2

- A. $\therefore R + R = R$, R has to be 0. As $Q + Q$ gives the last digit as 0, $Q = 5$. ($Q0$ as $R = 0$)

Also $Q \times P$ i.e., $5 \times P$ gives a units digit of R i.e., 0 and $P5 \times P$ gives a two digit number i.e., $QR = 50$.

$\therefore P$ is 2. \therefore The expression rewritten in number form is:

$$\begin{array}{r} 25 \\ 52 \\ \hline 50 \\ 1250 \\ \hline 1300 \end{array}$$

$\therefore T = 3$. Hence, (3).

Group Coding of Words / Numbers

The question below gives a case of **Mixed Word Coding**.

In this type of question, three or four complete messages are given in the coded language and the code for a particular word is asked. To analyse such codes, any two messages bearing the common word are picked up. The common code word will mean that word.

SOLVED EXAMPLES

- 10.** In a code language 'mok dan sil' means 'nice big house', 'fit kon dan', means 'house is good' and 'warm tir fit' means 'cost is high'. Which word stands for 'good' in that language?
- A.** In the first 2 codes, the common code word is 'dan' and the common word is 'house' so 'dan' stands for 'house'. In the last 2 codes, the common code word is 'fit' and the common word is 'is', so 'fit' stands for 'is'. Thus in the second code, 'kon' stands for 'good'.

The question below gives a case of **Mixed Number Coding**.

In this type of question, a few groups of numbers each coding a certain short message are given. Through a comparison of the given coded message, taking two at a time, it is required to find the number code for each word and then the code is formulated for the message given.

- 11.** In a certain code '247' means 'spread red carpet', '256' means 'dust one carpet' and '264' means 'one red carpet'. Which digit in that code means 'dust'?
- A.** In the first 2 codes, the common code digit is '2' and the common word is 'carpet', so '2' means 'carpet'. In the last 2 codes, the common code digit is '6' and the common word is 'one', so '6' means 'one'. Therefore, in the second code '5' means 'dust'.

CONDITIONAL CODING

In these type of questions, coding for the given set of letters or numbers is based on the conditions given in the question. These questions usually occur in the form of set of 4 or 5. Hence, understanding the conditions might take time but it is worth as it then helps to solve 4 to 5 questions.

SOLVED EXAMPLES

DIRECTIONS for questions 12 to 15: Refer to the data below and answer the questions that follow.

In a certain coding language, the codes for digits from 2 to 9 are as follows:

| Number | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--------|---|---|---|---|----|----------|----------|--------|
| Code | # | ! | & | * | \$ | Σ | ∇ | χ |

In this coding language, any number is coded according to the following conditions:

- Condition i: If the 1st digit is prime and even, the 2nd digit is odd and prime, the 3rd digit is even and composite and the 4th digit is odd and composite, then the code for the number is reversed.
- Condition ii: If the 1st digit is odd and composite, the 2nd digit is even and composite, the 3rd digit is prime and even and the 4th digit is odd and prime, then the codes for the 1st and the 4th digits are interchanged.
- Condition iii: If the 1st digit is prime and even, the 2nd digit is odd and composite, the 3rd digit is odd and prime and the 4th digit is even and composite, then the codes for the 2nd and the 3rd digits are interchanged.
- Condition iv: If the 1st digit is odd and prime, the 2nd digit is prime and even, the 3rd digit is even and composite and the 4th digit is odd and composite, then the codes for the 1st and the 2nd digits are interchanged and the codes for the 3rd and the 4th digits are interchanged.
- Condition v: If the 1st digit is even and composite, the 2nd digit is odd and composite, the 3rd digit is prime and even and the 4th digit is odd and prime, then the 1st and the 4th digits are coded with 'X'.
- If the number does not satisfy any of the above conditions, then the digits of the number are coded with their respective codes.

12. What will be the code for 2958?

- A.** First digit is 2 i.e. even and prime, so we need to check condition (i) and (iii) for the remaining numbers. Second digit 9 is odd and composite and also the remaining conditions fit in the criteria mentioned in condition (iii), number has to be coded according to condition (iii). Therefore, code for 2 is # and 8 is ∇ . Codes for 9 and 5 are interchanged.
 \therefore Code for 2958 is #* χ ∇ .

13. What will be the code for 6927?

A. First digit is 6 i.e. even and composite, so we need to code the given number according to condition (v).

\therefore Code for 6927 is $X\chi\#X$.

14. If a number is coded as $!\$#\chi$, then the number could be:

- 1) 3692 2) 2369 3) 3269 4) 9623 5) None of these

A. Such questions are option based.

In such questions, we need to check code for every option.

The number 3692 does not satisfy any condition,

$\therefore 3692 \equiv !\$#\chi$

The number 2369 satisfies condition (i),

$\therefore 2369 \equiv \chi\$\! \#$

The number 3269 satisfies condition (iv),

$\therefore 3269 \equiv \#\! \chi \$$

The number 9623 satisfies the condition (ii),

$\therefore 9623 \equiv !\$#\chi$.

The given code is applicable to 9623.

15. If a number is coded as $!\forall\#\chi$, then the number could be:

- 1) 3289 2) 2938 3) 9823 4) 8923 5) None of these

A. The number 3289 satisfies condition (iv),

$\therefore 3289 \equiv \#\! \chi \forall$

The number 2938 satisfies condition (iii),

$\therefore 2938 \equiv \#\! \chi \forall$

The number 9823 satisfies condition (ii),

$\therefore 9823 \equiv !\forall\#\chi$

The number 8923 satisfies condition (v),

$\therefore 8923 \equiv X\chi\# X$.

The given code is applicable to 9823.

SYMBOL BASED LOGIC

In symbol based problems a symbol or an operator is given and the operation which could be performed using that symbol or operator is also defined. This could be explained using the following example.

$$A \circ B = A + B$$

Here, symbol \circ is defined as $+$ i.e., the question that could be asked are as follows.

- Find value of the expression given i.e., $5 \circ 6 = 5 + 6 = 11$
- Compare the given expressions.
i.e., Find the greater of $6 \circ 6$ & $9 \circ 3$. $6 \circ 6 = 12$; $9 \circ 3 = 12$
i.e., $6 \circ 6 = 9 \circ 3$
- Find whether the given expression is commutative or not.

Note: An operation is commutative, if $A + B = B + A$

$$\text{i.e., } 5 \circ 6 = 5 + 6 = 11; 6 \circ 5 = 6 + 5 = 11$$

\circ operation is commutative.

Note: While solving these kind of problems, one has to remember that the operation would be performed as it is defined in the problem given. Sometimes, a conventional operator with different meaning may be given. Then one has to perform the operation that is defined and not the conventional one.

$$\text{i.e., if } A \times B = A + B$$

$$\text{Then value of } 3 \times 4 = 3 + 4 = 7 \text{ and not } 3 \times 4 = 12$$

SOLVED EXAMPLES

DIRECTIONS for questions 16 to 19: Refer to the data below and solve the following.

$$A + B \text{ means } A \times B$$

$$A \div B \text{ means } A - B$$

$$A \times B \text{ means } A + B$$

$$A - B \text{ means } A \div B$$

16. Find the value of $28 - 4 \times 3 \div 10$.

$$\begin{aligned} \text{A. } & 28 - 4 \times 3 \div 10 \\ \Rightarrow & 28 \div 4 + 3 - 10 = 7 + 3 - 10 = 0. \end{aligned}$$

17. Find the value of $63 \times 4 + 3 \times 75 - 5$.

$$\text{A. } 63 \times 4 + 3 \times 75 - 5 \Rightarrow 63 + 4 \times 3 + 75 \div 5 = 63 + 12 + 15 = 90.$$

18. Find the value of $5 \times 5 + 1 \times 5 + 2 \times 5 + 3$.

$$\text{A. } 5 \times 5 + 1 \times 5 + 2 \times 5 + 3 \Rightarrow 5 + 5 \times 1 + 5 \times 2 + 5 \times 3 = 5 + 5 + 10 + 15 = 35.$$

19. Which of the given expressions are true?

1] $a \times b \div c = a \div c \times b$ 2] $a \times b + c = a \times c + b$ 3] $a + b \times c = a \times b + c$

A. 1] $a \times b \div c$ $a + b - c$ and $a \div c$ b $a - c + b$

$\therefore a \times b \div c = a \div c \times b$. This is true.

2] $a \times b + c$ $a + b \times c = a + bc$

$a \times c + b$ $a + c \times b = a + bc$

$\therefore a \times b + c = a \times c + b$. This is true.

3] $a + b \times c$ $a \times b + c = ab + c$

$a \times b + c$ $a + b \times c = a + bc$. This is not true.

Symbol Based Family Tree

SOLVED EXAMPLES

DIRECTION for question 20: Choose the correct alternative.

20. If $A + B$ means A is mother of B, $A - B$ means A is father of B, $A \times B$ means A is sister of B, $A \div B$ means A is brother of B. Which of the following represents P is Aunt of Q?

1] $P \div R + Q$

2] $P \times R - Q$

3] $P - R \div Q$

4] $P - Q \div R$

5] None of these

A. From (b) i.e., $P \times R - Q$, $P \times R$ means P is R's sister, $R - Q$ means R is father of Q. Therefore, $P \times R - Q$ means P is aunt of Q.

Symbol Based Conclusions

In these type of questions, the relation between the two terms of the question is given in symbol. For example, $X \$ Y$ means X is not less than Y or $X \& Y$ means X is neither less than nor equal to Y.

In the expressions relationship between the terms are shown with the symbols mentioned and based on these two conclusions are drawn. Using the following instructions, we need to answer the question.

SOLVED EXAMPLES

DIRECTIONS for questions 21 to 24: Refer to the data below and answer the questions that follow.

Mark [1], if only conclusion I is definitely true.

Mark [2], if only conclusion II is definitely true.

Mark [3], if either conclusion II or I is definitely true.

Mark [4], if both conclusions are definitely true.

Mark [5], if no conclusion is definitely true.

A \diamond B means A is not less than B.

A \clubsuit B means A is neither less than nor equal to B.

A \heartsuit B means A is neither less than nor greater than B.

A \spadesuit B means A is neither greater than nor equal to B.

A \blacklozenge B means A is not greater than B.

Now, in each of the questions, assuming the given statements to be true, find which of the two conclusions I and II given below them is/are definitely true.

Mark [1], if only conclusion I is definitely true.

Mark [2], if only conclusion II is definitely true.

Mark [3], if either conclusion I or II is definitely true.

Mark [4], if both conclusions are definitely true.

Mark [5], if no conclusion is definitely true.

21. L \spadesuit M, M \spadesuit N, N \clubsuit O

I. L \heartsuit O

II. M \clubsuit O

A. L \spadesuit M \Rightarrow L \leq M

M \spadesuit N \Rightarrow M \leq N

N \clubsuit O \Rightarrow N $>$ O

\therefore L \leq M \leq N $>$ O

\therefore L \leq O or O \leq L

\Rightarrow I may or may not be true.

Also, M \leq O or O \leq M \Rightarrow II may or may not be true.

22. J \spadesuit K, J \spadesuit I, K \spadesuit L

I. J \spadesuit L

II. I \clubsuit K

A. J \spadesuit K \Rightarrow J $<$ K

J \spadesuit I \Rightarrow J $<$ I

K \spadesuit L \Rightarrow K $<$ L

\therefore J \leq K $<$ L \Rightarrow J $<$ L

\Rightarrow I is definitely true.

Also, I $>$ J \leq K

\therefore I \geq K or I \leq K \Rightarrow II may or may not be true.

23. P \spadesuit R, P \heartsuit S, Q \clubsuit R

I. Q \clubsuit P

II. S \spadesuit R

A. P \spadesuit R \Rightarrow P $<$ R

P \heartsuit S \Rightarrow P = S

Q \clubsuit R \Rightarrow Q $>$ R

\therefore S = P $<$ R $<$ Q

\therefore Q $>$ P

\Rightarrow I is definitely true.

Also, P $<$ R \Rightarrow S $<$ R \Rightarrow II is definitely true.

24. U \spadesuit E, I \spadesuit U, I \spadesuit O

I. O \diamondsuit E

II. E \clubsuit I

A. U \spadesuit E \Rightarrow U \leq E

I \spadesuit U \Rightarrow I $<$ U

I \spadesuit O \Rightarrow I $<$ O

\therefore I $<$ U \leq E

\therefore I $<$ E

\Rightarrow II is definitely true.

Also, O \geq E or O \leq E

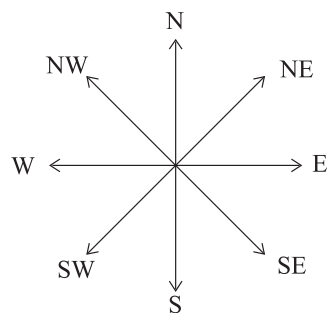
\Rightarrow I may or may not be true.

DIRECTIONS

Introduction

Logical reasoning questions based on directions test your sense of directions and understanding of them.

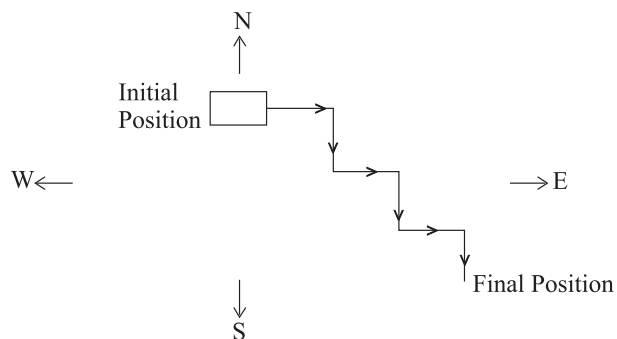
The figure below shows the four main directions (North N, South S, East E and West W) and its cardinal directions (NorthEast NE, NorthWest NW, SouthEast SE and SouthWest SW).



There are 2 types of questions based on Directions, one that tests your sense of directions and the other that involve calculations.

SOLVED EXAMPLES

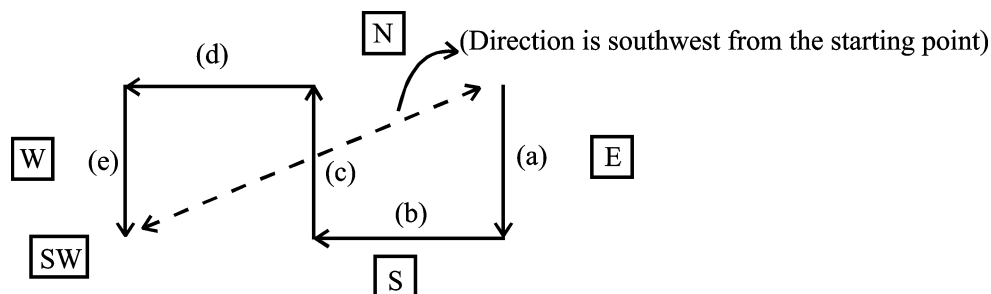
25. A man facing north goes to his right hand direction and then goes to the south. He then goes to his left hand direction and then again moves to the south. Finally he goes towards east and then moves to his right direction. What is the direction of his final position with respect to his initial position?
- A. Consider yourself as the person in the problem and draw the directions in which he is moving. You will come out with the following diagram.



From the above diagram, you can see that the final position of the person is in the SE direction with respect to his initial position.

26. 'A' walks southwards then turns right then right again and then left and again left. In which direction is he from the starting point? (Assume that at each turn he walks the same distance)

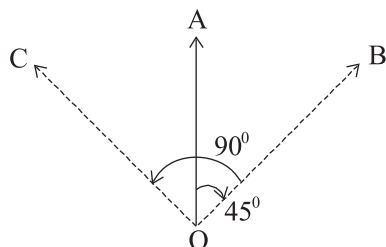
A.



⇒ He is south-west from the starting point.

27. A man is facing north. He turns 45° in the clockwise direction and then 90° in the anticlockwise direction. Which direction is he facing now?

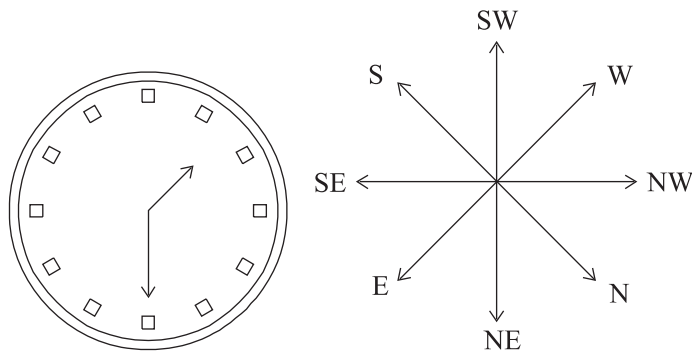
A.



The man initially faces in the direction OA. On moving 45° clockwise, he faces in the direction OB. On further moving 90° anticlockwise, he faces in the direction OC which is North-West.

28. A clock shows 1:30. If the hour hand points west, in what direction will the minute hand point?

A.

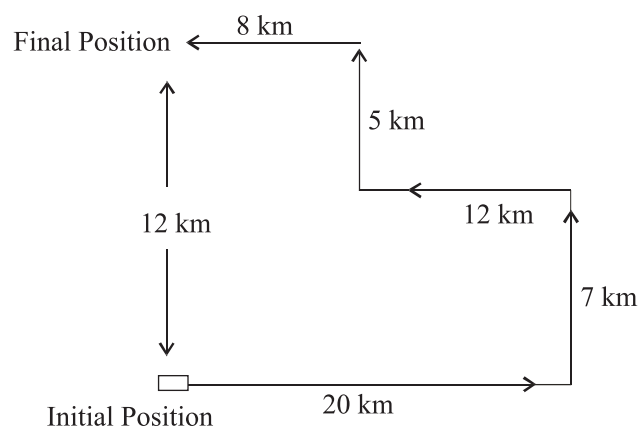


At the time of 1:30, the hour hand and the minute hand are 135° apart. If the hour hand points west, then the minute hand will point north-east.

Questions based on Calculation of Distance

- 29.** A driver drives 20 km towards east. He then takes a left turn and drives 7 km after which he goes 12 km towards west. Next, he takes a right turn and drives 5 km. Finally he takes left and drives 8 km. How far is he from the starting point?

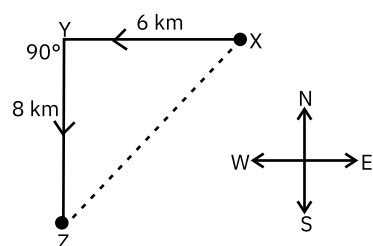
A. Diagrammatically movement of driver is depicted as below:



So, the driver is at a distance of 12 km from the starting point. Hence, (2).

- 30.** Ravi travels 6 km towards the west. He then takes a proper left and walks 8 kms. What is the shortest distance between his initial and final position?

A. Step I: Diagrammatically represent the movement of Ravi.



Step II: Calculation of distance

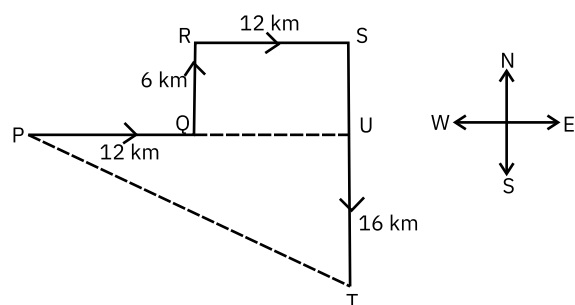
Now the shortest distance between the final point 'X' & the initial point 'Z' can be found out using Pythagoras Theorem since angle at Y is 90°.

$$\therefore \text{Shortest distance (XZ)} = \sqrt{6^2 + 8^2} = \sqrt{100} = 10 \text{ km}$$

Note: From a particular point if a person travels 'a' m in a straight line and then turns 90° in any direction and walks 'b' m and then stops, then the straight line distance from the starting point to the end point can be calculated using Pythagoras Theorem. Also note that taking a left is synonymous with turning anti-clockwise at a 90° angle and taking a right is synonymous with turning 90° in the clockwise direction (unless the angle at which the person is turning is specified). The properties of $45-45-90^\circ$ triangles (where the ratio of sides is $1 : 1 : \sqrt{2}$) and $30-60-90^\circ$ triangles (where the ratio of sides is $1 : \sqrt{3} : 2$) can be extended to direction based problems where calculations are involved.

31. Arun leaves his house to go towards the office. He takes his car and goes 12 km in the east direction. He then takes a left and goes 6 km. After that he again takes a right and goes 12 km. Finally he takes a right and goes 16 km. In which direction is his office from the house and what is the shortest distance between his house and office?

- A. **Step I:** Diagrammatically represent movement of Arun. Let P be the initial position and T the final position of Arun.



Step II: Calculation of Distance

Now we need to find the length of PT. Since PUT is a right angled triangle,

$$\Rightarrow PT^2 = PU^2 + UT^2$$

$$\Rightarrow \text{Now } UT \Rightarrow TS - SU \Rightarrow TS - RQ \quad (\because RQ = SU \text{ as } RSUQ \text{ is a rectangle})$$

$$\Rightarrow UT = 16 - 6 = 10 \text{ km}$$

$$\text{Also } PU = PQ + QU = PQ + RS \quad (\because RS = QU)$$

$$\Rightarrow PU = 12 + 12 = 24 \text{ km}$$

$$PT = \sqrt{24^2 + 10^2} = \sqrt{576 + 100} = \sqrt{676} = 26 \text{ km.}$$

So the shortest distance between Arun's house and office is 26 km. Also, looking at Step (I) Arun's office is in the South-East direction with respect to his house.

ALPHANUMERIC SERIES

In these types of questions, sequence comprising of letters, digits or symbols is given. There is then set of questions based on the sequence. Solving these questions involve careful observation of the given sequence.

SOLVED EXAMPLES

DIRECTIONS for questions 32 to 36: Refer to the number / letter sequence. Study the sequence carefully and answer the questions that follow.

A 8 B C 5 9 7 K V 3 5 L 6 P T Q

32. In above sequence how many pairs of letters have same number of characters (i.e., letters or numbers) between them as in the alphabet?

A. Such pairs are BC and AL. Thus, there are two pairs.

33. How many numbers in the above sequence are both followed and preceded by a letter?

A. Letter-number-letter triplets are A 8 B and L 6 P. Thus, there are only two such numbers.

34. If the first half of above sequence is reversed then what will be the second letter to the right of third letter from the left?

A. The new sequence could be:

K 7 9 5 C B 8 A V 3 5 L 6 P T Q

Third letter from left is 9 second letter to right of 9 is C.

35. If the second half of above sequence is reversed then what will be the fifth letter to the right of eighth letter from the right.

A. The new sequence would be

A 8 B C 5 9 7 K Q T P 6 L 5 3 V

Eight letter from right = Q.

Fifth letter to the right of Q = 5.

36. In above sequence how many pairs of numbers have same number of characters i.e., (letters or numbers) between them as in the number system?

A. The required number of pairs are: 8...5, 5....7 and 3....6. Thus, there are 3 pairs.

LOGICAL SERIES & ANALOGIES

Introduction

These type of questions involve inferring a logical relationship between numbers or letters that occur in a series or pairs. A series of numbers/letters occur in a particular pattern and the student has to predict the pattern of the occurrence of the numbers/letters and find the missing number(s)/letter(s).

Number and Letter Series

There are 2 types of questions based on number/letter series. In one question type, we have to find the missing term in the series.

For example, find the missing term in the series represented by (?):

1, 3, ?, 7, 9.

As can be seen, the above series consists of odd natural numbers. So the missing number in the series is 5 as it is the next odd number after 3 and the odd number before 7.

In the second question type, we have to find the odd term in the series.

For example, in the series: 1, 4, 5, 7, 9.

We can predict that the odd term would be 4 as all the other numbers are odd.

Missing Term in the Series:

The logic on which questions are based on series can be classified as below:

DIRECTIONS for questions: Find the missing term in the given series represented by (?).

I. Difference between consecutive terms is constant or increasing/decreasing in value.

37. 3, 5, 8, 12, 17, ?.

A. $3 + 2 = 5$; $5 + 3 = 8$; $8 + 4 = 12$; $12 + 5 = 17$; $17 + 6 = 23$

Hence, the next number in the series is 23.

II. Consecutive terms of a series can be obtained by multiplication or division of the previous term by a constant value or by a value that is constantly increasing/decreasing.

38. 3, 3, 6, 18, 72, ?

A. Divide each term by the previous you get the series of natural numbers $\frac{3}{3} = 1$, $\frac{6}{3} = 2$,

$$\frac{18}{3} = 3 \text{ \& } \frac{72}{18} = 4$$

$$\text{So, } \frac{6^{\text{th}} \text{ term}}{72} = 5, \Rightarrow 6^{\text{th}} \text{ term} = 72 \times 5 = 360.$$

III. Each term in the series is a square, cube or the nth power of consecutive terms.

39. 4, 9, 16, 25, ?

A. It can be seen that it is a difference of odd numbers starting with 5 i.e.,

$$4 + 5 = 9 + 7 = 16 + 9 = 25 + 11 = 36. \quad \text{or}$$

$$2^2 = 4, 3^2 = 9, 4^2 = 16, 5^2 = 25, 6^2 = 36.$$

IV. Combination series which consists of more than one type of arithmetic operation performed on the terms or that have more than 1 series combined.

40. 21, 62, 23, 60, 25, 58, ?

A. These are sequences which are alternated: 21, 23, 25 and 62, 60, 58

$$21 + 2 = 23; 23 + 2 = 25$$

$$62 - 2 = 60; 60 - 2 = 58$$

Therefore, the next number is $25 + 2 = 27$.

V. Miscellaneous types consist of series with prime numbers, fibonacci series etc.

41. 11, 17, 23, 31, ?

A. The series consists of alternate prime numbers starting from 11. So the next term will be 41.

42. 1, 1, 2, 3, 5, 8, ?

A. This can be represented as below:

| | | | | | |
|---|---|---------|---------|---------|---------|
| 1 | 1 | 2 | 3 | 5 | 8 |
| | | ↓ | ↓ | ↓ | ↓ |
| | | $1 + 1$ | $1 + 2$ | $2 + 3$ | $3 + 5$ |

So, the next term is $5 + 8 = 13$.

This is also called the fibonacci series.

Note: For letter series, the logic used in the questions are nearly the same. The only thing we need to know is that each of the letters from A to Z have to be assigned their numerical position in the English alphabetical series and then solve the question. For example A is assigned 1, B is assigned 2, C is assigned 3 and so on till Z is assigned 26.

For example to find the missing term in the series: A, C, E, G, ?

| | | | | | |
|-------|---|---|---|---|---|
| Since | A | C | E | G | ? |
| | ↓ | ↓ | ↓ | ↓ | |
| | 1 | 3 | 5 | 7 | |

The missing term (?) is I, which is the 9th letter in the English alphabetical series.

Odd Term in the Series/Group:

In these type of problems, the given terms of the question follow similar logic as in the numerical/letter series. The logic is followed from the first term/option to the second and from the second to the third and so on. However one term/option will not follow the logic in the given series/group i.e., the odd term. That odd term is then the correct answer. To verify, if the odd term is correct, the consecutive term/option before and/or after the odd term in the series/group follows the logic of the remaining terms in the series/group.

DIRECTIONS for question: Find the odd term in the given series.

43. 2, 9, 28, 65, 126, 216, 344.

A. Relationship established among the terms is as follows:

$$2 = (1^3 + 1) \quad 9 = (2^3 + 1) \quad 28 = (3^3 + 1)$$

$$65 = (4^3 + 1) \quad 126 = (5^3 + 1)$$

$217 = (6^3 + 1)$ Thus, the term should be 217 instead of 216.

$344 = (7^3 + 1)$ To verify we can see that according to the logic obtained the subsequent term 344 follows. \therefore 216 is the odd term out.

DIRECTIONS for question: Find the odd term in the group.

44. 1) 3 2) 5 3) 7 4) 12 5) 17

A. Given numbers are 3, 5, 7, 12, 17. Each of the numbers, except 12, is a prime number. \therefore Different number is 12. Hence, (4).

Logical Analogies

The word Analogy implies 'similar relationship'. Questions based on Analogy are such that one pair of terms (which we will call the 1st and 2nd term) consisting of a single / group of number/s or letter/s is followed by a second pair of similar terms [i.e., the 3rd & 4th term] consisting of a single/group of number/s or letter/s (the value of which is generally known) and a missing term (represented by [?]). One needs to find the value of the missing term such that the relationship between the third and the fourth term is the same as the relationship between the first and the second term. The types of logic used in the questions based on Analogy are the same as those questions based on number/letter series i.e., numbers/letters are paired according to squares/cubes, differences etc.

Given below are examples of questions based on Analogies:

DIRECTIONS for questions: Each question consists of a pair of terms related in a certain way, followed by another pair of terms. Choose the alternative that bears the same relation to the given term as in the first pair.

45. bc : df :: df : ?

- 1) hl 2) bc 3) hc 4) bl

A. In the given analogy, each letter of the first term in the first set of relation is replaced with the letters with position numbers twice that of the letters in first term in the alphabetical series.

i.e., B(2) C(3)
 ↓ ↓
 D(4) F(6)

∴ for the 2nd pair of terms

 D(4) F(6)
 ↓ ↓
 H(8) L(12)

Hence the required term is HL. Hence, (1).

46. 9 : 28 :: 65 : ?

- 1) 194 2) 212 3) 196 4) 128

A. In the given analogy, the relation between the terms is as follows:

$$9 \times 3 + 1 = 27 + 1 = 28,$$

∴ In the 2nd pair of terms

$$65 \times 3 + 1 = 195 + 1 = 196. \text{ Hence, (3).}$$



CLASS EXERCISE

DIRECTIONS for questions 1 to 10: Choose the correct alternative.

1. If 'PEOPLE' is coded as 'PLPOEE', then how is 'TREND' coded?
1) TREDN 2) DNERT 3) NDETR 4) TNERD
2. If in a certain code, 'MACHINE' is coded as 'LBBIHOD', then which word would be coded as SLTMFNB?
1) RKSLEMA 2) TKULGMC 3) RMSNEOA 4) TMUNGOC
3. If in a certain code 'COVET' is written as 'FRYHW', then which word would be written as 'SHDUO'?
1) QUAKE 2) REPAY 3) VKGXR 4) PEARL
4. If 'REASON' is coded as 5 and 'BELIEVED' as 7, then what is the code number for 'GOVERNMENT'?
1) 6 2) 8 3) 9 4) 10
5. If 'MASTER' is coded as '411259', then 'POWDER' will be coded as:
1) 765439 2) 765439 3) 765459 4) 765549
6. If in a certain language, '943' is coded as 'BED' and '12448' is coded as 'SWEET', then how is '492311' coded in that language?
1) EDSWBS 2) TSWBDD 3) DSWTEE 4) EBWDSS
7. If 'POND' is coded as 'RSTL', then how is 'HEAR' written in that code?
1) GHIJ 2) GHIZ 3) JIGZ 4) JCLZ
8. If in a code, 'ALTERED' is written as 'ZOGVIVW', then in the same code, 'RELATED' would be written as:
1) IVOZGVW 2) IVOZGWZ 3) IVOGZVW 4) VIOZGVW
9. If 'BOMBAY' is written as 'MYMYMY', then how will 'TAMILNADU' be written in that code?
1) TIATITATIA 2) MNUMNUMNU 3) IATITATAT 4) ALDALDALD
10. 'I am smart' is coded as 'spjm okz pkj' and 'I know everything' is coded as 'sat zyk okz'. Which of the following could be the code of 'smart girls know everything'?
1) pkj spjm gre ykz 2) sat zyk spjm pkj
3) sat gre cat pkj 4) pkj cat zyk sat

DIRECTIONS for questions 11 to 15: Refer to the data below and answer the questions that follow.

Find the code for the numbers given in questions according to following conditions.

- i. If the sum of the first and last digit of a number is even, then the first digit is coded as ‘*’ and the last digit is coded as ‘\$’, if its sum is odd then the first digit is coded as ‘\$’ and the last digit is coded as ‘*’.
- ii. If the product of second and fifth digit is odd, then the second digit is coded as ‘#’ and the fifth digit is coded as ‘%’, if the product is even, then fifth digit is coded as ‘#’ and the second digit is coded as ‘%’.
- iii. If the sum of third digit and the fourth digit is odd, then the third digit is coded as ‘@’ and the fourth digit is coded as ‘!’, if the sum is even then the third digit is coded as ‘!’ and the fourth digit is coded as ‘@’.

11. 123456

- 1) \$#!@%* 2) \$%!@#* 3) \$%@!#* 4) *%!@#\$ 5) #!\$%@*

12. 341068

- 1) \$%@!#* 2) \$%!@#* 3) *#@!%\$ 4) *%!@#\$ 5) None of these

13. 998877

- 1) *#@!%\$ 2) \$%!@#* 3) \$%@!#* 4) *#@!%\$ 5) None of these

14. 555555

- 1) *#@!%\$ 2) \$#@!%* 3) *#@!%\$ 4) \$%!@#* 5) None of these

15. 957123

- 1) *%!@#\$ 2) *#@!%\$ 3) \$#@!%*
4) *%@!#* 5) Cannot be determined

DIRECTIONS for questions 16 to 20: Refer to the data below and answer the questions that follow.

| | | | | | | | | | | |
|---------------|---|---|---|---|---|---|---|---|---|---|
| Digits | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
| Code | C | D | A | B | G | E | J | F | H | I |

Given above are digits and their corresponding codes. The number given in the question below has to be coded using these codes, subjected to the following conditions:

- i. If the majority of digits in the number are even, then the first digit is coded as ‘@’ and the last digit is coded as ‘\$’.
- ii. If the majority of digits in the number are odd, then the first digit is coded as ‘#’ and the last digit is coded as ‘?’
- iii. If there are equal number of even and odd digits, then the code is reversed.

Note: Consider ‘0’ as even number.

16. 123456
1) EGBADC 2) CDABGE 3) @DABG\$ 4) @GBAD\$ 5) EGBDAC
17. 623751
1) EDAJGC 2) #DAJG? 3) ?DAJG# 4) @DAJG\$ 5) @DAGJ\$
18. 102368
1) \$EADI@ 2) FEADIC 3) @IDAE\$ 4) @IDEA\$ 5) CIDAEF
19. If the code for a number is @AEDJ\$, then which of the following cannot be the original number?
1) 036278 2) 836274 3) 436278 4) 536271 5) 636278
20. If the code is '#BJHC?', which of the following can be the original number?
1) 647912 2) 397146 3) 347915 4) 247916 5) None of these

DIRECTIONS for questions 21 and 22: Choose the correct alternative.

21. If in a coded language, A O B means A is taller than B, A Δ B means A is shorter than B, A \square B means A is as tall as B. Then, which of the following represents that C is the shortest in the group of C, D and E.
1) D O E; E \square C 2) D O C; E \square C 3) D O E; E Δ C
4) D O C; E O C 5) None of these
22. A = B means A is daughter of B, A || B means A is son of B, A >> B means A is B's sibling, A << B means A is B's grandchild. Which of the following necessarily means that A is B's father?
1) B << C and A = C 2) A << C and B || C 3) A >> C and B || C
4) All of these 5) None of these

DIRECTIONS for questions 23 to 27: In each question, statement is followed by two conclusions where:

A \$ B means 'A is greater than B'
A * B means 'A is equal to B'
A & B means 'A is not less than B'
A ! B means 'A is less than B'
A + B means 'A is not greater than B'

Mark (1), if only conclusion I is true

Mark (2), if only conclusion II is true

Mark (3), if either I or II is true

Mark (4), if neither I nor II is true

Mark (5), if both I and II are true

23. $P \& Q, Q \neq L, R \$ P$
I. $R \$ L$ II. $R \neq L$
24. $K \neq P, P + S, S * R$
I. $S \& K$ II. $K \neq R$
25. $A \$ L, L \& D, K * D$
I. $L \$ K$ II. $K * L$
26. $A + B, B \neq C, B \& D$
I. $C * D$ II. $A \neq C$
27. $W * X, X + Y, W \& Z$
I. $X \& Z$ II. $W + Y$

DIRECTIONS for questions 28 to 30: In each question, statement is followed by two conclusions where:

$a \% b$ means a is neither smaller nor equal to b .
 $a \$ b$ means a is not greater than b
 $a \# b$ means a is neither greater nor smaller than b .
 $a \wedge b$ means a is not smaller than b
 $a \& b$ means a is neither greater nor equal to b .
Mark (1), if only conclusion I is true.
Mark (2), if only conclusion II is true.
Mark (3), if either conclusion I or II is true.
Mark (4), if both conclusions are true.
Mark (5), if neither of the conclusions is true.

28. $a \% b, b \# c, c \wedge d$
I. $a \wedge d$ II. $b \% d$
29. $P \$ Q, Q \& R, S \% R$
I. $S \% P$ II. $R \wedge P$
30. $K \# L, L \$ M, M \wedge N$
I. $L \$ N$ II. $K \& M$

DIRECTIONS for questions 31 to 35: Choose the correct alternative.

31. Om travels 4 km towards north and then turns left to travel 3 km. Find the distance between the starting point and the end point.
1) 7 km 2) 6 km 3) 5 km 4) None of these
32. A man travels 10 m towards east, then 4 m towards north and then 6 m towards east and then 4 m towards south. How far is the end point from his starting point?
1) 18 m 2) 20 m 3) 24 m 4) 16 m
33. Viswas travels 2 km towards west, then he turns left and travels 3 km, again he turns left to travel 4 km. In which direction is Viswas positioned now with respect to the starting point?
1) Southeast 2) Southwest 3) South 4) North
34. A man facing north turns 120° in the clockwise direction and then 180° in the anticlockwise direction. In which direction is he facing now?
1) Northeast 2) Northwest 3) Southwest 4) Southeast
35. A travels 7 m towards west, then travels 6 m towards north and finally turns to his right to travel 15 m. What is the distance between the final and the initial positions of A?
1) 10 m 2) 11 m 3) 14 m 4) 28 m

DIRECTIONS for questions 36 to 40: Refer to the sequence below and answer the questions that follow.

N J P A 7 # Q R ~ B ! U ! 8 4 M # Z 7 Q 1 * E 2 E 2 ! L

36. If the position of each symbol is interchanged with the element that appears immediately before it, then how many symbol/s will have a number appearing just before it/them?
1) 3 2) 4 3) 2 4) 1 5) 0
37. If only the second half of the sequence is reversed, then which element will immediately precede the 7th element to the right of the 12th element from the left?
1) U 2) 8 3) ! 4) 2 5) E
38. If the entire sequence is reversed, then how many symbols will have vowels appearing just before them?
1) 5 2) 4 3) 3 4) 2 5) 1
39. If all the symbols are removed from the sequence, then how many alphabets will be immediately followed by a number?
1) 4 2) 7 3) 6 4) 3 5) 5

40. Suppose the sequence is rearranged in such a way that in the first step, all the symbols swap places with the element appearing to their immediate right. In the next step, all the numbers swap places with the element appearing to their immediate right. In the sequence so obtained, which is the 3rd element to the right of the 15th element from the right?

1) M 2) 4 3) # 4) 8 5) Z

DIRECTIONS for questions 41 to 44: Find the missing term in the series represented by (?).

41. 1, 2, 9, 28, ?

1) 55 2) 65 3) 35 4) 45 5) 42

42. 3, 5, 6, 9, 11, 15, ?

1) 18 2) 16 3) 20 4) 19 5) None of these

43. 8, 20, 17, 10, 35, 5, ?

1) 71 2) 64 3) 61 4) 68 5) None of these

44. 36, 28, 24, 22, ?

1) 18 2) 20 3) 21 4) 22

DIRECTIONS for questions 45 to 47: Each question consists of a pair of terms related in a certain way, followed by another pair of terms. Choose the alternative such that the known term bears the same relation to the unknown term represented by (?) in the second pair as the relation between the two terms in the first pair.

45. AEZ : EIY :: IOX : ?

1) UYZ 2) AEX 3) EIX 4) OUW

46. PAT : NCS :: CEP : ?

1) ECQ 2) ACO 3) EGO 4) AGO

47. P1N : Q2L :: ? : K4H

1) L5T 2) L5H 3) J3J 4) I5G

DIRECTIONS for questions 48 to 50: Pick the odd one out in the group.

48. 1) 37 2) 82 3) 227 4) 325

49. 1) 56 N 4 2) 42 F 7 3) 86 B 43 4) 81 D 27

50. 1) BOP 2) FST 3) IUV 4) KXY



PRACTICE EXERCISE-1

DIRECTIONS for questions 1 to 4: Choose the correct alternative.

1. If 'PEN' and 'MONKEY' are coded as 'GEE' and 'DFEBEG', then 'MAGGY' will be coded as:
1) DAYYY 2) DYYYG 3) DAYYG 4) DAGGG
2. If 'DEMOCRAT' is coded as 'CDNPBQBU', then how is 'BETTER' coded?
1) ADSSDQ 2) ADUUDQ 3) CFSSDQ 4) CFUUDQ
3. If 'gem' is coded as 'qow', then in what way can 'bike' be coded?
1) 'lsop' 2) 'lswo' 3) 'lsuo' 4) None of these
4. If in a certain language, 'MYSTERY' is coded as 'NZTUFSSZ' then what is the code for 'BIOGRAPHY' in the same language?
1) CJQISBQIZ 2) CJPHRCQIZ 3) CJPHSBQIZ 4) CJPHSBRIC

DIRECTIONS for questions 5 to 9: Refer to the data below and answer the questions that follow.

A coding system converts every six-digit number into a four-digit number according to the following rules:

- i. First digit of the code is obtained from the first digit of the original number. If the first digit of the original number is:
Prime, then code is next prime number 2, and if
Even, then code is next even – 1.
Remains same otherwise.
 - ii. Second digit of the code is the absolute difference or the digital root of the third and fourth digits.
 - iii. Third and fourth digits of the code are the fifth and sixth digits of the original number in ascending order.
5. What will be the first digit in the code of 345620?
1) 3 2) 4 3) 5 4) 2 5) 3 or 5
 6. Which of the following is code of 545287?
1) 5377 2) 5778 3) 5386 4) 5387 5) 5378

7. If a number is coded as 9234, then which among the following can possibly be the number/s?
I. 863543 II. 973534 III. 763443
1) Only I 2) Only II 3) Both I and II
4) Both I and III 5) I, II and III
8. What will be absolute difference between the third and the fourth digits in the code of 654892?
1) 2 2) 3 3) 4 4) 1 5) 7
9. Find the difference between the codes of 743210 and 843210.
1) 1000 2) 2000 3) 2010 4) 0 5) 3000

DIRECTIONS for questions 10 to 13: Choose the correct alternative.

10. Sunil goes for a walk everyday in the morning and takes a specific route. He walks 10 km to the north of his house and then takes a left turn and walks for another 5 km. He then walks another 15 km after taking a left turn. In what direction is Sunil's house when he stops walking?
1) North-East 2) North-West 3) South-East.
4) South-West. 5) None of these
11. Sheela is facing towards the East. Turning to her right, she walks 10 metres. She then turns left and walks 5 metres. Next, she walks 7 metres to her right. Which direction is she facing now?
1) North 2) South 3) East 4) West
12. Deepak walks 25 metres towards west. He then turns left and walks 15 metres. He again turns left and walks 25 metres. Further, he moves 10 metres after turning to the left. How far is he from his original position?
1) 10 metres 2) 15 metres 3) 5 metres 4) 25 metres
13. A person is facing North. He turns 60° in the clockwise direction and then 105° in the anticlockwise direction. Which direction is the man facing now?
1) West 2) North West 3) North East 4) South East

DIRECTIONS for questions 14 to 17: Refer to the sequence below and answer the questions that follow.

The given alphanumeric series is:

8 B # 5 9 @ M 1 U L ! K ? > 0 Z D 6 / S

14. If the elements in the first half of the series are placed after the last element, without changing the order, which element is 7th to the left of the element which is 5th from the right?
1) S 2) ? 3) B 4) / 5) None of these

15. If the elements in the alphanumeric series are arranged such that all the odd positioned elements follow all the even positioned elements, without changing their order, find the number of letters preceded by numbers.
- 1) 0 2) 4 3) 2 4) 3 5) 5
16. If the letters of the alphanumeric series are written first, followed by the numbers, and then the symbols, without changing their order, which element is the second element to the right of the element which is the 12th element to the left of the element which is 4th from the right?
- 1) S 2) 6 3) D 4) U 5) ?
17. If starting from the left the consecutive elements of the alphanumeric series are divided into groups of two and each element interchanges its position with its neighbouring elements, how many symbols are preceded and succeeded by numbers?
- 1) 0 2) 2 3) 3 4) 1 5) 6

DIRECTIONS for questions 18 and 19: Find the missing term in the series represented by (?).

18. 7, 15, 32, ?, 138, 281.
- 1) 57 2) 67 3) 77 4) 87
19. 4, 9, 13, 22, 35, ?
- 1) 48 2) 50 3) 54 4) 57

DIRECTIONS for questions 20 and 21: Each question consists of a pair of terms related in a certain way, followed by another pair of terms. Choose the alternative such that the known term bears the same relation to the unknown term represented by (?) in the second pair as the relation between the two terms in the first pair.

20. AE : ZV :: ? : UT
- 1) GF 2) EF 3) FG 4) FE
21. 12F : 6C :: ? : 3E
- 1) 6D 2) 2K 3) 6J 4) 6K

DIRECTIONS for questions 22 and 23: Pick the odd one out in the group.

22. 1) BD 2) CI 3) EY 4) AC
23. 1) 244 2) 686 3) 301 4) 581

DIRECTIONS for questions 24 to 28: Refer to the data below and answer the questions that follow.

$$A \Delta B = \frac{A+B}{2}; \quad A \circ B = \frac{A-B}{2};$$

$$A \square B = \frac{A+B}{A-B}; \quad A * B = \frac{A-B}{A+B}$$

24. Find the value of $(2 \Delta 8) \circ (6 \Delta 4)$.

- 1) 10 2) 20 3) 0 4) 2

25. Find the value of $12 \square 6$.

- 1) 5 2) 12 3) 18 4) 3

26. Find the value of $(10 \square 6) \Delta (28 \square 20)$.

- 1) 5 2) 6 3) 8 4) 10

27. Which of the options is greatest?

- 1) $(2 \Delta 3) \circ (2 \Delta 3)$
2) $(7 \square 3) \Delta 4$
3) $(7 * 4) (7 \square 4)$
4) $\frac{9 \square 3}{9 * 3}$

28. Which of the following is true?

i. $A \Delta B = -(A \circ B)$

ii. $A \square B = \frac{A \Delta B}{A \circ B}$

iii. $A * B = \frac{A \circ B}{A \Delta B}$

- 1) (i) and (ii) 2) (ii) and (iii)
3) (i) and (iii) 4) (i), (ii) and (iii)



PRACTICE EXERCISE-2

DIRECTIONS for questions 1 and 2: Refer to the data below and answer the questions that follow.

The following are few words and their codes in a certain language. Letters of the code are not necessary in same order. Using the same code, answer the questions below.

| | | | | |
|-------|------|------|------|------|
| Word: | ROSE | GOAT | RAIL | BITE |
| Code: | NGVF | PLQN | LCDV | PRDF |

1. What is the possible code for 'GREAT'?
 1) QVFLC 2) PLFVQ 3) CLFQV 4) STPQS
2. If the code for a word is 'FGPL', then what can be the word?
 1) ESTE 2) ESTO 3) TOSE 4) EAST

DIRECTIONS for questions 3 and 4: Choose the correct alternative.

3. If 'PANAMA' is coded as '4-13-14-13-15-13' and 'UJBKISTAN' is coded as '5-6-7-8-9-10-11-12-13-14', then in the same code 'PAKISTAN' will be:
 1) 9-10-11-12-13-14-8-7 2) 7-8-9-10-11-12-13-14
 3) 4-13-9-10-11-12-13-14 4) 4-13-5-6-7-8-9-10
4. If 'Ram likes Shyam' is coded as 'If or but' and 'Shyam likes Gopal' is coded as 'but or Hut', then what is the code for 'Gopal likes Ram'?
 1) If or but 2) If the but 3) But if hut 4) Or but hut

DIRECTIONS for questions 5 to 8: Refer to the data below and answer the questions that follow.

Given below are the words and the codes for those words in a certain language.

| | | | | |
|----------------|---------------|--------------|---------------|---------------|
| <u>JODHPUR</u> | <u>JAIPUR</u> | <u>DELHI</u> | <u>MUMBAI</u> | <u>MADRAS</u> |
| AXNVJUP | VAXPOG | RNKOJ | SHOGAS | GXYGSJ |

5. What is the code for letter 'D'?
 1) N 2) X 3) J 4) A 5) U
6. What is the code for letter 'B'?
 1) A 2) O 3) H 4) S 5) G

7. 'A' is a code for letter:
1) U 2) O 3) B 4) I 5) P
8. What is the code for 'H'?
1) K 2) J 3) V 4) N 5) U

DIRECTIONS for questions 9 and 10: Choose the correct alternative.

9. After going 30 metres towards south, Ravi takes a left turn and goes another 8 metres. He again then takes a left turn and goes 24 metres. How far is he from the starting point?
1) 8 metres 2) 10 metres 3) 6 metres 4) 12 metres
10. In a certain code language, East is West, South-East is North-West and so on. What will be the angle between South-West and West?
1) 45° 2) 90° 3) 135° 4) 180°

DIRECTIONS for questions 11 and 12: Refer to the data below and answer the questions that follow.

From A, Rohan walks 10 meters towards east and then takes a right turn and walks for 5 meters to B turns 45° right and stops.

11. Which direction will he be facing now if initially he faces East?
1) South-west 2) North-east 3) North-east 4) South-East
12. Find the distance between A and B.
1) $\sqrt{55}$ meters 2) $\sqrt{25}$ meters 3) $5\sqrt{5}$ meters 4) 125 meters

DIRECTIONS for questions 13 to 16: Refer to the sequence below and answer the questions that follow.

N F C I O R O O I U M N T S M C T U A A N R T I E I C T O A N N T I

13. How many vowels in the given sequence are preceded by a vowel and followed by a consonant?
1) 3 2) 4 3) 5 4) 6 5) 7
14. If all the vowels from the given sequence are removed, then which letter will be the 8th letter to the right of the 5th letter to the left of the 10th letter from the right?
1) N 2) R 3) T 4) M 5) F

15. In the given sequence, how many letters appear more than once?
1) 5 2) 6 3) 9 4) 8 5) 7
16. In which of the following pairs is the number of letters between the two, NOT same in the given sequence (when read from the left) as is in the English alphabet series?
1) CI 2) CT 3) IS 4) NT 5) OT

DIRECTIONS for questions 17 and 18: Find the missing term in the series represented by (?).

17. 2, 6, 14, 26, ?, 62.
1) 42 2) 54 3) 44 4) 52
18. AC, DG, HJ, KN, OQ, ?
1) RS 2) RT 3) RU 4) PS

DIRECTIONS for question 19: Each question consists of a pair of terms related in a certain way, followed by another pair of terms. Choose the alternative such that the known term bears the same relation to the unknown term represented by (?) in the second pair as the relation between the two terms in the first pair.

19. GTPU : CXLY :: PDTO : ?
1) SLPS 2) LHPS 3) PSLS 4) SSLP

DIRECTIONS for question 20: Find the missing term in the series represented by (?).

20. 7, 9, 40, 74, 1526, ?
1) 5436 2) 6486 3) 5486 4) 3456

DIRECTIONS for question 21: Pick the odd one out in the group.

21. 1) 64 2) 38 3) 132 4) 324

DIRECTIONS for question 22: Find the odd term in the series.

22. 131, 272, 393, 524, 655
1) 131 2) 272 3) 524 4) 655

DIRECTIONS for questions 23 to 27: Refer to the data below and mark the alternative that follows from the data given in the question.

'=' means '<'; 'Δ' means '>'; '□' means '≤'; '◻' means '≥'; '⊗' means '='

23. $x^2 + b^2 \Delta z^2 + a^2$; $b \otimes a$.

1) $x > z$

2) $b^2 = a^2$

3) $x^2 = z^2$

4) $x + b = z + a$

24. $ab = \frac{z}{y} \otimes c$.

1) $a > z$

2) $ab < c$

3) $(ab)^2 < z$

4) $c < ab$

25. $AB \Delta (Z + R) \frac{Y}{N} \square M$.

1) $AB \leq M$

2) $Y \leq MN$

3) $Z + R > AB$

4) $\frac{ABN}{Y} - R > Z$

26. $\frac{PQ}{R} \square Z^2 \otimes 1$.

1) $Z = 1$

2) $PQ \leq Z$

3) $PQ \leq \pm R$

4) $PQ \geq Z^2 R$

27. $\frac{M+N}{K} \square L = Z^2 \otimes M$.

1) $M + N > Z^2 K$

2) $L < M$

3) $KL > Z^2$

4) $\frac{M}{K} \geq L - N$

LR-5.2 | LOGICAL REASONING-2



THEORY

PUZZLES

Puzzles involve questions which have a certain criteria or data that is very specific to them. Puzzles are brain teasers. These involve a situation and one has to understand the given information before one proceeds to its solution. In solving these type of questions, exact understanding of the situation becomes important.

Various puzzles are solved in this chapter. Puzzles could be individual questions or may be asked in a set. They include:

1. Numerical logic
2. Distribution of objects into different groups according to given conditions
3. Visualization of the relative position of an object.
4. Problems involving routes/networks which could involve finding out number of ways of travelling between two points.

Given below are some illustrations of the different types of logical puzzles.

SOLVED EXAMPLES

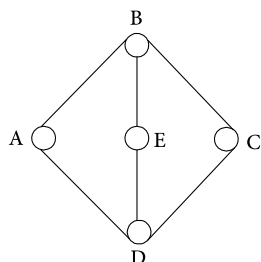
DIRECTIONS for questions 1 to 5: Solve the following.

Q :

| | | |
|----|-----|------|
| 4 | 8 | 16 |
| 32 | 64 | 128 |
| ? | 512 | 1024 |

A : 4 4×2 8×2
 16×2 32×2 64×2
 128×2 512×2 1024
 $128 \times 2 = 256$.

Q : There are 5 cities A, B, C, D and E which are connected by roads as shown in the figure. Which city should you choose to take a start so that you walk on all the six roads once and only once?



A : The route has to start from either city B or city D.
BADCBED, BEDCBAD, BADEBCD, BEDABCD, BCDABED and BCDEBAD are the possible routes to start from city B so that you walk on all the six roads once and only once. DABCDEB, DABEDCB, DEBCDAB, DEBADCB, DCBEDAB and DCBADEB are the possible routes to start from city D so that you walk on all the six roads once and only once.

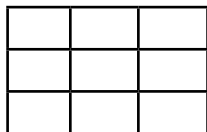
Q : There are three identical boxes containing black and white balls. It is known that one of the boxes contains two white balls, one contains two black balls and another contains one black and one white ball. You are required to correctly label the boxes with the labels BW (black and white balls), WW (two white balls) and BB (two black balls) which are all mislabelled, by picking a sample of the ball from only one box. What is the label on the box that you should sample?

A : Since all the boxes are mislabelled, one should choose the box with the label BW which will have either only black balls or only white balls.

Two outcomes are possible:

- If the sample ball picked up from the box labelled BW is black, then label this box as BB. The box labelled WW will now be labelled as BW. Lastly, the box labelled BB will be labelled as WW.
- If the sample ball picked up from the box labelled BW is white, then label this box as WW. The box labelled BB will now be labelled as BW. Lastly, the box labelled WW will be labelled as BB.

Q : How many squares are there in the figure below?



There are in all 14 squares.

9 small squares, 4 squares each formed by 4 smaller squares and the outermost square.

Hence, $9 + 4 + 1 = 14$ squares.

Q : A cube has its six sides painted as blue, yellow, white, red, green and black. Red is opposite yellow, green and white are not adjacent to each other. Which colour is opposite black?

A : From the data available, we know that red and yellow are opposite to each other. If green and white are not adjacent to each other, they have to be opposite to each other. And hence blue and black have to be opposite to each other.

Resultant of two rows

Refer to the data below.

In the following questions, two rows of numbers are given. The resultant number in each row is to be worked out separately based on the following rules and the questions below the rows of numbers are to be answered. The operations of the numbers progress from left to right.

Rules:

- If an even number is followed by an even number, then multiply the numbers.

- ii. If an even number is followed by an odd number, then add the numbers.
- iii. If an odd number is followed by an even number, then subtract the smaller number from the bigger number.
- iv. If a prime number is followed by an odd number, then multiply the numbers.
- v. If an odd number which is not a prime is followed by an odd number, then divide the larger number by the smaller number.

Q : 6 10 5

a 24 3

If 'a' is the resultant of the first row, then what is the resultant of the second row?

- 1) 123 2) 75 3) 339 4) 59 5) 267

A : Row 1: 6 10 5, From (i), $6 \times 10 = 60$, From (ii), $60 + 5 = 65$

$\therefore a = 65$

Row 2: 65 24 3, From (iii), $65 - 24 = 41$, From (iv), $41 \times 3 = 123$. Hence, (1).

Q : 7 9 8

165 b 5

If 'b' is the resultant of the first row, then what is the resultant of the second row?

- 1) 15 2) 55 3) 5.4 4) 99 5) 28

A : Row 1: 7 9 8, From (iv), $7 \times 9 = 63$, From (iii), $63 - 8 = 55$

$\therefore b = 55$

Row 2: 165 55 5, From (v), $165 \div 55 = 3$, From (iv), $3 \times 5 = 15$. Hence, (1).

Q : 5 7 22

c 3 8

If 'c' is the resultant of the first row, then what is the resultant of the second row?

- 1) 30 2) 32 3) 31 4) 47 5) 37

A : Row 1: 5 7 22, From (iv), $5 \times 7 = 35$, From (iii), $35 - 22 = 13$

$\therefore c = 13$

Row 2: 13 3 8, From (iv), $13 \times 3 = 39$, From (iii), $39 - 8 = 31$. Hence, (3).

Q : 12 4 27

b 15 4

If 'b' is the resultant of the first row, then what is the resultant of the second row?

- 1) 20 2) 9 3) 1 4) -1 5) 5

A : Row 1: 12 4 27, From (i), $12 \times 4 = 48$, From (ii), $48 + 27 = 75$

$\therefore b = 75$

Row 2: 75 15 4, From (v), $75 \div 15 = 5$, From (iii), $5 - 4 = 1$. Hence, (3).

Numbers by Letters

The numbers are coded as letters (or sometimes as symbols like *, #, etc). Mathematical Operations like addition, subtraction, multiplication or division are carried out on these coded numbers. Using basic number logic, one can decode the letters or symbols.

Q : In the mathematical addition below, each letter represents a different digit. What is the value of A?

$$\begin{array}{r} 2A \\ + B2 \\ \hline D \ 2C \end{array}$$

A : As two numbers of two digits are added, the maximum carry can be 1. So value of D must be 1. Also the addition $2 + B$ generates a carry that implies the value of B is 9 and there is carry over from the previous operation i.e., $A + 2 = C$. To generate a carry, value of A can be 8 or 9. But it cannot be 9 as in that case A and B will have same value.

Hence, $A = 8$. Also $C = 0$ and the operation is $28 + 92 = 120$.

Q : In the multiplication between numbers 'PQ' and 'QP' below, each letter represents a different digit. What is the value of T?

$$\begin{array}{r} PQ \\ \times QP \\ \hline SP \ QR \\ ST \ RR \end{array}$$

- 1) 5 2) 4 3) 3 4) 2

A : $\therefore R + R = R$, R has to be 0. As $Q + Q$ gives the last digit as 0, $Q = 5$. ($Q0$ as $R = 0$)
Also $Q \times P$ i.e., $5 \times P$ gives a units digit of R i.e., 0 and $P5 \times P$ gives a two digit number i.e., $QR = 50$.

$\therefore P$ is 2. \therefore The expression rewritten in number form is:

$$\begin{array}{r} 25 \\ \times 52 \\ \hline 50 \\ 12 \ 50 \\ \hline 13 \ 00 \end{array}$$

$\therefore T = 3$.

Hence, (3).

Binary Logic

Q : In the city of questioners, the inhabitants only ask questions; they never make statements. Furthermore, they ask only questions answerable by 'yes' or 'no'. Each inhabitant is one of two types, A and B. Those of type A ask only questions whose correct answer is 'yes'; those of type B ask only questions whose correct answer is 'no'.

An inhabitant of this city asks you, "Am I of type A?" What type is he?

- | | |
|-----------------------------------|-------------------------------------|
| 1) A | 2) B |
| 3) He could be either of the two. | 4) Such a question cannot be asked. |

A : If he is of type A, the correct answer is yes; if he is of type B, the correct answer is no. He could be of either of the two types. Hence, (3).

FAMILY TREE

Introduction

Family tree logical problems mainly deal with the hierarchical structure of a family i.e., grandparents, parents, children etc. Various relationships between the family members of two or three generations will be given. The entire family tree has to be constructed by putting the various relationships together.

Relations at a glance

brother-in-law

- The brother of one's spouse.
- The husband of one's sister.
- The husband of the sister of one's spouse

sister-in-law

- The sister of one's spouse.
- The wife of one's brother.
- The wife of the brother of one's spouse.

mother-in-law

- The mother of one's spouse.

father-in-law

- The father of one's spouse.

son-in-law

- The husband of one's daughter.

daughter-in-law

- The wife of one's son.

grandfather

The father of one's mother or father.

sibling

Person having one or both parents in common with another; a brother or sister.

cousin

A child of one's aunt or uncle. Also called first cousin.

A relative descended from a common ancestor, such as a grandparent, by two or more steps in a diverging line.

second cousin

A child of a first cousin of one's parent.

A child of one's first cousin.

uncle

The brother of one's mother or father.

The husband of one's aunt.

aunt

The sister of one's father or mother.

The wife of one's uncle.

nephew

Son of one's brother or sister.

niece

Daughter of one's brother or sister.

maternal

Related through one's mother, such as a maternal grandmother being the mother's mother.

paternal

Related through one's father, such as a paternal grandmother being the father's mother.

Diagrammatic representation of a family tree

To build a family tree, certain standard notations are used in this book to indicate a relationship between the members of the family. It is not necessary to follow them implicitly, you can formulate your own notations to draw the family tree quickly and accurately.

Notations

1. A is a male



2. A is a female



3. Sex of A not known

A

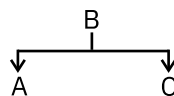
4. A and B are married to each other

A = B

5. A and B are siblings

A ↔ B

6. A and C are B's children



7. A is the uncle/aunt of B



8. A is the only child of B



Solved Example (1)

In these type of questions, the **gender of all the family members is known.**

Directions for questions 1 to 4: Refer to the data below and answer the questions that follow:

A family of Aamir, Basanti, Chander, Deepak, Esha, Farida, Ganesh, Hansika and Inder, consists of 3 generations. The following information is given about the family.

- Aamir is married to Basanti and has 2 sons and 1 daughter Esha.
- Ganesh is Basanti's son-in-law.
- Deepak is Farida's brother-in-law and Esha's brother.
- Chander has 2 children, and they are the only grandchildren in the family.
- Basanti, Esha, Farida and Hansika are females and the others are males.

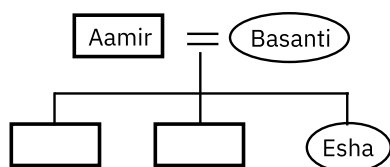
Q1. How is Chander related to Ganesh?

Q2. Deepak is Aamir's _____.

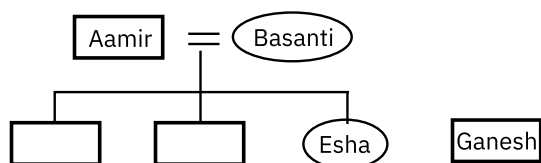
Q3. Aamir is Inder's _____.

Q4. How is Ganesh related to Hansika?

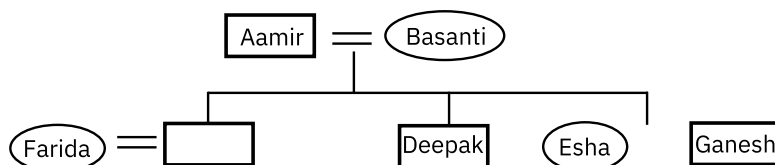
Soln: a] The family consists of 3 generations and 9 members.
b] Aamir is married to Basanti and has 2 sons and 1 daughter Esha.



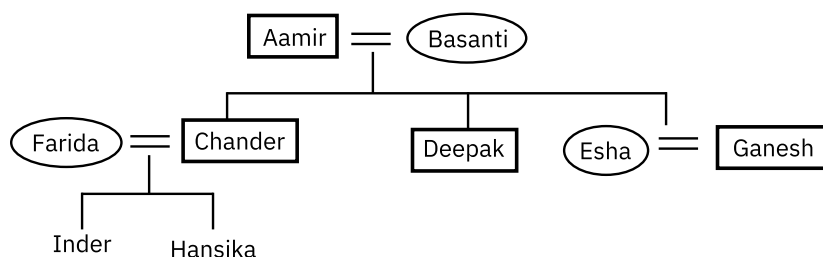
c] Ganesh is Basanti's son-in-law



d] Deepak is Farida's brother-in-law and Esha's brother.



e] Since its a family of 3 generations, Chander has to be married to Farida as he has 2 children who have to be Inder and Hansika. Hence the whole tree is represented as:



From this, we get to know all the relationships and can answer all the questions.

A1. Chander is Ganesh's brother-in-law.

A2. Deepak is Aamir's son.

A3. Aamir is Inder's grandfather.

A4. Ganesh is Hansika's uncle.

Solved Example (2)

In these type of questions **gender of some family members is not known.**

Directions for questions 5 to 7: Refer to the data below and answer the questions that follow:

A, B, C, D, E and F are related to each other as given here. B is F's daughter in-law. D is A's only grandchild. C is D's only uncle. A has only 2 children F and C, one male and one female (not necessarily in the same order). E is the father of C.

Q5. Who is the grandmother of D?

Q6. Who is the mother-in-law of B?

Q7. If a girl G is married into the family, then what is the relationship between G and D?

Soln: To make a family tree from the given data, we will first identify the males and the females in the family and then try to put each of them in their respective position in the tree.

Step I: Identify the sex of A, B, C, D, E, and F.

From the given conditions we can determine who are the males/females in the above group.

- a] B is F's daughter-in-law
- b] C is D's only uncle
- c] A has 2 children F and C, one male and one female. Since C is male, F is female.
- d] E is the father of C.

(B)

(C)

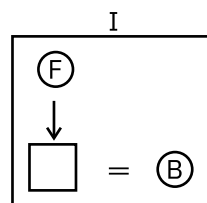
(F)

(E)

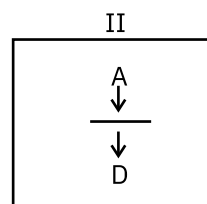
Step II: Try to identify the positions of the members in the family tree. For this, determine the number of generations involved from the statements. D is A's only grand child. Thus, we know that there are three generations.

Step III: Use the conditions to arrange A, B, C, D, E and F in these three generations.

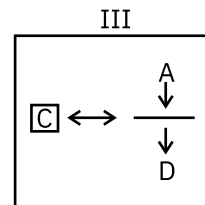
- a] B is F's daughter-in-law.



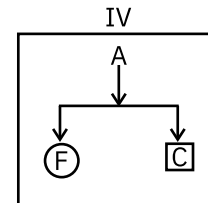
- b] D is A's only grandchild.



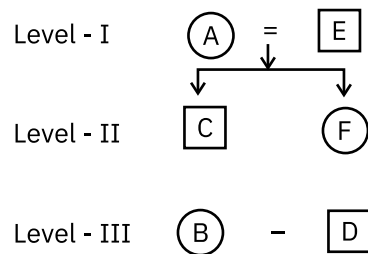
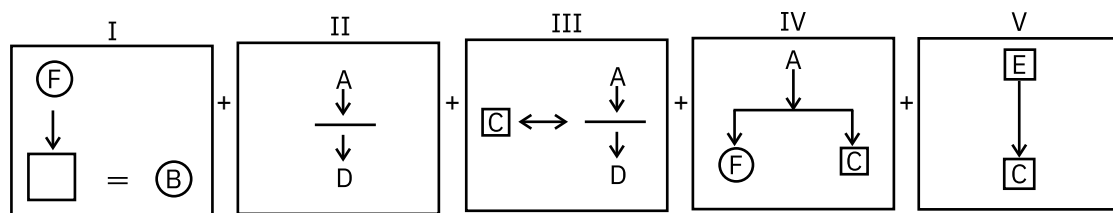
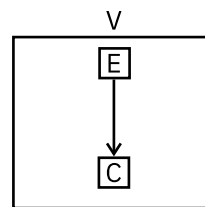
c] C is D's uncle.



d] A has only two children F and C, one male and one female.



e] E is C's father.



Question (1) and (2) can be answered easily by looking at the family tree. A is the grandmother of D and F is the mother-in-law of B. For question (3), C is the only male in the family who is unmarried. G will be married to C and hence she will be D's aunt.

Solved Example (3)

Sometimes we also have single questions in family tree based on logical inferences

- Q8.** Rachel says, “Paul’s father is the only son of my father”, how is Rachel related to Paul?
- A8.** Only son of Rachel’s father — Rachel’s brother. So, Paul’s father is Rachel’s brother or Rachel is the sister of Paul’s father i.e., Rachel is Paul’s paternal aunt.
- Q9.** Pointing to a photograph, Reggie says, “This man’s wife’s mother-in-law is my mother”. How is Reggie related to the man in the photograph?
- A9.** Man’s wife’s mother-in-law is the man’s mother who is also the mother of Reggie. Hence, the man in the photograph is either Reggie or Reggie’s brother.

SELECTION CRITERIA

This chapter deals with the criteria for selection of a candidate for any particular post, institute etc. In this type of problems, certain selection criteria would be given and one has to match the profile of the candidate with these given criteria and accordingly select or reject the candidate. The following examples would help to understand the logical analysis of problems involving selection criteria.

SOLVED EXAMPLES

Refer to the data given below.

A company wants to recruit a candidate for the post of a manager. The following is the criteria for selection of the candidate.

1. The candidate should be an Engineer with minimum 60% in the final year.
2. Should have an MBA degree with minimum 55% aggregate.
3. Should not be more than 27 years as on 01.10.2020.
4. Should be ready to go out of Mumbai.

In case a candidate does not satisfy,

Condition 1: he should be referred to the V.P. Marketing.

Condition 2: he should be referred to the M.D.

Mark [1], if the candidate is to be selected.

Mark [2], if the candidate is to be rejected.

Mark [3], if the candidate is to be referred to V.P. Marketing.

Mark [4], if the candidate is to be referred to M.D.

Mark [5], if the data is insufficient.

- Q :** Amit Khanna, an MBA from University of Mumbai with 64%, loves to travel. He obtained Engineering degree from Delhi University securing 64%. He will celebrate his 24th birthday on 24th Sept 2020.
- A :** Match the profile of the candidate with the criteria for selection.
1. Amit Khanna is an MBA with 64% percent, criteria (2) is satisfied.
 2. Loves to travel, Criteria (4) is satisfied.
 3. Engineer with 64%, Criteria (1) is satisfied.
 4. Below 27 years, Criteria (3) is satisfied. Thus, satisfying all the conditions. He will be selected. Hence, (1).
- Q :** Vishal Singh, a mechanical engineer from MIT, Manipal, secured 61% in his final year completed his MBA with 51% aggregate. He is 25 years old and ready to go out of Mumbai.
- A :** All the conditions are satisfied, but for the 55% aggregate in MBA. Therefore, he should be referred to MD. Hence, (4).
- Q :** Shailesh Rampal, MBA from JBIMS (Mumbai) secured 72% aggregate. He completed his engineering in June 2018, when he was 26 years old, securing 63% in the final term. He loves travelling.
- A :** In June 2018, Shailesh was 26 years old. In June 2020, he would be 28 years old. Therefore, he should be rejected. Hence, (2).
- Q :** Rajesh Nair, is 22 years old and has an MBA degree from Delhi University securing 60%. He likes travelling and has secured 59% in the final year of engineering.
- A :** He has scored only 59% in engineering, not fulfilling the criteria number (1). Therefore, he should be referred to the V.P. Marketing. Hence, (3).
- Q :** Shruti Sharma, Rank holder in her final MBA as well as final year engineering, is 22 years old and loves to travel.
- A :** Since her percentage is not given, the data is insufficient. Hence, (5).

SEQUENTIAL OUTPUT

In these question, a sequence of numbers is given which is called as input sequence. This sequence is fed to a machine which performs some mathematical and logical operations and develops a sequence of outputs in various steps. One has to read and analyse logical operation that the machine performs.

These questions look very complicated, but once you get the logic they are easy to solve. Following are some examples of sequential output tracing.

SOLVED EXAMPLES

For examples 1 to 5: Refer to the data below and answer the questions that follow.

Input : 75 only is not 13 54 these 72 84 now
 Step I : is only 75 not 13 54 these 72 84 now
 Step II : is 13 75 not only 54 these 72 84 now
 Step III : is 13 not 75 only 54 these 72 84 now
 Step IV : is 13 not 54 only 75 these 72 84 now
 Step V : is 13 not 54 now 75 these 72 84 only
 Step VI : is 13 not 54 now 72 these 75 84 only
 Step VII : is 13 not 54 now 72 only 75 84 these
 Step VIII: is 13 not 54 now 72 only 75 these 84
 After this step, the machine stops.

Input: go by 74 sing 56 lot 61

1. Which will be the last step for the above input?
 1) V 2) VI 3) IV 4) III 5) VII
2. What will be the third word / letter in the last step in question Example 1?
 1) lot 2) go 3) 74 4) 56 5) 61

For solutions to examples 1 and 2:

Input : go by 74 sing 56 lot 61
 Step I : by go 74 sing 56 lot 61
 Step II : by 56 74 sing go lot 61
 Step III : by 56 go sing 74 lot 61
 Step IV : by 56 go 61 74 lot sing
 Step V : by 56 go 61 lot 74 sing

1. Hence, (1).
2. Hence, (2).

3. If a sequence
man 20 may 29 milk stop 37
is fed to the machine, what will be the number of steps required for final arrangement?
1) 1 2) 2 3) 3 4) 4 5) None of these
4. What is the 3rd letter / number in the final step of the sequence in Example 3?
1) man 2) may 3) 20 4) 29 5) milk

For solutions to examples 3 and 4:

Input: man 20 may 29 milk stop 37
Step I: man 20 may 29 milk 37 stop

3. Hence, (1).
4. Hence, (2).
5. If "15" and "four" are added to the sequence in the Example 3, what would be the middle number / letter in the final sequence?
1) 15 2) four 3) may 4) milk 5) stop
Final sequence: four 15 man 20 may 29 milk 37 stop
∴ Middle letter is 'may'. Hence, (3).

For examples 6 to 11: Refer to the data below.

The following sequence is put through the machine which generates a series of outputs in various steps.

| | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----------|
| 28 | 44 | 53 | 61 | 81 | 07 | 05 | 29 | 16 | 74 | 99 | 76 | Original |
| 61 | 81 | 28 | 44 | 53 | 07 | 05 | 29 | 16 | 74 | 99 | 76 | Step I |
| 61 | 81 | 53 | 44 | 28 | 07 | 05 | 29 | 16 | 74 | 99 | 76 | Step II |
| 61 | 81 | 53 | 44 | 74 | 05 | 28 | 07 | 29 | 16 | 99 | 76 | Step III |
| 61 | 81 | 53 | 44 | 74 | 05 | 16 | 76 | 28 | 07 | 29 | 99 | Step IV |
| 61 | 81 | 53 | 44 | 74 | 05 | 16 | 76 | 07 | 28 | 29 | 99 | Step V |

6. If number 89 and 22 are added to the original sequence, what would be the position of number 76 in the final sequence?
1) 7th 2) 8th 3) 9th
4) 10th 5) Cannot be determined

In this sequence, first check the units digit of the numbers. The numbers with digit lowest units gets the preference i.e., 0, 1, 2, 3, ..., 9 61, 81, 53, 44, ...

Among those number having same units digits, the number with lower tens digit will be placed first. In one step, only two numbers get placed. The other numbers in the step shift accordingly. 61, 81, 22, 53, 44, 74, 05, 16, 76, 07, 28, 29, 89, 99

Position of number 76 is 9th in the final sequence.

7. Putting the sequence 37, 45, 81, 29, 18, 56, 74, 92, 08, 63 through this same machine, which numbers occupy the 8th and 4th positions in the final sequence?

1) 08, 74 2) 18, 63 3) 08, 63 4) 74, 18 5) 18, 08

| | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----------|
| 37 | 45 | 81 | 29 | 18 | 56 | 74 | 92 | 08 | 63 | Original |
| 81 | 92 | 37 | 45 | 29 | 18 | 56 | 74 | 08 | 63 | Step I |
| 81 | 92 | 63 | 74 | 37 | 45 | 29 | 18 | 56 | 08 | Step II |
| 81 | 92 | 63 | 74 | 45 | 56 | 37 | 29 | 18 | 08 | Step III |
| 81 | 92 | 63 | 74 | 45 | 56 | 37 | 08 | 29 | 18 | Step IV |
| 81 | 92 | 63 | 74 | 45 | 56 | 37 | 08 | 18 | 29 | Step V |

∴ Number at 8th position is 08 and number at 4th position is 74. Hence, (4).

8. In example (7), in which step does number 45 gets placed?

1) Step I 2) Step II 3) Step III 4) Step IV 5) Step V

Number 45 gets placed in step III. Hence, (3).

9. If number 65 of a series is placed in a particular step, which of the following numbers cannot follow this number?

1) 84 2) 66 3) 68 4) 78 5) 59

84 cannot follow 65, as 4 gets placed before 5.

10. In the series, 45, 81, 97, 10, 18, 24, 36. Which number will be first in the final step?

1) 97 2) 10 3) 18 4) 24 5) 81

Original sequence 45 81 97 10 18 24 36

Final sequence 10 81 24 45 36 97 18

Therefore, 10 is first. Hence, (2).

11. Which number will be placed in the middle of the final sequence in the above example?

1) 81 2) 24 3) 45 4) 36 5) 10

Number 45. Hence, (3).



CLASS EXERCISE

DIRECTIONS for questions 1 and 2: Choose the correct alternative.

- Renu wears socks of two different colours - white and grey. She keeps them all in the same drawer in a state of complete disorder.
She has altogether 10 white socks and 10 grey socks in the drawer. Supposing she has to take out the socks in the dark, how many must she take out to be sure that she has two of same colour?
1) 11 2) 15 3) 6 4) 3
- Little Johnny was playing marbles with his friend Tony. He said, "Tony, if you give me one of your marbles, I'll have as many as you." Tony replied, "If you give me one of your marbles, I'll have twice as many as you." How many marbles did each boy have?
1) Johnny - 4, Tony - 6 2) Johnny - 6, Tony - 8
3) Johnny - 5, Tony - 7 4) Johnny - 3, Tony - 3

DIRECTIONS for questions 3 to 5: Refer to the data below and answer the questions that follow.

The length, breadth and height of a rectangular piece of wood are 4 cm, 3 cm and 5 cm respectively. Opposite sides of 5 cm × 4 cm piece are coloured red. Opposite sides of 4 cm × 3 cm are coloured blue. Rest of the sides of 5 cm × 3 cm are coloured green. Now the piece is cut in such a way that cubes 1 cm × 1 cm will be made.

- How many cubes will not have any colour?
1) 2 2) 3 3) 6 4) 4
- How many cubes will have only one colour?
1) 12 2) 16 3) 22 4) 28
- How many cubes will have all the three colours?
1) 8 2) 10 3) 12 4) 16

DIRECTIONS for questions 6 and 7: Refer to the data below and answer the questions that follow.

A A A
+ A A
A B B

6. If $A^2 = B$, then find $A + B$.
 1) 2 2) 4 3) 6 4) 8
7. If B is the product of two different prime numbers, then B is:
 1) 3 2) 4 3) 5 4) None of these

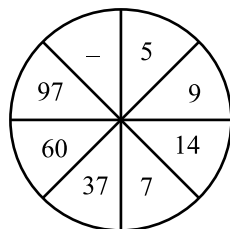
DIRECTIONS for questions 8 to 11: Refer to the data below and answer the questions that follow.

In the city of questioners, the inhabitants only ask questions; they never make statements. Furthermore, they ask only questions answerable by 'yes' or 'no'. Each inhabitant is one of two types, A and B. Those of type A ask only questions whose correct answer is 'yes'; those of type B ask only questions whose correct answer is 'no'.

8. An inhabitant of this city asks you, "Am I of type B?" What type is he?
 1) A 2) B
 3) He could be either of the two. 4) Such a question cannot be asked.
9. Mr. X asked his wife Mrs. X, "Are we of different types?" What type is Mr. X?
 1) A 2) B
 3) He could be either of the two. 4) Such a question cannot be asked.
10. With reference to previous question, what type is Mrs. X?
 1) A 2) B
 3) She could be either of the two. 4) Such a question cannot be asked.
11. Mr. Y asked someone, "Are Mrs. Y and I both of type B?" What type is Mrs. Y?
 1) A 2) B
 3) She could be either of the two. 4) Such a question cannot be asked.

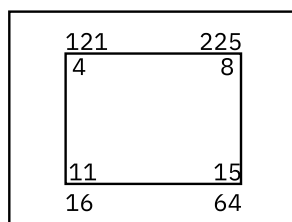
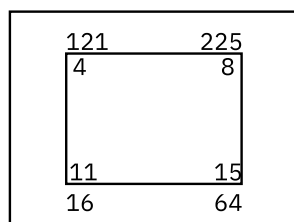
DIRECTIONS for questions 12 to 15: Choose the appropriate alternative that completes the figure.

12.



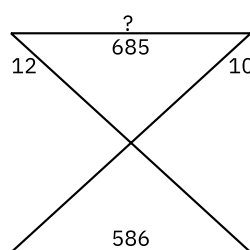
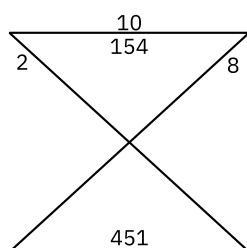
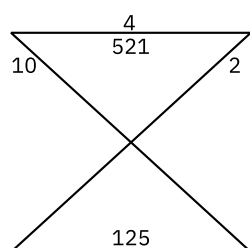
- 1) 73 2) 81 3) 23 4) 20 5) None of these

13.



- 1) 07 2) 71 3) 14 4) 49 5) None of these

14.



- 1) 8 2) 26 3) 16 4) 24 5) None of these

15.

| | | |
|---|---|---|
| 1 | 6 | 2 |
| 5 | 2 | 5 |
| 3 | 4 | ? |

- 1) 8 2) 10 3) 9 4) 16 5) None of these

DIRECTIONS for questions 16 to 18: Refer to the data below and answer the questions that follow.

A, B, C, D, E, F, G and H are a family. The following information about the family is available:

1. A is C's father and C has two siblings.
2. F is D's mother.
3. D got married to G who is his sister C's friend.
4. C got married to D's friend E.
5. D's only child likes uncle B more than anybody.
6. Number of males and females in the family are equal.

16. H is D's .

- | | | | |
|-------------|--------|----------|-----------|
| 1) Daughter | 2) Son | 3) Niece | 4) Nephew |
|-------------|--------|----------|-----------|

17. How many married couples are there in the family?

- | | | | |
|------|------|------|------|
| 1) 1 | 2) 2 | 3) 3 | 4) 4 |
|------|------|------|------|

18. How many generations are there in the family?

- | | | | |
|------|------|------|------|
| 1) 1 | 2) 2 | 3) 3 | 4) 4 |
|------|------|------|------|

DIRECTIONS for questions 19 to 21: Refer to the data below and answer the questions that follow.

Seema's husband, Ramesh, is the father of Riya and Tiya and has three grand-children; Rahul, Rohit and Reema. Seema's only son Kishore is married to Radha who is the only daughter of Gopal and Geeta. Geeta is the mother-in-law of Tiya who is married to Ritesh.

19. Who among the following is not married?

- | | | | |
|----------|----------|---------|---------|
| 1) Seema | 2) Radha | 3) Tiya | 4) Riya |
|----------|----------|---------|---------|

20. How is Reema related to Gopal?

- | | | | |
|-------------|-----------|----------|-------------------|
| 1) Daughter | 2) Sister | 3) Niece | 4) Grand-daughter |
|-------------|-----------|----------|-------------------|

21. If Kishore's only son is not the sibling of Rohit, then who is Rohit's mother?

- | | | | |
|---------|----------|----------|-----------|
| 1) Tiya | 2) Radha | 3) Geeta | 4) Seema. |
|---------|----------|----------|-----------|

DIRECTIONS for questions 22 and 23: Refer to the data below and answer the questions that follow.

Prishita Mukherjee a fashion designer is selecting male models for her show at Paris. Her criteria for the models are as follows.

- i. The model should have a minimum height of 6 feet.
- ii. The model should have weight between 70-90 kg.
- iii. He should not be more than 35 years of age as on 1.09.2018.
- iv. He should have done atleast 30 ramp shows.

However, if the model fulfills all the criteria except.

- i. Criteria (i) above, he can be selected for modelling of traditional dresses only.
- ii. Criteria (ii) he can be used for print ads.

On the basis of above information and information provided below decide the course of action in each case, no further information is available. You are not allowed to assume anything.

Mark (A), if the model is to be selected.

Mark (B), if the model is not to be selected.

Mark (C), if the model is selected for traditional dresses only.

Mark (D), if the model can be used for print ads.

22. Randhir has a height of 6ft 2 inches. He was born on 5th July 1995. He weighs 85 kg. He is fresh in the field of modelling and has done 35 ramp shows.
23. Rahul has a weight of 72 kg. He has done 45 shows and has a height of 175 cm. He was born in 1992.

DIRECTIONS for questions 24 to 26: Refer to the data below and answer the questions that follow.

For recruitment in Gentech Inc a software firm as software trainee the candidate should satisfy the following given criteria.

- i. He should be an engineer with minimum of 55% in his BE/BTech degree.
- ii. He should have cleared the recruitment entrance exam with a minimum of 65 percent mark.
- iii. Should not be more than 30 years of age as on 1-6-2019.
- iv. He should have at least 2 years of work experience.
- v. He should be willing to sign a bond of 3 years.

Any candidate who fails to fulfill criteria (iv) at above, he/she may be referred to the head of HR department.

Any candidate who scored more than 75% in the entrance test but does not fulfill the condition (i), he/she may undergo a training of 6 month before joining.

Given the above information and condition in each of the following questions, you have to decide which of the following course of action should be taken. You should not assume anything in case of any of the candidates

Mark (A), if the candidate is recruited as software trainee.

Mark (B), if the candidate is not recruited

Mark (C), if the candidate is referred to the head of HR.

Mark (D), if the candidate is to be sent for the training program.

24. Satish has secured 60 percent marks in his B-Tech and was born on 20.9.1994. He has cleared the recruitment test with 70% marks. He has worked with Combakt technologies for 20 months and is ready to sign a bond for 3 years.
25. Ritesh has secured 80 percent marks in his B.E. degree and has a work experience of 4 years, he has secured 60% marks in his recruitment test. He was born 12.7.1992. He is ready to sign a bond for 3 years.
26. Mahesh has secured 58 percent in his B.Tech. and also has cleared the recruitment test with 67%. He was born on 31st January 1985. He has worked in Altatech for 27 months. He is ready to sign the 3 year bond.

DIRECTIONS for questions 27 to 31: Refer to the data below and answer the questions that follow.

A call centre has walk-in interviews. Candidates who satisfy the following conditions are selected for the job:

A : Should be a graduate

B : Should be fluent in english

C : Should have worked for a minimum of 6 months in the call centre industry

D : Should not be above 35 years of age

E : Should have a basic knowledge of computers

F : Should be willing to work in night shifts

In case a candidate does not satisfy,

Condition [C], he/she should be referred to the Manager.

Condition [F], he/she should be referred to the Team Leader.

Mark [1], if the candidate is to be selected.

Mark [2], if the candidate is to be rejected.

Mark [3], if the candidate is to be referred to the Manager.

Mark [4], if the candidate is to be referred to the Team Leader.

Mark [5], if the data is insufficient.

27. Neil, a 30 year old English graduate, has applied for the job after working with Chetna call centre for a year. He is computer literate and is fluent in English. He is ready to work in shifts.

28. A 25 year old engineer, Abhinav, is applying for the first time for a job in this field. He is fluent in English and willing to work in night shifts. He is knowledgeable about computers.
29. 22 year old Tina was working with Prime call centre for the last 7 months. She has done her graduation and has a basic knowledge of computers. she is fluent in English and wants to work only in day shifts.
30. Shweta is a 21 year old graduate and is willing to work in night shifts. She has good knowledge of computers but is not very fluent in English.
31. Vijay is a 24 year old graduate who is fluent in English. He has worked for 3 years and has a good knowledge of computers.

DIRECTIONS for questions 32 to 36: Refer to the data below and answer the questions that follow.

A special course in Finance is offered by Mumbai University. To secure admission to this course, the candidates have to take the entrance test and satisfy the following conditions.

- A : be a Bachelor of Science (B.Sc.) with Mathematics or statistics as the major subject or a Bachelor of Commerce (B.Com) with a minimum of 60% in the final year.
- B : score a minimum of 50% in the entrance exam.
- C : have a minimum of 80% in Mathematics in the XIIth standard.
- D : not be more than 23 years of age as on 01.01.2019.
- E : have a basic knowledge of computers.

In case a candidate does not satisfy,

Condition [B]: S/he can pay Rs.10000 and get a payment seat.

Condition [C] or Condition [E]: S/he should be referred to the Principal.

Mark [1], if the candidate is to be given admission.

Mark [2], if the candidate is to be rejected.

Mark [3], if the candidate is to be referred to the Principal.

Mark [4], if the candidate can be offered a payment seat.

Mark [5], if the data is insufficient.

32. Sandeep, 22 years old as on 01.01.2019, is a B.Com. graduate with 70% in the final year and has a good knowledge of computers. In the XIIth, he scored 82 out of 150 in Mathematics and cleared the entrance test with 55%.
33. Geeta Nayer, born in 1991, is computer literate and finished her B.Sc. in Mathematics with 68% in her final year. Having scored 90% in Mathematics in the XIIth, she cleared the entrance test with 80%.
34. Pritesh is 21 years old as on 01.01.2018, He scored 62% in his B.Sc. exam with major in Statistics, but failed to get 50% in the entrance test. He scored 82% in mathematics in the XIIth standard. He has good knowledge of computers and is willing to get into the course, but does not want a payment seat.

35. A computer genius, Sanjana is 22 years old as on 01.01.2019. She scored 90% in the entrance test. She scored 72% in her final year of B.Com. and scored 90% in Mathematics in the XIIth standard.
36. Ketan is a B.Sc. with 65% in the final year. His age is 22 years as on 01.01.2019. He had 90% in mathematics in the XIIth and has good knowledge of computers. He secured 70% in the entrance exam.

DIRECTIONS for questions 37 to 42: Refer to the data below and answer the questions that follow.

The sequence 48, 96, 08, 21, 54, 66, 84, 34, 29, 16 was fed to a machine which generated series of outputs as follows:

| | | | | | | | | | | |
|----------|----|----|----|----|----|----|----|----|----|----|
| Input | 48 | 96 | 08 | 21 | 54 | 66 | 84 | 34 | 29 | 16 |
| Step I | 08 | 96 | 48 | 21 | 54 | 66 | 84 | 34 | 29 | 16 |
| Step II | 08 | 96 | 16 | 84 | 48 | 21 | 54 | 66 | 34 | 29 |
| Step III | 08 | 96 | 16 | 84 | 21 | 66 | 48 | 54 | 34 | 29 |
| Step IV | 08 | 96 | 16 | 84 | 21 | 66 | 29 | 54 | 48 | 34 |
| Step V | 08 | 96 | 16 | 84 | 21 | 66 | 29 | 54 | 34 | 48 |

37. How many numbers are placed in a particular step?
 1) 2 2) 1 3) 3 4) 4 5) None of these
38. If numbers 31 and 53 are added to the original sequence, which number will be placed 8th in the final sequence?
 1) 29 2) 54 3) 43 4) 31 5) None of these
39. If the following sequence is put through the same machine, 89, 41, 36, 84, 45, 65, 98, 31, 06, 78. In the final sequence, which numbers will be positioned as number 5 and number 8?
 1) 76, 36 2) 78, 41 3) 89, 31
 4) 36, 78 5) None of these
40. In the sequence of question (39), which number will occupy first and last positions in the final sequence in the above series?
 1) 98, 06 2) 06, 98 3) 06, 65 4) 45, 65 5) None of these
41. How many steps are required for the final sequence in question (3)?
 1) V 2) IV 3) VI 4) III 5) None of these
42. From the original sequence in question (39), if number 41 and 78 were removed from the sequence, what would be the positions of 84 in the final step?
 1) 4th 2) 7th 3) 8th 4) 5th 5) None of these

DIRECTIONS for questions 43 to 46: Refer to the data below and answer the questions that follow.

A sequence is fed to a numerical machine which produces series of output in various steps.

| | | | | | |
|--------|-----|------|------|------|------|
| Input | How | Man | King | IS | GO |
| Step 1 | HOW | 46 | MAN | 28 | KING |
| | 41 | IS | 28 | GO | 22 |
| Step 2 | GO | 22 | IS | 28 | MAN |
| | 28 | KING | 41 | HOW | 46 |
| Step 3 | GO | IS | MAN | KING | HOW |

43. Following sequence is fed to the machine
NINE SIX BOOK PEN PAY
What will be the last word in the final sequence?
1) NINE 2) SIX 3) BOOK 4) PEN 5) PAY
44. What will be the first word in the final sequence in question (11)?
1) NINE 2) SIX 3) BOOK 4) PEN 5) PAY
45. What will be the sixth word or number in the second step of the sequence in question (11)?
1) NINE 2) 42 3) BOOK 4) 35 5) PAY
46. How many steps are required for the final arrangement of a sequence in Q.43, when it is fed to the above numerical machine?
1) 1 2) 2 3) 3 4) 4 5) 5

DIRECTIONS for questions 47 to 52: Refer to the data below and answer the questions that follow.

An alphanumeric machine accepts a sequence of numbers/letters and produces a series of output in various steps as shown below.

| | | | | | | | |
|---------|------|---------|-----|----------|-------|--------|-----------|
| Input: | tree | passage | bar | revision | style | nature | direction |
| Step 1: | 16 | 49 | 9 | 64 | 25 | 36 | 81 |
| Step 2: | 33 | 40 | 55 | 39 | 11 | 45 | |
| Step 3: | 7 | 15 | 16 | 28 | 34 | | |
| Step 4: | 100 | | | | | | |

After this step, the machine stops. Analyse the above data and answer the following questions. A following sequence is fed in the machine: "to number idea man proximity machine hope become equation".

47. What will be second number in the first step?
1) 4 2) 36 3) 16 4) 9 5) 81

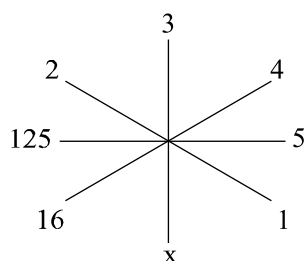
48. What will be the third number in second step?
1) 32 2) 20 3) 7 4) 72 5) 33
49. In how many steps will the final output be produced?
1) 2 2) 3 3) 4 4) 5 5) 6
50. What is the final output?
1) 146 2) 152 3) 294 4) 300 5) 58
51. How many numbers are present in the sequence in step 2?
1) 7 2) 8 3) 9 4) 10 5) 5
52. If the last word i.e., 'equation' is deleted from the sequence, then what would be the final output?
1) 144 2) 156 3) 174 4) 198 5) 254



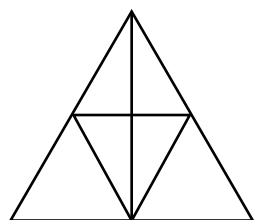
PRACTICE EXERCISE-1

DIRECTIONS for questions 1 and 2: Choose the correct alternative.

1. Find x in the given figure.



- 1) 1 2) 1.5 3) 2 4) 3
2. Find the number of triangles in the given figure.



- 1) 11 2) 12 3) 13 4) 15

DIRECTIONS for questions 3 to 5: Refer to the data below and answer the questions that follow.

Four piles of books are placed on four different tables. Pile A consisting of 15 books of thickness 7 cm each is placed on a table of height 95 cm. Pile B having 12 books of thickness 8 cm each is placed on a table of height 1 m. Pile C having 9 books of thickness 12 cm each is placed on a table of height 90 cm. Pile D consisting of 8 books of thickness 11 cm each is placed on a table of height 1.1 m.

3. Excluding the top book in each pile, which two piles are of the same height from the ground?
1) C, A 2) A, B 3) B, C 4) None of these
4. Taking all the books together, which two piles have the same height from the ground?
1) B, C 2) C, D 3) A, B 4) B, D
5. Which is the lowest pile(s) from the ground?
1) B, C 2) B 3) D 4) A, B

DIRECTIONS for question 6: Choose the appropriate alternative that completes the figure.

6.

| | | |
|-----|------|------|
| 81x | 4x | 625x |
| 9x | 16x | ? |
| 3x | 256x | 5x |

- 1) 125x 2) 135x 3) 25x 4) 15x 5) 27x

DIRECTIONS for questions 7 to 10: Refer to the data below and answer the questions that follow.

- K, L, M, N and O are members of a family running into six generations.
 - M is the only unmarried child whose grandparents have passed away.
 - N, a widow, is the daughter of O who is a widower.
 - A family does not have an adopted member.
 - One generation has atmost one family member.
 - Every couple has only one child.
 - No generation has any siblings.
- If K is the grandson of L, then the member of the second last generation is:
1) K 2) a male 3) a female 4) both (1) and (2)
 - If L is the eldest member in the family, then N is K's _____.
1) father 2) mother 3) uncle 4) none of these
 - If L is the eldest member in the family, then K is M's _____.
1) father 2) mother 3) uncle 4) Cannot say
 - If the grandfather of M were alive, he would belong to the _____ generation.
1) 2nd 2) 3rd 3) 3rd last 4) 4th last

For example 11 to 15: Refer to the data given below.

An American University is selecting candidates from India as per their set norms as given below.

1. Should be above 25 years as on 01.06.2020.
 2. A GRE score of 2050 and above.
 3. Work experience of atleast 2 years.
 4. Should have secured first class (> 60%) throughout his academic career.
- Any deviation from

Condition [1] above: the candidate should be referred to the chancellor.

Condition [2] above: the candidate should be referred to the principal.

Mark [1], if the candidate is to be selected.

Mark [2], if the candidate is to be rejected.

Mark [3], if the candidate is to be referred to the chancellor.

Mark [4], if the candidate is to be referred to the principal.

Mark [5], if the data is insufficient.

11. Raghuvandan, an Engineer from REC Suratkal, has secured first class throughout his career and obtained a GRE score of 2080. Has worked for 3 years in Yanoo Corp Services and turns 29 in July 2020.
12. Shailesh Gangoli secured 2350 in his GRE, has secured distinction throughout his career and has worked for 2 years. He is 24 years old.
13. Rachna has been a Rank holder throughout her career and secured 2300 score in GRE. Has worked with Glaxo India for 4 years now and is 26 years old.
14. Vishal Bhavsari, an engineer from VJTI secured 2040 score in his GRE test. He is 28 years old and has worked with HCL India for 6 years.
15. Satish Bhat, from Karnataka University is 28 years old and scored 2150 in his GRE test. He got 58% in his XIIth exam but went on to complete engineering with a higher first class. Has been working for 5 years now.

DIRECTIONS for questions 16 to 19: Refer to the data below and answer the question that follow.

Following is a input and series of output through a numerical machine.

| | | | | | | | | | | |
|----------|----|----|----|----|----|----|----|----|----|----|
| Input | 45 | 81 | 66 | 59 | 18 | 20 | 10 | 09 | 51 | 71 |
| Step I | 59 | 45 | 81 | 66 | 18 | 20 | 10 | 09 | 51 | 71 |
| Step II | 59 | 66 | 45 | 81 | 18 | 20 | 10 | 09 | 51 | 71 |
| Step III | 59 | 66 | 09 | 45 | 81 | 18 | 20 | 10 | 51 | 71 |
| Step IV | 59 | 66 | 09 | 18 | 45 | 81 | 20 | 10 | 51 | 71 |
| Step V | 59 | 66 | 09 | 18 | 45 | 81 | 71 | 20 | 10 | 51 |
| Step VI | 59 | 66 | 09 | 18 | 45 | 81 | 71 | 51 | 20 | 10 |

16. If number 55 and 78 were added to the sequences. What would be their positions in the final sequence?
 - 1) 1st, 9th
 - 2) 4th, 1st
 - 3) 3rd, 1st
 - 4) 3rd, 8th
 - 5) None of these
17. This sequence is put in the same machine 48, 74, 86, 98, 09, 29. What would be the last number in the final sequence?
 - 1) 29
 - 2) 09
 - 3) 98
 - 4) 74
 - 5) None of these
18. For the sequence in question (8), which number occupies position 4?
 - 1) 74
 - 2) 48
 - 3) 29
 - 4) 86
 - 5) None of these
19. How many steps are there in the output series in case of sequence in question (8)?
 - 1) 4
 - 2) 3
 - 3) 5
 - 4) 6
 - 5) None of these



PRACTICE EXERCISE-2

DIRECTIONS for questions 1 to 5: In the following questions, two rows of numbers are given. The resultant number in each row is to be worked out separately based on the following rules and the questions below the rows of numbers are to be answered. The operations of the numbers progress from left to right

Rules:

- If an odd number is followed by an even number, the two numbers are to be multiplied.
- If an even number is followed by a prime number, the two numbers are added.
- If an even number is followed by a number which is not prime, the positive difference of the two is taken as the resultant.
- If an odd number is followed by an odd number, the larger number is divided by the smaller number and their quotient is taken as the resultant.

1. 7 6 4
 3 11 a

If output of the first row is a, what is the output of the second row?

- 1) 12 2) 121 3) 114 4) 16 5) 32

2. 8 5 4
 3 9 12

What is the sum of the outputs of the two rows?

- 1) 85 2) 88 3) 45 4) 56 5) 47

3. 12 1 7
 14 15 13

What is the product of the outputs of the two rows?

- 1) 18 2) 14 3) 15 4) 13 5) 17

4. 24 n 11
 18 16 7

If n is the output of the second row, what is the output of the first row?

- 1) 1 2) 4 3) 5 4) 3 5) 7

5. 13 12 32 21
 8 18 27 31

What is the positive difference of the outputs of the two rows?

- 1) 1 2) 99 3) 55 4) 103 5) 102

DIRECTIONS for question 6: Choose the appropriate alternative that completes the figure.

6.

| | | |
|----|-----|------|
| 4 | 8 | 16 |
| 32 | 64 | 128 |
| ? | 512 | 1024 |

- 1) 256 2) 156 3) 288 4) 2048 5) 1048

DIRECTIONS for questions 7 to 11: Refer to the data below and answer the questions that follow.

A family consists of seven members P, Q, R, S, T, U, V. There are three married couples. Q is an engineer and father of T. U is grandfather of T and is a contractor. R is daughter-in-law of S who is a nurse by occupation, V is T's uncle who is a professor. There is one student, one housewife and one doctor in the family. The student is unmarried and R is the sister-in-law of Q.

7. Who is R's husband?

- 1) V 2) Q 3) T 4) R

8. Who is T's aunt?

- 1) S 2) P 3) R 4) None of these

9. What is the profession of P?

- 1) Housewife 2) Nurse 3) Doctor 4) [2] or [3]

10. Which of the following are married couples?

- 1) PV, QR, US 2) VT, PQ, US
3) PQ, RV and US 4) None of these

11. Which of the following is definitely a group of female members?

- 1) PRST 2) PRT 3) PRS 4) None of these

DIRECTIONS for questions 12 to 16: Refer to the data below and answer the questions that follow.

The government has decreed that the following conditions apply for people interested in becoming lecturers.

- An M.A. with 50% or more in the relevant subject will be considered.
- The NET degree from the University Grants Commission (UGC).
- Those without the NET degree as described above should be holders of either M.Phil. or PhD.

- iv. Those who fulfil neither conditions (ii) or (iii) above, but do fulfil condition (i) will not be considered.
- 1) If a candidate is an from poor family, all the conditions may be relaxed.
- 2) For blind candidates, the conditions (ii) and (iii) are not applicable.
- 3) For candidates with good academic record, condition (iv) does not apply.

Mark [1], if the candidate will certainly be considered.

Mark [2], if the candidate will certainly not be considered.

Mark [3], if the candidate may be considered.

Mark [4], if the candidate's qualification cannot be ascertained.

Mark [5], if the candidate must try again.

- 12. Mr. X has 54.5% in M.A. in the relevant subject and is yet to complete his M.Phil. He is not a Ph.D. He is blind.
- 13. Mr. Y has 60% in M.A. in the relevant subject. He is blind. He is about to complete his M.Phil. He is not a Ph.D. He is from poor family.
- 14. Mr. W has a reasonable academic record. He does not fulfil conditions (iii) and (iv). He fulfils condition (ii) but not condition (i). He is neither blind nor from poor family.
- 15. Mr. M is an S.T. candidate. He fulfils condition (iii) but he is not an M.A.
- 16. Mr. A is an M.Phil. but does not have the NET degree of the UGC. He has 57.5% in M.A. in the relevant subject. He is neither blind nor from poor family.

DIRECTIONS for questions 17 to 20: Refer to the data below and answer the questions that follow.

A number arrangement machine, when given a particular input, rearranges it following a particular rule. Illustration of the input and the steps of arrangement is given below:

Input : 537, 742, 663, 437, 842, 731, 337
 Step 1 : 731, 337, 537, 742, 663, 437, 842
 Step 2 : 731, 337, 537, 742, 663, 437, 842
 Step 3 : 731, 337, 742, 437, 537, 663, 842
 Step 4 : 731, 337, 742, 437, 537, 663, 842
 Step 5 : 731, 337, 742, 437, 663, 537, 842

Step 5 is the last step for the given input.

- 17. How many steps will be required to get the final output from the following input?
 Input: 525, 334, 260, 454, 531, 645, 897
 1) 3 2) 4 3) 5 4) 6

18. If input is given as 544, 634, 546, 712, 275, 367, 432 then which step is 432, 712, 544, 634, 546, 275, 367.
- 1) Step - 1 2) Step - 2 3) Step - 3 4) Step - 4
19. Step third for an Input is 423, 334, 245, 666, 743, 535, 475. What will be the first step?
- 1) 334, 423, 245, 535, 475, 666, 743 2) 423, 334, 535, 245, 666, 475, 743
- 3) 423, 535, 334, 666, 245, 743, 475 4) Cannot be determined
20. For the Input in previous question. Find the final Output.
- 1) 423, 245, 743, 475, 334, 535, 666 2) 423, 743, 245, 334, 475, 535, 666
- 3) 423, 535, 475, 334, 245, 743, 666 4) None of these

DIRECTIONS for questions 21 to 23: Refer to the data below and answer the questions that follow.

A word arrangement machine, when given a particular input, rearranges it following a particular rule. Following is the illustration of the input and the steps of arrangement.

Input : 'How to prepare for an MBA exam'

Step 1 : How for to prepare an MBA exam.

Step 2 : How for to an prepare MBA Exam.

Step 3 : How for to an exam prepare MBA.

Step 3 is the last step of the given Input. Now study the logic and rules followed in the above steps, find out appropriate step for the question given below for the given Input.

21. Which of the following will be last step for the Input given below?
Input: 'The only book with real IIFT questions.'
- 1) Only IIFT book real questions with the 2) IIFT questions only book real with the
3) IIFT questions book only real the with 4) Only IIFT questions real book with the
22. If step 2 of an Input is 'You get always should strive to something' then which step is 'you get always to something should strive'.
- 1) Step : 3 2) Step : 5
3) Step : 4 4) None of the above
23. How many steps will be required to get the final output from the following input?
Input : 'Their aim is a society at peace'.
- 1) Four 2) Five 3) Six 4) None of these

Data Sufficiency

DS-5.1 | DATA SUFFICIENCY



THEORY

Definition

A Data Sufficiency problem primarily consists of a mathematical or logical problem followed by two statements containing information relating to it. The students need to decide whether the problem can be solved by using the information from the given statement/s either individually or combined.

Nature of data sufficiency questions

Data Sufficiency questions can be classified into 2 broad categories:

1. **Quantitative Ability:** includes the topics on Numbers, Arithmetic, Algebra, Geometry and Modern Math.
2. **Logical Reasoning:** includes topics like Family Tree, Coding, Arrangements, Puzzles etc.

Very rarely are Data Sufficiency questions based on Data Interpretation. The topics for Data Sufficiency questions are the same as covered in the individual sections of Quantitative Ability, Logical Reasoning and Data Interpretation in the BRM. The nature of Data Sufficiency Questions are such that they test the reasoning ability and conceptual understanding of the student on that topic.

Types of Data Sufficiency questions

There are mainly 2 types of Data Sufficiency questions depending on the type of management entrance exam.

1. **4-option Data Sufficiency question:** This type of data sufficiency question has been appearing in the CAT exam in the recent years. The student has to choose from options (1) to (4) as per the given directions. The standard set of instructions of a 4-option Data Sufficiency question is as follows:

Directions: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Choose 1; if the question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.

Choose 2; if the question can be answered by using either of the statements alone.

Choose 3; if the question can be answered by using both statements together, but cannot be answered using either of the statements alone.

Choose 4; if the question cannot be answered even by using both statements together.

2. **5-option Data Sufficiency question:** There are 5 options for the student to choose from, to answer the question. These kind of questions appear in Management Entrance Exams like IRMA, CET, etc., The standard set of instructions of a 5-option Data Sufficiency question is as follows:

Each question is followed by two statements, I and II. Answer each question using the following instructions:

Choose [1], if the question can be answered by using the statement I alone.

Choose [2], if the question can be answered by using the statement II alone.

Choose [3], if the question can be answered by using either statement alone.

Choose [4], if the question can be answered using both statements together, but cannot be answered using either statement alone.

Choose [5], if the question cannot be answered using both statements together.

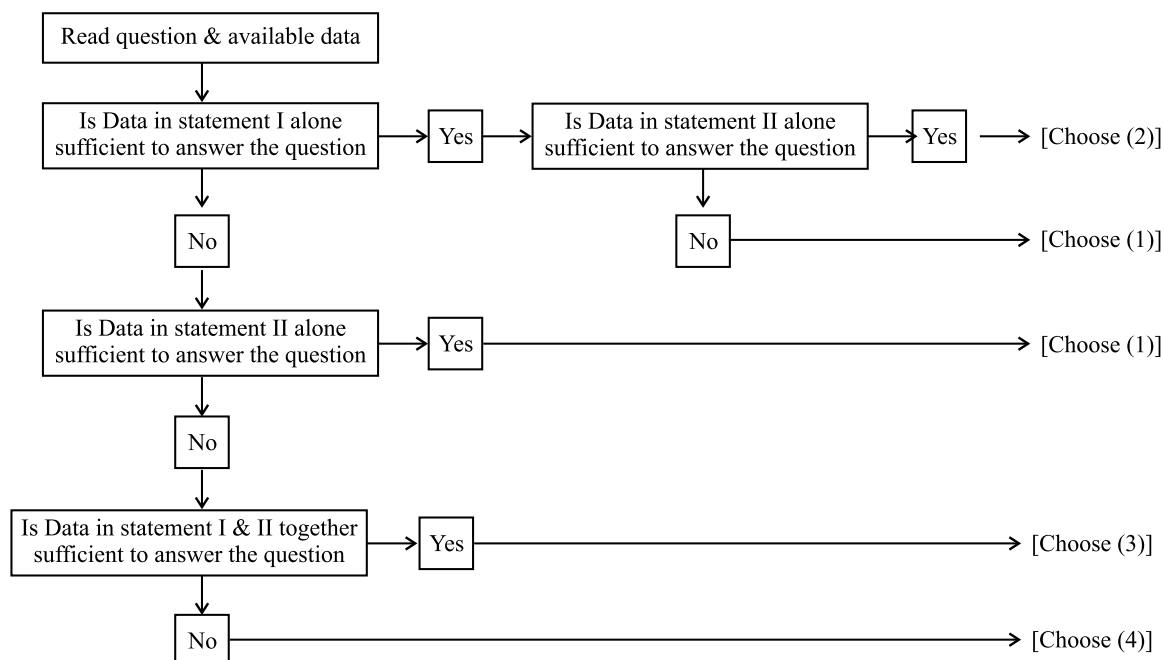
Approach to Data Sufficiency questions

A systematic procedure for solving a Data Sufficiency question is given below:

- Step 1:** Read and comprehend the basic data. One cannot assume anything other than the basic rules and formulae. Ask yourself if any specific information is needed to answer the question.
- Step 2:** Take statement I, combine the available data with the already existing information from the question, check if you can arrive at a solution. Do not try solving, just ensure that a solution can be obtained. The students should be careful not to read any more into a statement than what is given.
- Step 3:** Irrespective of whether a solution can be obtained from statement I alone, take statement II, combine the available data with the already existing information from the question, check if you can arrive at a solution. Remember not to use the data from statement I.
- Step 4:** This step is only required if a solution cannot be arrived at from either statement I or II individually. Combine the data available from the two statements and check if you can arrive at a solution.
- Step 5:** Select the right alternative.

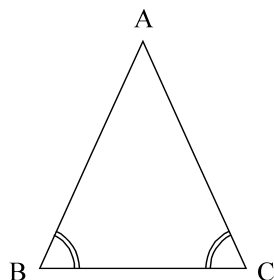
Steps to solve a 4-option Data Sufficiency Question:

The following flowchart will help you to select the right alternative.



Example

Q : (using directions of a 4-option data sufficiency questions)



ΔABC is an isosceles triangle with $\angle B = \angle C$. What is the measure of $\angle A$?

I. $\ell (AB) = \ell (BC)$

II. $\angle B = 20^\circ$

A : The given data says that ΔABC is an isosceles triangle with $\angle B = \angle C$.

This also means that $\ell (AB) = \ell (AC)$

According to statement I: $\ell (AB) = \ell (BC)$ thus $\ell (AB) = \ell (BC) = \ell (AC)$.

$\therefore \Delta ABC$ is an equilateral triangle. Hence, $\angle A = \angle B = \angle C = 60^\circ$.

Thus, statement I alone is sufficient.

Statement II: $B = 20^\circ$

$C = 20^\circ$

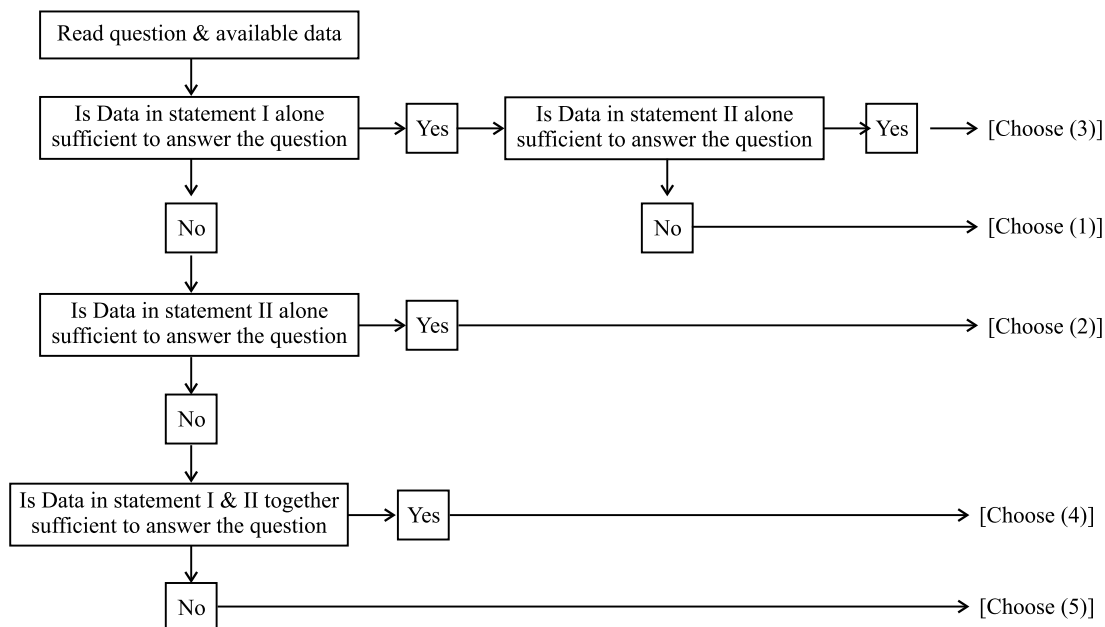
$A = 180 - (20 + 20) = 140^\circ$

Thus, statement II alone is also sufficient to answer this question. Since the question can be answered by either statement alone the correct answer option is [2]. Hence, [2].

Note: Data Sufficiency questions are designed to lure the student into making an unwarranted assumption. A figure given for a problem is intended to provide information consistent with that in the question, but not necessarily consistent with the information contained in either of the statements. Also, the figure is not consistent with the information from statement II i.e., A looks like an acute angle. Geometrical figures are not necessarily drawn to scale. Do not assume the measure of an angle, line segment etc., unless it is specified in the figure or statement.

Steps to solve a 5-option Data Sufficiency Question:

The following flowchart will help you to select the right alternative.

**Example**

Q : (using directions of a 5-option data sufficiency question)

If $x + y = 28$, then what is the value of xy ?

- I. x and y are both positive integers.
- II. x and y are consecutive odd integers.

A : Statement I says that x and y are both positive which is not sufficient to answer the question.

There can be many possibilities of values for x and y . For example, $x = 20$ and $y = 8$, then $xy = 160$ and if $x = 10$ and $y = 18$ then $xy = 180$. There is no unique solution for xy . So statement I alone is not sufficient to answer the question.

Statement II states that both x and y are consecutive odd integers so if value of one of the integers is n , the other will be $n + 2$. Adding both x and y we get:

$\rightarrow n + n + 2 = 28 \rightarrow n = 13$. So the two integers are 13 and 15. The product $x, y = 195$.

Since statement II alone is sufficient to answer the question, the correct answer option is [2].

Hence, [2].

Note: In the above problem it is not important to know which of the numbers from x and y is greater. All we need to know is whether xy has a unique value.

Important:

One has to read and follow the instructions carefully in a Data Sufficiency questions. The directions and examples we have given above are of the standard type of 4-option and 5-option Data Sufficiency question. There can be variations in the instructions to be followed for a Data Sufficiency question. For example: A certain question type of a 4-option Data Sufficiency question can have the following directions.

Directions: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Choose [1], if the question can be answered by using the statement I alone but not by statement II alone.

Choose [2], if the question can be answered by using the statement II alone but not by statement I alone.

Choose [3], if the question can be answered using both statements together, but cannot be answered using either statement alone.

Choose [4], if the question cannot be answered using both statements together.

This set of instructions does not cover the possibility of either of the statements alone being sufficient to answer the question.

Similarly, a variation of a 5-option Data Sufficiency question is:

Directions: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Choose [1], if the question can be answered by using the statement I alone.

Choose [2], if the question can be answered by using the statement II alone.

Choose [3], if the question can be answered using both statements together, but cannot be answered using either statement alone.

Choose [4], if the question can be answered by using either statement alone.

Choose [5], if the question cannot be answered using both statements together.

In this instruction set, **options [3] and [4] have been interchanged** from the standard set of instruction used in a 5-option Data Sufficiency question.

By the flowchart and illustrations we can easily infer that the approach to any type of Data Sufficiency question is the same. The only difference is when **the right alternative is to be selected.**

Concept Builders

Given below are some typical examples of Data Sufficiency questions based on Quantitative Ability, Logical Reasoning and Data Interpretation.

Data Sufficiency – Quantitative Ability

Directions for Questions: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Choose 1; if the question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.

Choose 2; if the question can be answered by using either of the statements alone.

Choose 3; if the question can be answered by using both statements together, but cannot be answered using either of the statements alone.

Choose 4; if the question cannot be answered even by using both statements together.

Numbers

Q : What is the value of x^{13} ?

- I. x is a prime number.
- II. x is even.

A : $x^{13} = ?$

Statement I: x is a prime number.

But a unique value of x is not known. It can take any value as 2, 3, 5, 7, 11 ...

Hence, statement I alone is not sufficient.

Statement II: x is even.

Again, a unique value of x is not known, x can be 2, 4, 6 ...

Hence, statement II alone is not sufficient.

Combining I and II: x is even and prime.

The only prime number which is even is 2. Hence, I and II together are sufficient. Hence, [3].

Note: Data sufficiency questions are intended to test your reasoning ability and quantitative concepts and not your calculation skills. So if you find yourself doing a lot of pencil work you are on the wrong track. One need not substitute the value of x in the equation x^{13} and find the value of 2^{13} .

Q : Is the integer x divisible by 36?

- I. The number is divisible by 18 as well as by 9.
- II. The number is divisible by 252

A : Statement I: This statement does not help much as divisibility by 18 does not imply divisibility by 36 also. The information that the number is divisible by 9 is extraneous as divisibility by 18 implies divisibility by 9 in any case.

Statement II: This statement alone is sufficient to answer the question, as a number divisible by 252 must also be divisible by 36 as 36, is a factor of 252. Hence, [1].

Q : What is the value of x in $14x433$?

- I. The number $14x433$ is divisible by 3.
- II. $x < 5$

A : Statement I: Since $14x433$ is divisible by 3, the sum of the digits must also be divisible by 3. Since the sum of the digits other than x is $1 + 4 + 4 + 3 + 3 = 15$, which is divisible by 3. Hence, x can be 0, 3, 6 or 9. Thus, this statement alone is not sufficient.

Statement II: x is less than 5. Thus, this is also not sufficient alone.

On combining both statements, we get values of x as 0 or 3. Since we cannot get a unique value of x , both statements together are not sufficient to answer the question. Hence, [4].

Note: If a question asks for a numerical value the question is answerable only if the statement/s provide data with which we can arrive at a unique value and not a range of values.

Arithmetic

Q : The population of Rampur is 12,69,000 in the year 2020. What was the population of Rampur in 2019?

- I. Population increased by 17.5% in 2020 as compared to 2019.
- II. Population in 2019 increased by 20% as compared to 2018.

A : Statement I tells us that the population in 2020 is 17.5% more than that of 2019. We can form a simple equation by assuming the population in 2019 to be x . Hence, the population in 2020 would be $1.175x$.

$$1.175x = 12,69,000 \quad \dots (i)$$

This equation can be solved to get a unique value for x .

Hence, statement I alone is sufficient to answer the question.

Statement II tells us that the population in 2019 was 1.2 times the population in 2018.

As we do not know the population in 2018 and 2019, we have two unknown variables.

$$1.2x = y \quad \dots (ii)$$

where x = population in 2018 y = population in 2019

In order to find the values of two variables, we need at least two equations.

Equation (ii) cannot be solved for x and y .

Hence, statement II is not sufficient to answer the question.

Statement I alone is sufficient and statement II alone is not sufficient to answer the question. Hence, [1].

Note: For data sufficiency questions on linear equations one should be able to identify the variables required to answer the question and the variables about which information is provided in the statements given. Also one has to form an equation that can be solved to arrive at the answer. No need to solve the equation, but formulating it correctly is very important.

Q : What is the profit percentage on the sale of a toy?

- I. The marked price is 20% higher than the cost price and a discount of 10% is offered thereon.
- II. The selling price is Rs.1050/-.

A : Statement I: Assume CP to be 100.

$$\therefore MP = 120 \quad SP = 108 \quad \therefore \text{Profit} = 108 - 100 = 8$$

$$\text{Profit \%} = \frac{\text{Gain}}{\text{CP}} \times 100 = \frac{8}{100} \times 100 = 8\%$$

Statement I alone is sufficient to answer the question.

Statement II alone is not sufficient as we do not know the CP of the toy. Since statement I alone is sufficient to answer the question. Hence, [1].

Q : The ratio of Venkat's salary to Arjun's salary is 7 : 4. How much is Arjun's expenditure?

- I. The ratio of their savings is 1 : 1.
II. Their expenditures are in the ratio 11 : 5.

A : Statement I gives the ratio of their savings. If we know the ratio of income as well as savings, we can calculate the ratio of expenditure, but we cannot calculate the absolute values for any of them.

If salary of Venkat = $7x$, then Arjun's salary = $4x$

savings of Venkat = y , then Arjun's savings = y

$$\text{Ratio of expenditure} = \frac{7x - y}{4x - y} \quad (\text{expenditure} = \text{income} - \text{savings})$$

Hence, statement I alone is not sufficient to answer the question.

Statement II gives the ratio of expenditure. As no other absolute value is given, only ratio of expenditure is not sufficient to find out Arjun's absolute expenditure.

Hence, statement II alone is not sufficient to answer the question.

Taking statement I and II together,

$$\frac{7x - y}{4x - y} = \frac{11}{5} \quad \text{or} \quad 35x - 5y = 44x - 11y$$

$$-9x = -6y \quad \frac{x}{y} = \frac{2}{3}$$

There will be infinite values of x and y , for which $\frac{x}{y}$ will remain equal to $\frac{2}{3}$.

For example: $x = 2, y = 3, x = 4, y = 6, x = 6, y = 9$ and so on ...

Hence, we will not get any unique value of x and y , and hence the question cannot be answered. Hence, [4].

Note: You do not have to simplify the equation. It is obvious that you will get an equation with two variables and hence a unique value of x and y is not possible. In a ratio-proportion problem one must keep in mind that, if throughout the problem only ratios are mentioned and one has been asked to determine absolute value for any of the variables, it is not possible to do so.

Q : Basmati rice at Rs.32/kg. is mixed with Kalimunch rice at Rs.22/kg. What is the ratio of Basmati rice to Kalimunch rice in the mixture?

- I. Mixture is sold at Rs.38/kg with a 29% profit margin.
II. The total weight of mixture is 12 kg.

A : In the problem, cost price of both qualities of rice is given. We can find the ratio of two qualities of rice, if we know the cost price of mixture.

Statement I gives the information that at Rs.38/kg. of mixture, a profit of 29% is made.

Hence, cost price of mixture can be found as $1.29x = 38$, where x is the cost price. Using alligation formula, the ratio in which the quantities are mixed can be found.

Hence, statement I alone is sufficient to answer the question.

Statement II tells us that the total weight is 12 kg. But it does not give any additional information.

Hence, statement II alone is not sufficient to answer the question, statement I alone is sufficient. Hence, [1].

Note: The price of mixture will always be more than or equal to the price of the cheap and less than or equal to the price of the dear.

Q : What is the speed of the train?

I. It takes 40 seconds to pass a bridge 1200 m long.

II. It takes 8 seconds to pass a telegraph pole.

A : Let s be the speed of the train and l be the length of the train.

Statement I: $s = \frac{l + 1200}{40}$

Statement II: $s = \frac{l}{8}$

Thus, statements I and II are independently not sufficient to answer the question.

Combining I and II: We get two equations in s and l , and hence, the value of s can be found.

Hence, [3].

Note: It is very important in case of questions asked on equations to remember that there is no need to solve the equations. All these equations should be unique, i.e., one should get n different equations if n different variables are involved. The equations should not be similar, once they are reduced to normal form. e.g., $x + y = 7$ and $2x + 2y = 14$ are the same equations.

Q : Is the average (arithmetic mean) of the two numbers x and y less than y ?

I. x and y are both positive integers.

II. $x > y$.

A : The average of two numbers x and y will be $\frac{x + y}{2}$.

The average of two numbers lies between the two numbers. So, the average will be greater than the smaller number and smaller than the greater of the two.

Statement I: x and y are positive. But which among them is greater is not known. Hence, statement I alone is not sufficient.

Statement II: $x > y$. The average will be greater than y and smaller than x i.e., the average is not less than y . Since statement II alone is sufficient to answer the question. Hence, [1].

Algebra

Q : What is the value of $\frac{p^2}{q^2} + \frac{q^2}{p^2}$?

I. $\frac{p}{q} + \frac{q}{p} = 12$ II. $\frac{p}{q} - \frac{q}{p} = 4$

A : Statement I: $\frac{p}{q} + \frac{q}{p} = 12$

$$\therefore \left(\frac{p}{q} + \frac{q}{p}\right)^2 = (12)^2 = 144 \therefore \frac{p^2}{q^2} + 2 \times \frac{p}{q} \times \frac{q}{p} + \frac{q^2}{p^2} = 144 \therefore \frac{p^2}{q^2} + \frac{q^2}{p^2} = 144 - 2 = 142$$

Hence, I alone is sufficient.

Statement II: $\frac{p}{q} - \frac{q}{p} = 4$

$$\therefore \frac{p^2}{q^2} - 2 \times \frac{p}{q} \times \frac{q}{p} + \frac{q^2}{p^2} = 16 \qquad \therefore \frac{p^2}{q^2} + \frac{q^2}{p^2} = 16 + 2 = 18$$

Hence, II alone is sufficient.

Both the statements are independently sufficient to answer the question. Hence, [2].

Note: It is not necessary to actually solve the algebraic equation. Once you know the formula that can be used to answer the question asked, using the given statement, it is sufficient to answer the question.

$$\text{For example, } \frac{p^2}{q^2} + \frac{q^2}{p^2} = \left(\frac{p}{q} + \frac{q}{p}\right)^2 - 2 = \left(\frac{p}{q} - \frac{q}{p}\right)^2 + 2$$

In the above example, the complete solution is shown to understand the concept.

Q : Is $a^x > b^x$?

I. $a > b, x > 0$ II. $\frac{1}{a} < \frac{1}{b}, x < |x|$

A : One has to determine the relationship between a^x and b^x .

Statement I: $a > b$ and x is positive.

But we do not know whether a and b are positive or negative. Also, it is not known whether x is even or odd. Thus, depending on these a^x may or may not be greater than b^x . We have to consider cases with different values of a , b and x .

Case I: $a, b > 0$ and x is even.

For example let $a = 8, b = 2$ and $x = 2$

$$a^x = 8^2 = 64; b^x = 2^2 = 4 \therefore a^x > b^x$$

Case II: $a > 0, b < 0$ and x is even.

For example let $a = 8, b = -10$ and $x = 2$

$$a^x = 8^2 = 64; b^x = (-10)^2 = 100 \therefore a^x < b^x$$

Case III: $a > 0, b < 0$ and x is odd.

For example let $a = 3, b = -4$ and $x = 1$

$$a^1 = 3^1 = 3 > b^1 = (-4)^1 = -4 \therefore a^x > b^x$$

In each case we are getting a different relationship between a^x and b^x .

Thus I alone is not sufficient to arrive at the answer.

Statement II: $a > b$; also, $x < |x|$ $x < 0$

Thus, we get $a > b$, $x < 0$.

Since, x is negative a^x will be $\frac{1}{a^{|x|}}$ and b^x will be $\frac{1}{b^{|x|}}$.

Again, it is not known whether a and b are positive or negative.

Also, whether $|x|$ is even or odd is not known. Like in statement I, we will not be able to establish a relationship between a^x and b^x .

Statement II alone is not sufficient to answer the question.

Even after combining statements I and II, the question cannot be answered. Hence, [4].

Q : x is a number between 10 and 20. What is the value of x ?

I. x is a prime number.

II. x is a solution to the equation $x^2 - 23x + 132 = 0$.

A : x is a number between 10 and 20. Hence, x can take values 11, 12 ... 19. Now, one has to find the unique value of x .

Statement I: x is a prime number. Thus, x can be 11, 13, 17 or 19. But the unique value of x cannot be found. Hence, statement I alone is not sufficient.

Statement II: $x^2 - 23x + 132 = 0$

$(x - 11)(x - 12) = 0$

$\therefore x = 11$ or $x = 12$

Both 11 and 12 lie between 10 and 20. This equation gives two possible values of x .

Statement II alone is not sufficient.

Using statements I and II together, $x = 11$.

Hence, both statements together are sufficient to answer the question. Hence, [3].

Note: In questions where there are possibilities of multiple values of the unknown variables from each of the given statements that are insufficient to answer the question then take the value/s that is/are common to both the statements. If the common value/s can answer the question then both statements together are sufficient to answer the question. Else, both statements together are insufficient to answer the question.

Q : Is $x > \frac{1}{5}$?

I. x is positive.

II. $\frac{1}{x} < 5$.

A : Statement I: $x > 0$.

But x can lie between 0 and $\frac{1}{5}$ or it can be greater than $\frac{1}{5}$.

Hence, statement I alone is not sufficient to answer the question as 0.1 and 2 both are positive but $0.1 < \frac{1}{5}$ and $2 > \frac{1}{5}$.

Statement II: $\frac{1}{x} < 5$.

In case of inequalities, one cannot cross-multiply without knowing whether the terms are positive or negative as, in the case of negative multipliers, the sign of inequality will change.

$$\therefore \frac{1}{x} < 5 \quad \therefore x > \frac{1}{5} \text{ if } x > 0 \text{ and } x < \frac{1}{5} \text{ if } x < 0.$$

For example, x can be 0.25 or -1

In both cases $\frac{1}{x} < 5$

Thus, statement II alone is not sufficient.

Combining I and II, as x is positive, $x > \frac{1}{5}$. The question can be answered using both statements. Hence, [3].

Note: In case of inequalities, it is important to remember that it changes sign when both the terms are multiplied or divided by a negative number.

Q : x is a positive integer. Is x equal to 5?

I. $x^2 - 16 = 0$

II. $x^2 - 8x + 16 = 0$

A : Statement I and the basic data can give us a value of x and we can determine whether x is equal to 5. Similarly, statement II and the basic data can give us a value of x . There is no need to go to combined data step. Both statements, statement I and statement II individually can answer the question.

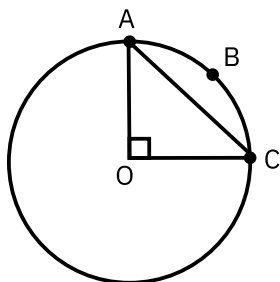
The error commonly made is that some students compute the value of x as 4 and then claim that the statement I is not sufficient to answer the question.

In the first place, there is no need to compute the value of x . Secondly, one has to see whether the question has a unique answer. Even 'No' is an answer i.e., no; x is not equal to 5. Thus the question could be answered using statement I alone. Similarly, the question can be answered by using statement II alone.

Note: Even 'no' can be the answer. It is not necessary to always get a positive answer. If the question asked can be answered in either yes or no, then getting 'no' as an answer is possible and the basic Data Sufficiency question is answered.

Geometry

Q :



What is the circumference of the circle above with center O?

- I. The perimeter of $\triangle OAC$ is $20 + 10\sqrt{2}$.
- II. The length of arc ABC is 5.

A : The circumference of the circle can be found if the radius r is known. $\triangle OAC$ is a right angled triangle with $OA = OC = r$ and perimeter $= 2r + AC$. By Pythagoras theorem,

$$AC = \sqrt{r^2 + r^2} = \sqrt{2r^2} = r\sqrt{2}; \text{ the perimeter of } \triangle OAC \text{ is then } 2r + r\sqrt{2} \quad \dots(i)$$

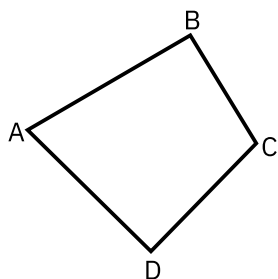
According to Statement I, the perimeter of $\triangle OAC = 20 + 10\sqrt{2} = 2(10) + 10\sqrt{2}$, Comparing this to equation (i) the radius r can be found out. So statement I alone, is sufficient to answer the question.

Statement II states that the length of arc ABC which is $\frac{1}{4}$ th of the circumference is 5π i.e., $\frac{1}{4} \times \text{circumference} = 5\pi$. From this the circumference can be found out. Statement II alone is sufficient to answer the question. Since either statement alone is sufficient to answer the question. Hence, [2].

Q : Is $\triangle ABC$ right angled at B?

- I. Quadrilateral ABCD is a cyclic quadrilateral.
- II. $\angle D = 90^\circ$

A :



Statement I: Quadrilateral ABCD is a cyclic quadrilateral i.e., the four vertices lie on a circle. But nothing can be said about angle B. Thus statement I alone is not sufficient.

Statement II: $\angle D = 90^\circ$

We do not know anything about angle B.

Combining Statements I and II: Quadrilateral ABCD is cyclic. Hence, the sum of its opposite angles is 180° . This is a property of cyclic quadrilaterals, which can be assumed while solving data sufficiency questions.

Thus, $\angle B + \angle D = 180^\circ$

But, $\angle D = 90^\circ \therefore \angle B = 90^\circ$. $\triangle ABC$ is right angled at B.

Thus, statements I and II are together sufficient to answer the question. Hence, [3].

Note: In Data Sufficiency questions on Geometry the properties of geometrical figures can be assumed.

Q : What is the volume of the cuboid, whose two surface diagonals are of length $4\sqrt{2}$ and 6 units?

I. One face of the cuboid is a square of area 16 sq. units.

II. Height of the cuboid is 4 units.

A : We need to know the length, breadth and height of the cuboid to know its volume.

Statement I tells us that one face of the cuboid is a square of length 4 units.

Now we know that out of 3 surface diagonals, two diagonals are of length $4\sqrt{2}$ and 6.

Now, this is possible only if the diagonal measuring $4\sqrt{2}$ cm is on the face, which is a square of length 4.

$$\text{Length of diagonal} = \sqrt{4^2 + 4^2} = 4\sqrt{2}$$

$$\text{Also, } 6 = \sqrt{4^2 + h^2} \Rightarrow 36 - 16 = h^2 \Rightarrow h = 2\sqrt{5}$$

$$\text{And, hence, } \ell = 4, b = 4 \text{ and } h = 2\sqrt{5}.$$

Therefore, the volume can be found out.

Hence, statement I alone is sufficient to answer the question.

Statement II gives only the height of cuboid. As no other information is given, we will get two equations and will have two variables.

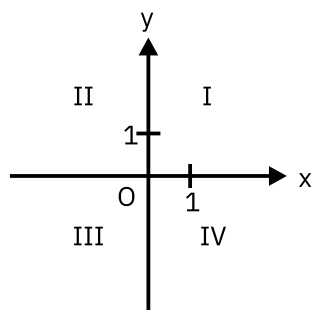
$$x^2 + (4)^2 = 36 \text{ and } x^2 + y^2 = 32 \Rightarrow x^2 = 20 \text{ and } y^2 = 12.$$

$$\text{OR, } x^2 + y^2 = 36 \text{ and } x^2 + (4)^2 = 32 \Rightarrow x^2 = 16 \text{ and } y^2 = 20.$$

So, the equation can be solved to find two different values of x and y, hence, statement II will not give us a unique solution.

Hence, statement II alone is not sufficient to answer the question. Hence, [1].

Q :



If $pq \neq 0$, then what quadrant of the coordinate system above does point (p,q) lie?

- I. (q, p) lies in quadrant IV.
- II. $(p, -q)$ lies in quadrant III.

A : Statement I: if (q, p) lies in quadrant IV, then $q > 0$ and $p < 0$ which means (p, q) lies in quadrant II. Since in quadrant II the x-coordinate i.e., $p < 0$ and y-coordinate i.e., $q > 0$. Statement I alone, is sufficient to answer the question.

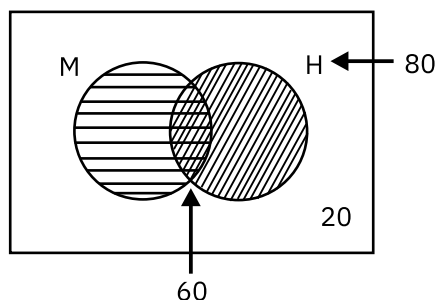
Statement II: If $(p, -q)$ lies in quadrant III, then $p < 0$ and $-q < 0 \Rightarrow q > 0$. This means that (p, q) lies in quadrant II. Statement II alone is sufficient to answer the question. Since either statement alone is sufficient to answer the question. Hence, [2].

Modern Math

Q : In a class of 80 students, how many students passed in only Mathematics?

- I. In the class, 60 students passed in Mathematics, History or both.
- II. In the class, 40 students passed in History.

A : Total number of students in the class = 80.



Statement I:

From this statement, number of students failing in both the subjects can be calculated. But, the number of students passing in only Mathematics cannot be found out.

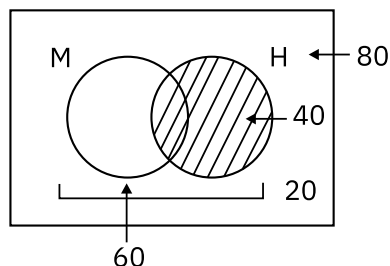
Hence, statement I alone is not sufficient.

Statement II:

Out of 80 students, 40 pass in History. This means 40 fail in History. But these 40 may or may not have passed in Mathematics. Moreover, out of 40, who passed in History, a few may or may not have passed in Mathematics.

Hence, statement II alone is not sufficient.

Combining statements I and II, we get the following Venn diagram:



The number of students passing in only Mathematics = $60 - 40 = 20$.

Hence, both statements together are sufficient to answer the question. Hence, [3].

Note: In case of Venn diagrams it is very important to actually draw the diagram and solve the question. This takes lesser time and also it becomes very clear as to what information is provided and what data is lacking.

Q : For a badminton tournament, 2 players are to be selected from a group of 'n' players to form a doubles team. What is the value of n?

- I. The number of ways in which 2 players can be selected from a group of 'n' players is 21.
- II. The number of ways of selecting 2 players from a group of 'n' players is the same as selecting 5 players from a group of 'n' players.

A : Statement I: According to given data ${}^nC_2 = \frac{n!}{2!(n-2)!} = \frac{n(n-1)}{2} = 21$

$$\Rightarrow n^2 - n = 42 \Rightarrow n^2 - 7n + 6n - 42 = 0$$

$$\Rightarrow n(n-7) + 6(n-7) = 0 \Rightarrow (n-7)(n+6) = 0$$

$$n = 7 \text{ or } n = -6$$

But n i.e. number of players cannot be negative $n = 7$

Statement I alone is sufficient to answer the question.

Statement II: According to the rule of combinations

$${}^nC_r = {}^nC_{n-r} \quad \dots(i)$$

According to given data

$${}^nC_2 = {}^nC_5$$

Comparing this with equation (i) we get

$$r = 2 \text{ and } n - r = 5$$

$$\Rightarrow n - 2 = 5 \Rightarrow n = 7$$

Statement II alone is sufficient to answer the question.

Since either statement alone is sufficient to answer the question. Hence, [2].

Q : What is the probability that a ball drawn from a bag at random is red, if the bag contains only blue, red and yellow balls?

- I. There are three red balls and 15 balls of other colours in the bag.
- II. There are equal number of red and blue balls in the bag and the number of yellow balls is twice that of blue balls.

A : Probability of drawing a red ball will depend only on the relative number of the red balls with respect to the total number of balls in the bag.

Statement I: Red balls = 3

Blue + yellow = 15

Total balls = 15 + 3 = 18

Probability of drawing a red ball = $\frac{3}{18} = \frac{1}{6}$

Thus, statement I alone is sufficient.

Statement II: Let the number of red balls = x

Blue balls = x, Yellow balls = 2x

Total balls = x + x + 2x = 4x

Probability of getting a red ball = $\frac{x}{4x} = \frac{1}{4}$

Thus, statement II alone is also sufficient.

Therefore both the statements are sufficient independently to answer the question. Hence, [2].

Q : What is the value of $f(f(5))$?

- I. $f(x) = x^2 + 1$ for an odd value of x.
- II. $f(x) = 4x + 1$ for an even value of x.

A : Statement I: $f(x) = x^2 + 1$ for an odd value of x.

$f(5) = 5^2 + 1 = 26$

$f(f(5)) = f(26)$

26 is an even number; we cannot use $f(x) = x^2 + 1$ as it is true only for odd values of x. Thus, statement I alone is not sufficient.

Statement II: $f(x) = 4x + 1$ for an even value of x

$f(5)$ cannot be calculated as 5 is odd.

Combining statements I and II, $f(5) = 26$

$f(f(5)) = f(26) = 4 \times 26 + 1 = 105$

Thus, statements I and II are together sufficient to answer the question asked. Hence, [3].

Note: There is no need to calculate $f(26)$. At first the student might make a mistake by marking statement I alone as sufficient to answer the question as $f(f(5))$ is asked and 5 is an odd number. But, it should be noted that, $f(f(5))$ is a composite function and the value of $f(5)$ is not odd. Generally, in data sufficiency questions, it is not necessary to solve the question. But in the case of algebraic functions it is important to actually substitute the values of variables and get the value of the function.

Q : What is the first term of the A.P.?

- I. The sum of the first three terms is 30.
- II. The product of the first three terms is 960.

A : Let the first term be $a - d$, second term be a and third term be $a + d$.

Statement I: Sum of the first three terms = $3a = 30$

$\therefore a = 10$

We do not know the value of d thus we cannot say what is the value of $a - d$.

Statement II: Product of the first three terms = $(a - d)a(a + d) = 960$

$\Rightarrow (a^2 - d^2)a = 960$

Here also we cannot find the value of $a - d$.

Combining both statements we get, $(100 - d^2) \times 10 = 960 \Rightarrow d = + 2$

If $d = 2$: $a - d = 8$, $a = 10$, $a + d = 12$

If $d = -2$: $a - d = 12$, $a = 10$, $a + d = 8$

Hence, the first term is either 8 or 12. Since both statements together cannot answer the question. Hence, [4].

Data Sufficiency – Logical Reasoning

Directions for Questions: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Choose 1; if the question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.

Choose 2; if the question can be answered by using either of the statements alone.

Choose 3; if the question can be answered by using both statements together, but cannot be answered using either of the statements alone.

Choose 4; if the question cannot be answered even by using both statements together.

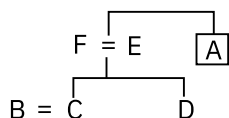
Family Tree

Q : A family consists of six members A, B, C, D, E and F. How is A related to C?

I. F and E have two children C and D. B is the spouse of C and A is the uncle of D.

II. The family has only 3 couples. C and B have a daughter D, who is married to F. They also have a daughter-in-law E.

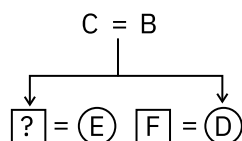
A : From statement I: we get,



Since A is the uncle of D, so he will be C's uncle.

Hence, the question can be answered using statement I alone.

From statement II: we get,



∴ The missing person represented by (?) in the square box has to be A to fulfill the condition of 3 couples in the family.

Thus, statement II alone is also sufficient to answer the question.

Hence, the question can be answered using either of the statements alone. Hence, [2].

Linear Arrangement

Q : Who is the tallest amongst X, Y, and Z?

I. X's height is the arithmetic mean of the heights of Y and Z.

II. Z is taller than at least one of X and Y.

A : From statement I: X is the A.M. of Y and Z.

∴ Either Y or Z, will be the tallest or $X = Y = Z$.

Thus, statement I alone is insufficient to answer the question.

From statement II: $Z > X$ or $Z > Y$ or $Z > X$ and $Z > Y$.

Thus, statement II alone, is insufficient to answer the question.

Combining statements I and II: Since all three have different heights, X is the middle person in ascending order of height and given that Z is not the shortest, so Z has to be the tallest amongst the three. Since both statements together can answer the question. Hence, [3].

Conditionalities

Q : Deepak got a job. Did Aman get a job?

I. If Aman gets a job, Deepak will also get a job.

II. If Aman does not get a job, Deepak will not get a job.

A : If Aman gets a job, Deepak gets a job. But the converse may not be true.

Statement I alone cannot answer the question.

Statement II implies that till Aman gets a job, Deepak won't get a job. But, we know that Deepak has got a job. So, Aman must have got a job. Since, statement II alone is sufficient to answer the question. Hence, [1].

Coding

Q : * denotes \times or \div , # denotes + or $-$. What do * and # denote?

I. $1 * 0 = 1 \# 1$

II. $1 \# 0 = 1 * 1$

A : Statement I: Looking at the R.H.S. of the expression $1 \# 1 \Rightarrow 1 + 1 = 2$ or $1 - 1 = 0$. So the value of $1 * 0$ has to be defined as the value of $1 \# 1$ is defined.

Now, $1 * 0 = 1 \div 0 = \infty$, which is not a defined value.

So, $1 * 0 = 1 \times 0 = 0$, which is possible as one of the 2 values of $1 \# 1$ is 0. So '#' is the code for '-' and '*' is the code for 'x'.

Statement I alone, is sufficient to answer the question.

Statement II: Looking at the R.H.S. of the expression $1 * 1 \Rightarrow 1 \div 1$ or $1 \times 1 = 1$. So, $1 \# 0 = 1$. Now this is possible in 2 ways $\Rightarrow 1 + 0 = 1$ or $1 - 0 = 1$. Since no unique relation can be derived between the arithmetic operators and the codes. Statement II alone is not sufficient to answer the question. Hence, [1].

Numerical Puzzle

Q : There are 180 blue and red balls in a cylinder and a square box together. What is the number of blue balls in the square box?

I. There are 70 balls in the square box.

II. There are 30 blue balls in the cylinder.

A : Total number of balls = 180.

Statement I: Number of balls in the square box is 70. Therefore, number of balls in the cylinder is 110. But the break-up as blue or red is not known.

Statement II: Number of blue balls in the cylinder is 30. But the total number of blue balls is not known. Hence, number of blue balls in the square box cannot be found out.

After combining statements I and II, we get a table as follows:

| | Red | Blue | Total |
|------------|-----|------|-------|
| Cylinder | 80 | 30 | 110 |
| Square Box | | | 70 |
| Total | | | 180 |

Even after using both statements one cannot find the number of blue balls in the square box. Hence, data is insufficient to the answer the question. Hence, [4].

Note: It is very important to represent the given information in a graphical or tabular form in such kind of problems. It becomes very easy to arrive at the conclusion if the data is represented in a graphical or tabular manner.

Data Sufficiency – Data Interpretation

Directions for questions: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Choose [1], if the question can be answered by using the statement I alone.

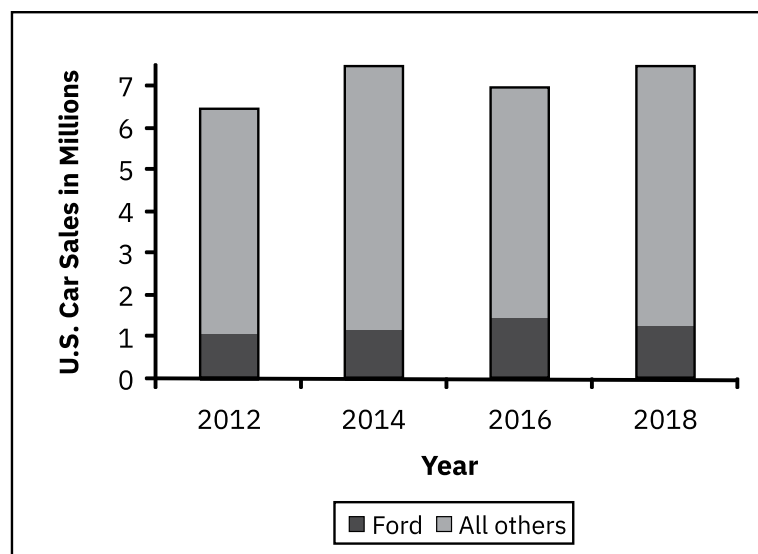
Choose [2], if the question can be answered by using the statement II alone.

Choose [3], if the question can be answered by using either statement alone.

Choose [4], if the question can be answered using both statements together, but cannot be answered using either statement alone.

Choose [5], if the question cannot be answered using both statements together.

The graph shows car sales by Ford and some other companies in the U.S. over a period of four years.



Q : If the sales of Chrysler are a part of the sales of 'All other' cars, then in how many of the given years have the sales of Chrysler overtaken those of Ford?

- I. The sales of Chrysler are 25% of the sales of 'All other' cars during all the given years.
 II. The sales of Chrysler were 1 million in 2012 and they grew at the rate of 10% every year.

A : For the year 2012,

Ford sales = 1 million

'All other' Car sales = $6.5 - 1 = 5.5$ million

Chrysler sales = $\frac{25}{100} \times 5.5 = 1.375$ million.

For the year 2014,

Ford sales = 1.25 million

'All other' Car sales = $7.5 - 1.25 = 6.25$ million

Chrysler sales = $\frac{25}{100} \times 6.25 = 1.56$ million.

For the year 2016,

Ford sales = 1.5 million

'All other' Car sales = $7 - 1.5 = 5.5$ million.

Chrysler sales = $\frac{25}{100} \times 5.5 = 1.375$ million.

For the year 2018,

Ford sales = 1.25 million

'All other' cars sales = $7.5 - 1.25 = 6.25$ million

Chrysler sales = $\frac{25}{100} \times 6.25 = 1.5625$ million

\therefore Chrysler sales exceed Ford sales in the years 2012, 2014 & 2018. Statement I alone is sufficient to answer the question.

Statement II: At a 10% annual growth rate, sales of Chrysler will be approximately as follows:

| Year | 2012 | 2014 | 2016 | 2018 |
|-------|-----------|--------------|--------------|--------------|
| Sales | 1 million | 1.21 million | 1.46 million | 1.77 million |

By comparing with the Ford sales (as per the graph) we can see that Chrysler sales overtake Ford sales in the year 2014 and 2018. So, statement II alone is sufficient to answer the question. Since either statement alone is sufficient to answer the question. Hence, [3].

Note: It is not necessary to actually calculate the sales of Chrysler for all the years. All we need to know is that the data provided is sufficient to calculate the sales. The complete solution is shown to understand the concept.

Q : The production of 'all other' cars has grown by what percentage between 2012 and 2016?

- I. The production of Ford cars has grown at an annual rate of 10% between 2012 and 2016.
 II. The total U.S. cars production has grown at an annual rate of 10% between 2012 and 2016.

A : Since the production figures or any co-relation between the production and sales of Ford and all U.S. cars is not indicated for 2012 or any of the other years, by the graph or the statements provided, the growth percentage of the production of 'All other' cars cannot be computed by either of the statements, either individually or combined. Hence, [5].



CLASS EXERCISE

DIRECTIONS for questions 1 to 20: Each question is followed by two statements, I and II. Answer each question using the following instructions:

Choose 1; if the question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.

Choose 2; if the question can be answered by using either of the statements alone.

Choose 3; if the question can be answered by using both of the statements together, but cannot be answered using either of the statement alone.

Choose 4; if the question cannot be answered even by using both the statements together.

1. What would be Ram's share in the profit of a partnership with Shyam if they put money in the ratio 7 : 3 respectively? There are no other partners.
I. Ram put in Rs.2100 for 3 months.
II. Shyam put in money for 6 months.
2. By what percent is C's age greater than A's age?
I. The ratio of the ages of A, B and C is 3 : 4 : 5.
II. A's age is 45 years.
3. Tom plucks apples. He sells some of the apples, distributes some of them among his friends, eats some and takes the rest home. How many apples did Tom eat?
I. He distributes 6 apples among his friends, which comes to be $\frac{3}{5}$ th of what he has eaten and sold.
II. He eats $\frac{1}{3}$ rd of the plucked apples, which is 12 less than what he has plucked.
4. Are Tom and Harry twins?
I. They are the only two siblings of the same parents.
II. The father's age is 5 times of Tom's age, and he is 20 years older than Harry.
5. What is the numerical value of $\frac{p+q}{r+s}$ where p, q, r and s are not all zero simultaneously?
I. $p : r :: q : s$
II. $q(2s + q) = s^2 + q^2$
6. Is the number x divisible by 9?
I. The number x can be obtained by taking the difference between a number (say N) and another one obtained by reversing the digits (of the number N).
II. The sum of the digits of x is divisible by 9.
7. Average speed of a car for return journey is:
I. It travelled equal distance each time.
II. Time taken for onward and return journey was 51 mins. and 47 mins, respectively.

8. How many girls does a class have?
 - I. There are a total of 40 students in the class.
 - II. The product of the number of boys and the number of girls is 300.
9. Is the product of the natural numbers a , b , c and d divisible by 24?
 - I. 3 of the numbers out of a , b , c and d are 31, 32 and 33.
 - II. a , b , c and d are consecutive numbers.
10. What is the value of x , if x and y are prime numbers?
 - I. $x + y = 14$
 - II. 198 is divisible by xy .
11. The sum of the ages of A , B and C is 137 years. What is C 's age?
 - I. The sum of the ages of A and C is 91 years.
 - II. The sum of the ages of B and C is 104 years.
12. How long will two trains travelling in the same direction take to pass each other if the speed of one of the trains is 30 m/sec.?
 - I. The sum of the lengths of both trains is 260 m.
 - II. The sum of their speeds is 80 m/sec.
13. What is the population of the village?
 - I. $\frac{7}{11}$ of the village comprises of married people.
 - II. 200 widows comprise 10% of the singles population.
14. What is the value of the digit x in the number $42x0x59$, if x is a natural number?
 - I. The number is a multiple of 11.
 - II. $x > 5$.
15. A and C working together take 30 days to complete a piece of work. How long does A take working alone?
 - I. A , B and C working together take 20 days.
 - II. B is 2 times more efficient than C .
16. Base of a triangle is 8 cm, and one other side is 6 cm. What is the area of the triangle?
 - I. Altitude is 5 cm.
 - II. Median to base is 5.5 cm.
17. What is the selling price of the mixture, if the ratio of the two qualities of rice mixed is 3 : 5?
 - I. Cost price of the first quality of rice is Rs.20/kg.
 - II. Cost price of the second quality of rice is Rs.28.5/kg.
18. Radius of the circle is 6.4 cm. What is the length of the chord?
 - I. Length of perpendicular from centre to the chord is 4 cm.
 - II. Measure of the sector whose end points are the end points of the chord is 60° .

19. Radius of base of a cone is 4.2 cm, what is the volume of the cone?
- I. The ratio of slant height to the height is 1.25 : 1.
 - II. The ratio of the total surface area to volume is 1.5 : 1.
20. Are the lines ℓ and m parallel?
- I. For every point on line ℓ there is a point on line m such that there is a one-one correspondence between the two and the points are distinct.
 - II. The two lines lie on the same plane.

DIRECTIONS for questions 21 to 40: Each question is followed by two statements.

Mark [1]; if the question can be answered by using statement I alone.

Mark [2]; if the question can be answered by using statement II alone.

Mark [3]; if the question can be answered by using either of the statements, I and II, alone.

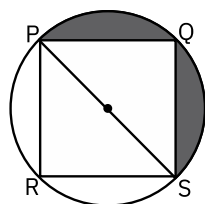
Mark [4]; if the question can be answered by using both the statements together.

Mark [5]; if the question cannot be answered.

21. What is the value of A , if A and B are real numbers?
- I. $A^2 + B^2 = 49$
 - II. $AB = 21$
22. Is the sum of the elements in a series of integers divisible by 3?
- I. None of the integers in the series is divisible by 3.
 - II. The series is an A.P. with 36 terms.
23. Find the 1st term of the arithmetic progression.
- I. 10th term exceeds the 6th term by 20.
 - II. 11th term is twice the 1st term.
24. What is the radius of the circle?
- I. Length of the tangent from P to the circle is 10 cm.
 - II. Shortest distance from P to the circle is 5 cm.
25. Who has more money, Vipin or Meenal?
- I. Vipin has more money than the sum of twice Dileep's money and Ambica's money.
 - II. Meenal has more money than the sum of thrice Dileep's money and twice of Ambica's money.
26. Is the volume of the sphere greater than the volume of the cube?
- I. Radius of sphere is greater than edge of a cube.
 - II. Diameter of sphere is greater than side of cube.

27. Students of standard VII appeared for one or more of the English, French and Hindi language proficiency exams. How many students took the French exam?
- 100 students took both the English and the French exam.
 - 200 students took only the French exam.

28. M is the centre of the circle. $QS = 10\sqrt{2}$ units. Find the area of the shaded region.



- $PR = RS$.
 - $PR \parallel QS$.
29. It is known that the code made up of n alphabets, is written in the Creapulsion script which happens to have n different alphabets. An archaeologist A suggested that there were x different possible codes assuming that alphabets could repeat. Another archaeologist B found out that no alphabet was repeated in the code and there were y different possible codes. What is the percentage of the possibilities suggested by archaeologist A but not suggested by archeologist B?
- $n = 4$
 - $\frac{x}{y} > 1$
30. What is the probability that an archer is able to hit a given target at a shooting range?
- The probability that the archer hits a given target is $\frac{1}{6}$ if the weather is clear.
 - The probability that the weather is clear is $\frac{1}{8}$.
31. Eight friends Alice, Beth, Cinderella, Dave, Elizabeth, Francis, Gary and Harry are playing a game in which six of them participate by forming two groups of three each, while the remaining two judge their performance. Alice definitely participates if Dave participates. Is Harry participating?
- Gary never wants to be with Beth.
 - Cinderella and Dave are participating but are not in the same group. Also Elizabeth prefers to remain a judge.
32. X is an integer between 2 and 100. X is also the square of an integer. What is the value of X ?
- X is the cube of an integer
 - X is an even number.
33. There are seven persons A, B, C, D, E, F and G. A is taller than D but shorter than E. F's height is the median of the height of all persons. C and E are shorter than G. What is the ascending order of heights?
- G is shorter than B.
 - F is shorter than C and taller than E.

34. Who is/are the heaviest among A, B, C, D and E?
- D is the heaviest among C, D and E.
 - B, who is not lighter than D, is not the lighter of A and B.
35. Six people are sitting in a row. How many people are sitting between D and A?
- C and B are sitting on extreme corners. A sits adjacent to B. H keeps the maximum possible distance between A and himself. D and E are always together such that D sits to the left of E and the number of people between C and D is less than the number of people between C and E.
 - E and D are sitting on the extreme corners such that E sits to the right of D. A and C always sit together such that if they exchange their positions, D sits next to C. H sits on the right of C.
36. Is Richa the tallest girl in the class?
- Julie is shorter than Richa.
 - Julie is taller than all her friends in the class.
37. Alok and Trilok are standing in a queue. How many people are there in the queue?
- There are 20 people behind Alok and 20 people in front of Trilok.
 - There are 5 people between Alok and Trilok.
38. In an intercom system of a certain office, all phone numbers (extensions) consist of four digits. The manager of that office has a number which has distinct digits. What is his phone number?
- The digits of the phone number are in A.P from left to right.
 - The product of the digits is divisible by 5 and 7. The sum of the digits is less than 19.
39. Five males A, B, C, D and E and their wives P, Q, R, S and T are seated around a circular table subject to the following conditions:
- A and S are sitting opposite to each other.
 - P is seated opposite R's husband.
 - Q is not seated in front of her husband.
 - T is sitting in front of her husband who is not C.
 - R is sitting opposite E.
- Who is P's husband?
- Q is not married to B or C.
 - S is married to D.
40. There are 6 students who opt for 3 out of 5 optional subjects viz., Drawing, Music, Craft, Dance and Writing. How many students opt for Music but not Dance?
- 5 students opt for Music, 3 opt for Drawing, 4 opt for Craft, 3 opt for Dance and 3 opt for Writing.
 - 2 students opt for Drawing, Music and Craft. 1 student has Dance, Craft and Writing as the 3 optional subjects, 1 student has Music, Craft and Dance as the optional subjects.



PRACTICE EXERCISE-1

DIRECTIONS for questions 1 to 20: The question is followed by two statements.

Mark [1]; if the question can be answered by one of the statements alone but not by the other.

Mark [2]; if the question can be answered by using either statement alone.

Mark [3]; if the question can be answered by using both the statements together but cannot be answered using either statement alone.

Mark [4]; if the question cannot be answered even by using both the statements.

1. What is A's share out of a profit of Rs.5000?
I. A invested twice the money invested by B.
II. B invested for 4 years, while A invested for 3 years.
2. Is $p^q \times r^s$ odd or even?
I. p is even and q is odd.
II. r is odd and s is even.
3. If $a : b = \frac{3}{7} : 2$ and $b : c = 7 : \frac{11}{2}$, find the value of a, b and c.
I. The value of b is equal to the sum of a and c.
II. $a + 3b - 2c = 23$.
4. What is the value of x?
I. $x = y - z$ where $y + z = 20$ and y is a factor of z.
II. $|x| = |y + z|$ where $|y + z| = 30$.
5. What will be the height of a cuboid?
I. Its body diagonal is of length 25 cm.
II. Its base diagonal is of length 15 cm.
6. What are the roots of a quadratic equation?
I. One of the roots is complex.
II. Sum of the roots is 4.
7. Sum of two numbers is 22. Find the numbers.
I. HCF of the numbers is 2.
II. LCM of the numbers is 60.
8. A computer shop gives three successive discounts, of a% each, on a laptop having a marked price of Rs.100000. What is the value of a?
I. Price of the laptop after two successive discounts of a% is Rs.81000.
II. Price of the laptop after three successive discounts of a% is Rs.72900.

9. A person observed that when buying a watch from a shop, at a discount of 10%, he paid the same amount as when he had purchased the same watch from another shop, where he had been charged 10% more than the marked price. How much amount had he paid for the watch?
- I. The marked price of the watch which was purchased earlier was Rs.20 less than the marked price in the other shop.
II. The ratio of the marked prices was 2 : 3.
10. A contractor supplies hay at a fixed rate (to everyone). He supplies hay, for a month, to a cattle farm having 20 cows and 30 buffaloes. A buffalo and a cow need 28 kg. and 21 kg. of hay per week respectively. How much is the farm owner supposed to pay the contractor at the end of the month?
- I. Another farm having 30 cows and 40 buffaloes which gets supplies from the same contractor needs to pay Rs.10000 for hay per month.
II. If the farm owner reduces the number of cows to 5 then he has to pay the contractor Rs.2000 less for a month's supply of hay.
11. Ram went to meet Shyam and then came back. The cities in which they live are 100 km. apart from each other. Between the two cities Ram took one stop exactly between the two cities. After every stop, Ram doubled his speed. Neglecting the time for which he stopped, what was Ram's average speed during the whole trip?
- I. Ram was back to his place in 2 hours of travelling time.
II. Ram started at a speed of 50 km/hour from his city.
12. What is the length of train A?
- I. Train A crosses a pole in 5 second.
II. Train A crosses a 1 km. platform in 55 second.
13. Raju has two sons Sonu and Monu. He is four times older than the younger son and the difference between the ages of his sons is two years. What is Raju's age?
- I. Sonu's age is 10 years.
II. Monu's age is 12 years.
14. Two arms of a square lie along the lines $x = 0$ and $y = 0$: find the area of the square.
- I. Equation of a diagonal is $y = x$.
II. Equation of a diagonal is $y = 1 - x$.
15. What is the ratio of the heights of cone A and cylinder B?
- I. Both A and B have equal volumes.
II. Both A and B have equal base areas.

16. Find the value of x .
 - I. $5\left(x^2 + \frac{1}{x^2}\right) + 4\left(x - \frac{1}{x}\right) + 3 = 0$.
 - II. $8x^2 - 24x + 18 = 0$
17. What is the radius of the (concerned) circle?
 - I. When the area corresponding to a circle of radius half that of the given circle is cut out, the remaining area is 7.45m^2 .
 - II. When a sphere is formed with radius equal to that of the given circle, the ratio of the surface area of the sphere to the area of the circle is $4 : 1$.
18. A person wants to purchase one chair and one table. How much does he need to pay?
 - I. Cost of 4 chairs and 3 tables is Rs.1200.
 - II. Cost of 15 tables and twenty chairs is Rs.6000.
19. What is x percent of y ?
 - I. $(x + 20)$ percent of y is $(x + 20)$.
 - II. $\frac{x}{3} = \frac{y}{4}$.
20. Is $x^2 - 14x + (50 + c)$ always positive, x being real?
 - I. c is a natural number.
 - II. c is an integer.



PRACTICE EXERCISE-2

DIRECTIONS for questions 1 to 20: Each question is followed by two statements.

Mark [1]; if the question can be answered by using statement I alone.

Mark [2]; if the question can be answered by using statement II alone.

Mark [3]; if the question can be answered by using either of the statements, I and II, alone.

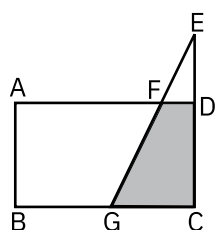
Mark [4]; if the question can be answered by using both the statements together.

Mark [5]; if the question cannot be answered.

1. What is the value of $(8 \# 6) \# (12 \# 9)$?
 I. $(a \# b) = b$; if both a and b are divisible by 2.
 II. $(a \# b) = a$; if both a and b are divisible by 3.
2. Two persons, P and S, are given the product and the sum of two distinct, positive and even numbers x and y , respectively. They do not know the number given to the other person. They take turns trying to guess the other person's number. Assuming each of them uses perfect logic, will S on her first turn say, "I know that the number given to P is 24"?
 I. P takes the first turn and says, "I don't know the number S has".
 II. The number given to S is 10.
3. In a phone directory, 20% of the names start with A. The names that start with surnames are 25%. What percent of names start with A, but not with the surname?
 I. The names that start with surnames and with C are 10% of all the names in the directory and those that start with surnames but not with B are 15% of all the names in the directory.
 II. The names that start with surnames and with B are 10% of all the names in the directory and those that start with surnames but not with C are 10% of all the names in the directory.
4. The number of new cars sold in the span of 6 consecutive months by a company were 200, 126, 156, 231, 96, 286 (not necessarily in this order). The cars sold in the month of December were 200. The month in which 231 cars were sold is between the months in which 156 and 126 cars were sold. Find the month in which the maximum number of cars were sold if it was not March.
 I. The least number of cars were sold in May.
 II. In January 126 cars were sold.
5. Abba, Babba, Chabba, Dabba and Ebba are standing in the descending order of their heights. The boy having a letter repeating the maximum number of times in his name is the shortest. Who, among the five, is the tallest?
 I. One of the boys standing at the end positions does not have the same number of different letters in his name as any one else.
 II. The boy with the maximum number of different letters in his name is taller than Ebba.

6. $a^2 + b^2 + c^2 + d^2 = x^2 + y^2 + z^2 + w^2 = 78$. Find the value of $a + b + c + d + x + y + z + w$; where a, b, c, d, x, y, z and w are natural numbers.
- $b = y = 3$
 - $(a + b + c + d) - (x + y + z + w) = 2$
7. Uma made a necklace using round and triangular beads only. She noticed that exactly 10% of the round beads in her necklace were yellow and number of yellow triangular beads were 20% more than the number of yellow round beads. Find the number of triangular beads used in the necklace.
- Exactly 30% of the total beads were round.
 - The total number of triangular and round beads used was 4000.
8. Five minutes after the running race started, A was running ahead of 5 runners while B was still behind 3 runners. How many participants were running in the race?
- 10 minutes after the race started, A was running at the position just ahead of B, while B could manage to beat only one runner in the last 5 minutes.
 - 15 minutes after the race started, B was running at the second position, while A beat 5 runners in the last 10 minutes.

9.



In the above figure, ABCD is a rectangle and $AB = CG$ and $BC = EC$. Find the ratio $AF : FE$.

- $AB : BC = 1 : 2$
 - The areas of $\square ABGF$ and $\square GCDF$ are in the ratio 5 : 4.
10. Vanita, Sunila, Moloy, Suresh, Shailesh, Vrinda, Bijoy, Keyur, Vijay and Girija study in Kindergarten and sit in pairs on 5 benches which are one behind the other without gaps. Who are the two sitting immediately behind Sunila?
- The children with names starting with 'V' sit with children whose names start with 'S', such that children with names starting with 'V' sit one behind the other on alternate benches in alphabetical dictionary order and those with names starting with 'S' sit one behind the other in reverse dictionary order.
 - Moloy, Bijoy, Keyur and Girija sit such that the pair in front has names starting with letters which occur before the starting letters of names of the pair sitting behind.

11. Out of 400 students, 150 drink milk, 200 drink tea, 150 drink coffee and 50 drink tea and coffee. What is the ratio of the number of students drinking both milk and tea to those drinking only coffee?
 - I. No person drinks both milk and coffee.
 - II. 25 students drink only milk and coffee.
12. In one particular year, the final match for the Wimbledon Grand Slam tennis tournament was played between Nadal and Federer. In a match 3, 4 or 5 sets are played. A person wins a set when he wins 6 games. To win a match 3 sets have to be won. For the first 4 sets (if the match lasts for more than 3 sets), if the scores are tied at 6 games each, a tie-breaker is played to decide the winner of the set. For the fifth set, the player who wins 6 or more games which is at least 2 more than the games won by the opponent, wins the set. Did Nadal win the Wimbledon trophy?
 - I. Nadal won 34 games including both the tie-breakers.
 - II. Federer won more games than that won by Nadal.
13. A, B, C, D and E were the finalists in a Maths Talent Quiz. A, B, C, D and E are ranked from highest to lowest depending on their scores in the final. If B scored more than A and A scored more than C, what is B's rank?
 - I. D's score was higher than E's.
 - II. E's score was the average of A's and D's score.
14. A wooden rectangular box of dimensions 5 cm 6 cm 8 cm is solid except for a small spherical section in the centre filled with liquid. What is the minimum depth upto which Rahul will have to drill so as to reach the liquid?
 - I. Volume of the wood is known.
 - II. Rahul can drill a hole 1 m. deep in 1 hour.
15. What is the time taken by the winner to run a 1 km race?
 - I. The winner beats his nearest rival by 6 seconds.
 - II. The winner beats his nearest rival by 24 metres.
16. What was the total investment of Ravi on 600 cans?
 - I. Out of 600 cans, 80 were broken and Ravi sold the remaining at Rs.7.50 per dozen.
 - II. Ravi gained 18% on his investment.
17. What is the geometric mean of four consecutive odd numbers?
 - I. Arithmetic mean of the numbers is 8.
 - II. One of the numbers is 7.
18. Find the area of the trapezium.
 - I. The lengths of the parallel sides are 30 cm and 44 cm.
 - II. The lengths of the non parallel sides are 15 cm and 13 cm.

19. What is the first term of a series?
 - I. The sum of the first n terms is given as $n(n - 2)$.
 - II. The n th term of the series is represented as $(3n - 7)$.

20. A father has two daughters, Janis and Monica. Janis is twice as old as Monica. How old is the father?
 - I. Sum of the father's age and twice that of Janis's age is 84 years.
 - II. Sum of thrice of the father's age and twelve times that of Monica's age is 252.

Verbal Ability

VA-5.1 | FIJ, IMPLICIT STATEMENTS, PROBABLY TRUE/FALSE



FIJ (Fact, Inference, Judgment)

Introduction

Fact-Inference-Judgment questions require us to classify sentences under three labels as follows:

- Facts, which deal with pieces of information that one has heard, seen or read, and which are open to discovery or verification (the answer option indicates such a statement with an 'F').
- Inferences, which are conclusions drawn about the unknown, on the basis of the known (the answer option indicates such a statement with an 'I').
- Judgments, which are opinions that imply approval or disapproval of persons, objects, situations and occurrences in the past, the present or the future (the answer option indicates such a statement with a 'J').

Facts:

A fact is a direct experience of someone – not necessarily yours. The instructions describe a fact as something that is 'open to discovery or verification'. A sentence is a fact when it states something that is directly observable and thus 'open to discovery'.

Example: According to the report mobile phones pose 'no health risk'.

'According to the report' in the statement makes it directly observable to everyone. A person has to merely read the report to discover/verify the truth of the sentence. So a fact is something that is directly verifiable.

Inferences:

Inferences are conclusions drawn from facts. Instructions describe an inference as 'unknown based on the known'. Inferences, hence, are not directly observable, but just verifiable through facts. The difference between fact and inference is that facts are 'open to (direct) discovery through mere observation,' but inferences cannot be discovered/verified; they will have observable facts as the basis for the statement that is made (unknown based on the known).

Example: From 1990 to 2014, worldwide mobile phone subscriptions grew to cover most of the global population reaching the bottom of the economic pyramid.

Every detail stated in this sentence is based on data that are observable. 'Subscriptions grew' – is based on statistics (facts). '...reaching the bottom of the pyramid' is also verifiable through statistics. The sentence is an Inference.

Judgments

The way inferences are based on directly verifiable facts or experiences, 'Judgment' is also based on direct experiences. In that respect they are similar to inferences. Judgment and inferences are not directly discoverable but will have facts to support them. However, a judgment differs from an inference in that judgments are personal opinions or highly subjective viewpoints or subjective assessments of the facts, whereas inferences are objective (and abstract) conclusions drawn from the same set of information/facts/ experiences.

Example: Smartphones are much better than kosher phones, which are without internet access, text messaging or cameras.

The view point that smartphones are 'much better than kosher phones', though acceptable to many of us is still a personal/subjective comparison and assessment of the two types of phones. Hence the statement is a Judgment. Well-reasoned judgments may appear like inferences but the data will not unequivocally lead to those conclusions; hence they are still judgments, however well-reasoned they may be.

IMPLICIT STATEMENTS

Introduction

Implicit ideas refer to those ideas that are derived from statements that are said or written. These are unexpressed but understood from what is stated. They are unstated or undeveloped ideas which give meaning and substance to what one speaks or writes. Technically, they are assumptions and conclusions. You may be asked to identify the 'assumptions' implicit in the main statement or the 'conclusions that follow' from the main statement. In such questions you may be required to distinguish between an assumption and a conclusion. However, if you are asked to identify the ideas 'implicit in the main statement', the answer will include both assumptions and conclusions.

These questions usually consist of brief statements or passage followed by several statements which may or may not be implicit in the main statement/s.

Firstly, let us try to understand what assumptions are.

An assumption is something that a writer or speaker believes in, but does not express in so many words. It is the unstated part of the main statement which the writer or the speaker takes for granted, leaves unexpressed, and undeveloped. And the listener too takes it for granted.

For example, when I ask a student why he/she is late for the class, the most frequent answer is – 'Sir, traffic jam.' The other students in the class (listeners) understand that latecomer travels by road, though it is not stated by the student. Such unstated facts which are necessary for the Main statement to be true are called Assumptions.

The truth of what is written or spoken will depend on the assumptions. The way we conduct ourselves in our day to day life – i.e. what we speak and write in the normal course of daily living, contain lot many assumptions. We are only sometimes questioned for or against our assumptions.

The writer or the speaker takes them for granted and expects that the listener would understand it anyway. For example: MBA students assume that MBA will help them have a great career, or help them advance in their careers. They believe that they will earn more than non-MBAs. They assume that MBA will enrich their credentials etc. Study the example below:

Main Statement: The “Keep your City Clean” campaign started by the Mumbai Municipal Corporation did not evoke any response from the citizens.

Assumptions:

- I. The campaign was a failure
- II. The citizens were not interested in keeping the city clean.

Analysis:

The main statement says that the “Keep your City Clean” Campaign started by Mumbai Municipal Corporation did not evoke any response from the citizens.

The first assumption statement is that the campaign was a failure. Can this be the assumption of the authorities? Can this be something that the authorities believed in before the campaign? Definitely not! In fact, the failure followed the campaign – the authorities did not believe that the campaign was going to be a failure. They would not start the campaign under the belief that it would fail. In fact, they must have assumed the exact opposite that the campaign would be success. Hence, statement I is not an assumption. Let us look at the second statement: The citizens were not interested in keeping the city clean. The campaign failed because, perhaps, the citizens were not interested in keeping their city clean. But, was this the belief of the authorities? Is it possible that the authorities believed that the citizens were not interested in keeping the city cleans, and then, they went ahead and started a campaign called “keep your city clean.” This is also not possible. The authorities must have thought that the citizens are interested in or can be made interested in keeping the city clean. That’s why they started the campaign. So the statement that the citizens were not interested in keeping the city clean is also not an assumption. So the correct answer to the above question is that neither I nor II is an assumption.

Conclusions, on the other hand follow from the main statement. We saw that what is implicit is not stated, revealed, or expressed in the Main Statement, but it is what we understand from it. In other words, an inference is something that we understand by listening to somebody (or by reading something) though it is not expressed by the speaker or writer in so many words. That means in order to identify an inference you need to read between the lines. Or, look for things that are not said, but try to understand what becomes true indirectly once those words are spoken or written.

An inference, in short, is what logically and necessarily follows from the main statement, or it is a logical necessity arising from the main statement.

In your daily life you are making inference all the time. By observing what is happening around, you are always inferring things about them. You see people gathered by the side of the road. You infer something has happened. You look at your mom’s expression and infer that she likes what you have done. Or, you see a man lying in the gutter; you say to yourself that he is probably drunk! Another person looking at the same man might think that ‘here’s a man in need of help.’

All these inferences we derived from a set of facts. However, the possibilities that we consider are not necessarily the scoring options in the exam. A possibility however well supported is not an inference, nor is it implicit. In the exam, make sure that the option you choose is completely and conclusively supported by the given information.

Look at this example:

Main Statement: Life is a game.

Conclusions:

- I. In life, there are successes and failures.
- II. Life is governed by rules.

Life is a game – Are the ideas of success and failure integral to and implicit in this statement? Does ‘game’ mean something that is played for mere fun? Are the ideas of success and failure implied in a game? Or, even in recreational games, is there a sense of achievement and loss – equal to success and failure? The message of the sentence is – success and failure do not matter in life if one has played the game well. Thus the ideas of success and failure are implicit in the comparison. So conclusion I is true.

Is life governed by rules? Are all games necessarily governed by rules? Or, are games unstructured and without rules? One does what one likes, as one pleases, and calls it a game? Well, such unstructured activity cannot be a game. There must be some structure, or some purpose to a game. There are certain stipulations, certain specific ways to play a game. Random activities are not games. Hence statement II is also true about life and the ideas of rules or methods are implicit in the comparison between life and game. Hence both I and II are implicit in the main statement.

While solving questions that ask you to identify implicit ideas it may help to bear this in mind. Questions that ask you to identify implicit ideas or conclusion will give you the same answer. A minor distinction is necessary when you solve assumption questions. Assumptions are true prior to the main statement. You need to check if the answer statements are necessarily true prior to the main statement and choose your answer accordingly.

PROBABLY TRUE / FALSE

Introduction

Probably True/False (PT/F) questions appear in two different formats – the statement type and the paragraph type. The statement type PT/F questions appear similar to Logical Set Theory questions. The paragraph PT/F questions look like the conclusion/assumption questions based a short paragraph.

Probably True/False questions are based on the process of inductive logic. Inductive logic is the process in which we derive conclusions or generalizations based on specific pieces of information. The more popular cousin of inductive logic – deductive logic – gives you inferences that are certain. In inductive logic on the other hand, the given data or the premises provide differing degrees of support to the conclusion. Inductive logic articulates what is called the condition of adequacy: As evidence accumulates, it becomes possible to examine the degree to which the hypothesis derived

from such evidence is true or false. In other words, we can say how far the hypothesis can be true.

This is what happens in all PT/F questions. We examine the data given in the main statements, see the inference (hypothesis) arrived at from the given data and try to establish the degree of Truth and Falsity of it. In the exams after analyzing the data and the inference as above, we are required to choose one of the five options which are: Definitely True; Definitely False; Probably True; Probably False; Data Inadequate.

Since PT/F is based on inductive logic and not deductive logic, Venn Diagrams are to be avoided. They are useful only in rare PT/F questions.

However it is possible to examine the degree of Truth and Falsity of an inference systematically and arrive at an answer and choose one of the five options. The precondition is that you must understand the data very, very well. Only then can you assess how far the inference is supported by the data.

It is the nature of the question itself that all inferences in PT/F questions (other than definitely true and definitely false inferences) are immediately 'can't say'. And that's why you are asked to identify how far you can say it is true or false. Since situations are 'can't say', there is a tendency to choose Data Inadequate more often than the other options. But 'can't say' is not Data Inadequate. We will see what Data Inadequacy actually means and when to choose it.

The following method, if applied well, can give you complete accuracy in this question type. Hence at least in the beginning, stick to the steps described here while solving PT/F questions. Once mastered, you will develop speed in solving questions.

- Read the data statements and the conclusion.
- Evaluate Definitely True and Definitely False. If you cannot decide the conclusion is definitely true or definitely false eliminate both the options.
- Next, evaluate Data Inadequacy. While evaluating data inadequacy, examine the data and conclusion for the following inconsistencies:

1. The data and the conclusion are inconsistent – e.g., the data is about X and the conclusion is about Y or includes Y.

Example

R is a man: R is mortal hence all men are mortal.

The data is about R but the conclusion that all men include P, Q, S as well. The answer is data inadequate.

2. Check if data statements themselves are inconsistent with each other.

Example

R is not a man. Men are arrogant, Hence R is not arrogant.

R could be a woman and arrogant. We have no data about R except that R is not a man – that is no information whatsoever – data statements are inconsistent – any conclusion about R will be Data Inadequate.

If evaluating Data Inadequate on these parameters fail, eliminate data inadequate and move on to evaluate the options probably true or probably false. At this stage you can be mathematical. Determine the factors that go into probability and evaluate the chances. If the chances are 50% or more, choose Probably True. If the chances are less than 50%, choose Probably False.

An example would make it clear. We will use the method we just discussed.

Data Statements: Students in IMS are either male or female. X is a student of IMS.

Conclusion: X is male.

We cannot examine definiteness. So eliminate DT and DF. Are the data statements and the conclusion inconsistent with each other? – There is no inconsistency.

Are the data statements in themselves inconsistent? There is no problem with the data statements (the variables are consistent and unambiguous). Eliminate Data Inadequacy and move on to evaluate probability. The chances are 50%. So the conclusion that X is male is Probably True. So will be the conclusion X is female derived from the same data statements.

Paragraph based Probably True/False questions are easier to solve. You need to evaluate how far the given conclusions are supported by the information given in the paragraph.



CLASS EXERCISE

Directions: The following question has a set of sequentially ordered statements.

Each statement can be classified as one of the following:

- **Facts**, which deal with pieces of information that one has heard, seen or read, and which are open to discovery or verification (the answer option indicates such a statement with an 'F').
- **Inferences**, which are conclusions drawn about the unknown, on the basis of the known (the answer option indicates such a statement with an 'I').
- **Judgements**, which are opinions that imply approval or disapproval of persons, objects, situations and occurrences in the past, the present or the future (the answer option indicates such a statement with a 'J')

Select the answer option that best describes the set of four statements.

1.

- A. Earlier, the government tried to address the concerns of its key ally, the Left, on the Indo-US nuclear deal by proposing a committee of experts and Left members to review its implications.
- B. Government sources say that, while a committee to study the Hyde Act can be set up, negotiations with the IAEA and NSG countries cannot be put on hold.
- C. At the other end of the political spectrum, there's been a further hardening of stance.
- D. The opposition NDA has hit out at the Congress and the Left, accusing them of making the nuclear deal a family matter between them, and has demanded a parliamentary committee on the deal.

1) FFJJ

2) FFFF

3) IFJF

4) JFFF

2.

- A. If we ever hope to crack the grammar and syntax of political theology, it seems we will have to begin with ourselves.
- B. The history of political theology in the West is an instructive story, and it did not end with the birth of modern science, or the Enlightenment, or the American and French Revolutions, or any other definitive historical moment.
- C. Political theology was a presence in Western intellectual life well into the 20th century, by which time it had shed the mind-set of the Middle Ages and found modern reasons for seeking political inspiration in the Bible.
- D. At first, this modern political theology expressed a seemingly enlightened outlook and was welcomed by those who wished liberal democracy well.

1) JFFF

2) IJFJ

3) IFIF

4) JFFI

3.

- A. Education is a public good, generating 'externalities' that benefit society at large.
- B. Many demographers believe that improvements in levels of female education are a very cost-effective method of lowering fertility rates.
- C. The spread of basic education leads to improvements in personal hygiene and the adoption of simple preventive measures against many common diseases.
- D. Spread of basic education is the need of the day.

1) FJFI

2) FFFJ

3) JJFI

4) IFFJ

4.

- A. Approximations in the Indian statistical system are particularly marked in the estimation of savings and investment and where the open economy impinges on the two.
- B. The opening out of the economy may lead to interactions between inadequacies that would create a potentially large underestimation of savings and investment.
- C. Some elementary macro-economics would be of help in overcoming the inadequacies.
- D. Going by past experience, an underestimation of assets and liabilities may impinge on our assessment of growth prospects.

1) FFII

2) FIIJ

3) FFJJ

4) FIJI

5.

- A. It would be hard to tell whether a person's psychotherapy is any good because the outcome is generally months or years away.
- B. Most Americans reported feeling better with therapy, regardless of whether they were treated by a psychologist, a psychiatrist, or a social worker.
- C. Of course, not all therapy is helpful, and some of it can be downright harmful.
- D. Many patients would get better even if they got no treatment at all, since psychiatric disorders fluctuate spontaneously with time.

1) JFJI

2) JIIJ

3) FFJI

4) IFFI

Directions: In the questions below, a sentence is followed by three statements. Mark the option that represents statements that are implicit in the given sentence.

6. How Tony Blair must curse Elizabeth Gaskell, a Victorian novelist whose portrait of the contrast between the industrial north of England and the comfortable south in *North and South*, published in 1855, has turned into one of the most interesting stereotypes of British politics.
 - I. Elizabeth Gaskell was British.
 - II. There has always been a disparity between the Northern and the Southern parts of England.
 - III. North and South was released all over England.
 - 1) Only I is implicit. 2) I and III are implicit. 3) II and III are implicit.
 - 4) Only II is implicit. 5) None is implicit.

7. The General Electric Co. (GE) has a new bright idea. Long famous for washing machines and light bulbs, the company hopes that one day it will have as many customers for its mutual funds as it does for its electrical gadgets.
 - I. People will buy the GE mutual funds in great numbers.
 - II. GE has long been known for its washing machines and light bulbs.
 - III. GE's electrical gadgets are world famous.
 - 1) Only I is implicit. 2) II and III are implicit. 3) Only II is implicit.
 - 4) Only III is implicit. 5) None is implicit.

8. Good cooks and bad cooks often start with the same recipes. It is the quality of ingredients used and the way those ingredients are mixed and prepared that determine the taste of a dish.
 - I. Bad cooks cannot mix ingredients.
 - II. Good cooks have a unique method of mixing ingredients.
 - III. Too many cooks spoil the broth.
 - 1) I and II are implicit. 2) Only II is implicit. 3) II and III are implicit.
 - 4) I and III are implicit. 5) None is implicit.

9. The Tuatara was a scientific enigma until the last century. Before 1867, some experts believed it was a lizard.
 - I. The Tuatara is a reptile.
 - II. There was a misconception about what a Tuatara is.
 - III. The Tuatara is a scientific enigma.
 - 1) I and II are implicit. 2) Only II is implicit. 3) Only III is implicit.
 - 4) II and III are implicit. 5) None is implicit.

10. In May 2014, Mumbai inhabitants witnessed what could easily have been a scene lifted straight from a sci-fi novel; a pizza was home-delivered using an Unmanned Aerial Vehicle (UAV), more popularly known as a drone, from a local pizzeria. This experiment was not amiably met by the local police.
- I. A drone had never been used before May 2014 to deliver pizza.
 - II. The police reacted negatively as the use of the drone violated air traffic rules.
 - III. Using drones for menial tasks is the way of the future.
- 1) I and II are implicit. 2) Only II is implicit. 3) Only III is implicit.
4) II and III are implicit. 5) None is implicit.

Directions: Given below is a passage followed by several possible inferences that can be drawn from the facts stated in the passage. You have to examine each inference separately in the context of the passage and decide upon its degree of truth or falsity, and

Mark (1), if the inference is 'definitely true', i.e., properly follows from the statement of facts given.
Mark (2), if the inference is 'probably true', though not 'definitely true', in the light of the facts given.
Mark (3), if the inference is 'definitely false', i.e., it cannot be drawn from the facts given or it contradicts the given facts.
Mark (4), if the inference is 'probably false', i.e., it is probably but not definitely false.
Mark (5), if the 'data is inadequate', i.e., from the facts given you cannot draw any conclusion.

Using virtual reality goggles, a camera and a stick, scientists have induced out-of-body experiences in healthy people, according to experiments being published in the journal 'Science'. When people gaze at an illusory image of themselves through the goggles and are prodded in just the right way with the stick, they feel as if they have left their bodies.

The research reveals that "the sense of having a body, of being in a bodily self" is actually constructed from multiple sensory streams. Usually these sensory streams, which include vision, touch, balance and the sense of where one's body is positioned in space, work together seamlessly. But, when the information coming from the sensory sources does not match up, when they are thrown out of synchrony, the sense of being embodied as a whole comes apart. The brain, which abhors ambiguity, then forces a decision that can, as the new experiments show, involve the sense of being in a different body.

- 11. Out-of-body experiences may occur during sleep paralysis, the exertion of extreme sports and intense meditation practices.
- 12. The research is aimed at figuring out exactly how the brain creates a sensation of out-of-body experience.
- 13. The predominance of any one sensory stream can lead to the sense of being in a bodily self.
- 14. The experiments would not have yielded the same results had they been conducted on people in ill-health.
- 15. When the prods are not synchronous, the illusion will not occur.

Directions: Given below are some passages followed by several possible inferences that can be drawn from the facts stated in the passages. You have to examine each inference separately in the context of the passages and decide upon its degree of truth or falsity, and:

Mark [1], if the inference is 'definitely true', i.e., properly follows from the statement of facts given.

Mark [2], if the inference is 'probably true', though not 'definitely true', in the light of the facts given.

Mark [3], if the 'data is inadequate', i.e., from the facts given you cannot draw any conclusion.

Mark [4], if the inference is 'probably false', though not 'definitely false', in the light of the facts given.

Mark [5], if the inference is 'definitely false', i.e., it cannot be drawn from the facts given or it contradicts the given facts.

Even as LCD and plasma TV manufacturers are trying to find a niche in the Indian market, alternative home cinema options are now being offered to the consumer. Projectors, previously used mostly by corporates and educational institutions for presentations, are being touted as the next best thing in home entertainment. Cost wise, home projectors have a distinctive edge over LCD and plasma TVs. While a 46-inch plasma TV could cost anywhere between Rs.2 lakh and Rs.2.5 lakh, the home cinema projector ensemble costs between Rs.80000 and Rs.1 lakh, depending on the model. The screen size is flexible and can be anything from 14 inches to 200 inches, depending on the projector distance from the screen.

16. The cost of any plasma TV is around Rs.2 lakh.
17. Projectors will soon become popular in the home entertainment segment.
18. The home cinema projector ensemble is more expensive than the LCDs and plasma TVs.
19. Nowadays, projectors are used only by corporates and educational institutions.
20. HP is currently the market leader in the manufacture of home cinema projectors.

Directions: In each of the following questions, a statement/paragraph is followed by three conclusions, I, II and III. You have to decide which of the conclusions is/are implicit in the statement, and mark the appropriate option as the answer.

21. China is a rapidly ageing society, but in many villages, more than anything else, the abrupt shift towards a predominance of old people is driven by migration.
 - I. There are more old people in the villages of China than there are young people.
 - II. The young people in China migrate to larger towns and cities.
 - III. The rate of ageing among people is more rapid in China than in other countries.
 - 1) I and II are implicit.
 - 2) Only I is implicit.
 - 3) Only III is implicit.
 - 4) None are implicit.

22. Vikram excelled in cricket after 6 months of being coached at the Cricket Club of India (CCI), and he won the Man of the Match award a year later.
- I. Vikram's stint at the Cricket Club of India was a success.
II. The CCI had always produced good cricketers.
III. The Man of the Match awards were given only to sportsmen who got trained from the CCI.
- 1) I and II are implicit. 2) Only I is implicit.
3) Only III is implicit. 4) All are implicit.
23. Love is, perhaps, more important for life than food and drink, because it gives us a reason for the other two.
- I. Food and drink are important for life.
II. Love is our most important need in life.
III. Those without love will neither eat nor drink.
- 1) None of the three are implicit. 2) Only I is implicit.
3) I and II are implicit. 4) Only II is implicit.
24. Mr. Patil is now in charge of this hotel, so, obviously, we are going to stop serving liquor.
- I. Mr. Patil used to like liquor earlier, but has now given it up.
II. The hotel used to serve liquor before Mr. Patil took charge.
III. Mr. Patil disapproves of imbibing alcohol.
- 1) Only III is implicit. 2) All are implicit.
3) II and III are implicit. 4) None are implicit.
25. *Casablanca*, apart from being one of Bogart's most compelling performances, was also an outstanding film.
- I. Bogart was an actor.
II. Bogart gave many compelling performances.
III. *Casablanca* was a film about Bogart.
- 1) All are implicit. 2) I and II are implicit.
3) Only I is implicit. 4) I and III are implicit.



PRACTICE EXERCISE-1

Directions: Given below are some passages followed by several possible inferences that can be drawn from the facts stated in the passages. You have to examine each inference separately in the context of the passages and decide upon its degree of truth or falsity, and:

Mark [1], if the inference is 'definitely true', i.e., properly follows from the statement of facts given.

Mark [2], if the inference is 'probably true', though not 'definitely true', in the light of the facts given.

Mark [3], if the 'data is inadequate', i.e., from the facts given you cannot draw any conclusion.

Mark [4], if the inference is 'probably false', though not 'definitely false', in the light of the facts given.

Mark [5], if the inference is 'definitely false', i.e., it cannot be drawn from the facts given or it contradicts the given facts.

In the eerie stillness that envelops the world's most expensive and controversial power project, the only sign of life is the occasional appearance of a worker or two from behind heavily barricaded and padlocked gates. The men in orange boiler suits and hard hats are part of a skeletal force hired to keep the Dabhol Power Company's (DPC) power plant (set up at a cost of \$2.9 billion) from rusting and decay. They have been on the job for over four years. Since June 2001, Dabhol's trademark red and white chimneys have spewed no smoke, nor have its state-of-the-art gas turbines generated any power. Almost everything is in disuse at the 1700 acres that DPC occupies near Guhagar town, about 300 km from Mumbai. Lying unused in the huge tanks that dot the hillsides are over 50000 kilolitres of naphtha and distillate, the fuels that fired the 740 megawatt first phase of the project. The tanks are said to have corroded.

1. There was a major fire outbreak at the Dabhol Power Company.
2. The Dabhol Power Company's power plant is currently not operative.
3. The Dabhol Power Company has a power plant in Mumbai.
4. The company plans to shut down its power plant in Guhagar.
5. The tanks at the Dabhol power plant contain naphtha and distillate.

Directions: *Given below are some passages followed by several possible inferences that can be drawn from the facts stated in the passages. You have to examine each inference separately in the context of the passages and decide upon its degree of truth or falsity, and:*

Mark [1] 'Definitely True' if the inference follows directly from the passage.

Mark [2] 'Probably True' if the inference appears to be true in the light of the passage but cannot be ascertained to be definitely true.

Mark [3] 'Definitely False' if the inference contradicts the data in the given passage.

Mark [4] 'Data Insufficient' if the inference cannot be answered from the given data.

R. Spitz has found that infants deprived of handling over a long period will tend at length to sink into an irreversible decline and are prone to succumb eventually to disease. In effect, this means that what he calls emotional deprivation can have a fatal outcome. These observations give rise to the idea of 'stimulus-hunger' and indicate that the most favoured forms of stimuli are those provided by physical intimacy, a conclusion not hard to accept on the basis of everyday experience.

An allied phenomenon is seen in grown-ups subjected to sensory deprivation – in the past, social and sensory deprivation is noted to have produced temporary mental disturbances in individuals condemned to long periods of solitary imprisonment.

6. 'Stimulus-hunger' can lead to death.
7. Only infants deprived of physical intimacy are affected adversely.
8. Physical intimacy is necessary for the mental and physical health of humans.
9. In everyday social interaction, some form of physical intimacy exists.
10. Solitary confinement may turn a person into a lunatic.

Directions: *In each of the following questions, a statement/paragraph is followed by three conclusions, I, II and III. You have to decide which of the conclusions is/are implicit in the statement, and mark the appropriate option as the answer.*

11. On the island of Santiago, feral pigs – introduced in the 19th century by mariners so that they could have pork chops – have grown in number and appetite, and they now eat many of the eggs and hatchlings of the resident green sea turtles. The turtles' survival rate has declined dramatically, upsetting the natural food chain.

- I. The green sea turtles on the island of Santiago are endangered.
- II. Feral pigs in Santiago are affecting the ecological balance.
- III. Before the 19th century, feral pigs did not exist in Santiago.

- 1] Only I is implicit.
- 2] I and II are implicit.
- 3] II and III are implicit.
- 4] All are implicit.

12. 'The refineries will, once more, exceed their production targets, ensuring fuel for all,' said the relieved Petroleum Minister.
- I. Refineries have exceeded their production targets in the past.
 - II. Whether refineries would exceed their production targets, was a matter of worry to the Petroleum Minister.
 - III. The entire output of refineries is used as fuel.
- 1) Only I and II are implicit. 2) Only III is implicit.
 - 3) Only I is implicit. 4) Only II is implicit.

Directions: The following question has a set of sequentially ordered statements.

Each statement can be classified as one of the following:

- **Facts**, which deal with pieces of information that one has heard, seen or read, and which are open to discovery or verification (the answer option indicates such a statement with an 'F').
- **Inferences**, which are conclusions drawn about the unknown, on the basis of the known (the answer option indicates such a statement with an 'I').
- **Judgements**, which are opinions that imply approval or disapproval of persons, objects, situations and occurrences in the past, the present or the future (the answer option indicates such a statement with a 'J')

Select the answer option that best describes the set of four statements.

13. A. This is a black book.
B. All black books are unlucky.
C. Black books are more attractive than brown ones.
1) FFF 2) IJJ 3) JFJ 4) FJJ
14. A. The man is on the grass.
B. The grass is blue.
C. Plastic is not a bio-degradable substance.
1) JJJ 2) FFF 3) FIJ 4) FFJ
15. A. It is difficult to type standing up.
B. Gorillas prefer eating fruit to eating nuts.
C. The young chap was a hideous shade of red.
1) JIJ 2) FFI 3) FFF 4) JJF
16. A. She was typing sitting at the desk.
B. What I love about him is his calm nature.
C. The receptionist gave me a friendly smile.
1) JJJ 2) FJJ 3) FII 4) FFI

17. A. The stained glass ceiling depicts champagne on ice.
B. All in all, it's just another brick in the wall.
C. We are the Sultans of Swing.
1) JJJ 2) FII 3) FJJ 4) FFF
18. A. Raindrops are falling on my head.
B. She is standing near the window.
C. We are the best in painting.
1) FJF 2) FFJ 3) FIJ 4) FJJ
19. A. FM radio is a revolutionary concept.
B. Metal containers should not be used in a microwave oven.
C. A lot of people are wearing tight pants nowadays.
1) JFF 2) FJF 3) JJJ 4) JIF
20. A. White colour reflects light.
B. Grey colour is soothing to the eye.
C. Ray Bans are cool.
1) FFJ 2) JJF 3) FJJ 4) JIF
21. A. It is incredible.
B. God is great.
C. Politics is the last refuge of scoundrels.
1) FFF 2) JIJ 3) JFF 4) JJJ
22. A. Cricket fever has begun!
B. The stadium is newly renovated, so it will attract more spectators.
C. More spectators watch one-day matches than test matches.
1) JFJ 2) JIF 3) IJI 4) FIJ



PRACTICE EXERCISE-2

Directions: Given below are some passages followed by several possible inferences that can be drawn from the facts stated in the passages. You have to examine each inference separately in the context of the passages and decide upon its degree of truth or falsity, and:

Mark [1] 'Definitely True' if the inference follows directly from the passage.

Mark [2] 'Probably True' if the inference appears to be true in the light of the passage but cannot be ascertained to be definitely true.

Mark [3] 'Definitely False' if the inference contradicts the data in the given passage.

Mark [4] 'Data Insufficient' if the inference cannot be answered from the given data.

PASSAGE I

All too often, two-wheeler marketing is similar to racing; it is the twists and turns that produce new heroes. The scooter doesn't fit into the picture at all. Typified by the staid, functional workhorse Bajaj Chetak, it has always been a product for the ultra-conservative. Bending breezily around corners isn't the stuff of scooter riders, and if caught doing a wheelie, you can safely assume it was involuntary.

1. Risk takers do well in both racing and two-wheeler marketing.
2. Scooter riders love doing 'wheelies'.
3. The scooter is an example of the similarity between racing and two-wheeler marketing.
4. A 'wheelie' is a type of risky stunt while riding a two-wheeler.
5. A scooter would, typically, be for a conservative type of person.

PASSAGE II

Yang Yuanqing wants U.S. computer buyers to know that he is now a New Yorker. The 41-year-old chairman of China's Lenovo Group Ltd., the world's No. 3 PC company, recently moved from Beijing to New York (U.S.) when his company took over IBM's computer division. Lenovo is now headquartered in Westchester County, although it is 27%-owned by the Chinese Academy of Sciences and China remains its strongest market. The takeover is the most prominent example of a growing trend as Chinese companies attempt to expand overseas by acquiring well-known Western brands.

6. Lenovo wants to build itself as an international company.
7. Lenovo still plays second fiddle to IBM in the computer market.

Directions: In each of the following questions, a statement/paragraph is followed by three conclusions, I, II and III. You have to decide which of the conclusions is/are implicit in the statement, and mark the appropriate option as the answer.

8. The intervention of the government is necessary in all aspects of collective human endeavour.
 - I. Humans are incapable of collective endeavour.
 - II. The government's intervention is never harmful.
 - III. Collective human endeavour is unlikely to succeed without outside help.
 - 1) Only I is implicit.
 - 2) Only II is implicit.
 - 3) Only III is implicit.
 - 4) II and III are implicit.

9. Multinationals are expected to change the manufacturing landscape of the country.
 - I. Multinationals are capable of influencing the country's manufacturing sector.
 - II. Multinationals have a different level of manufacturing from that used in India.
 - III. The multinationals' technology is superior to that used in the country.
 - 1) Only III is implicit.
 - 2) Only II is implicit.
 - 3) II and III are implicit.
 - 4) Only I is implicit.

10. A series of studies show that, male fertility across the globe is declining.
 - I. By the turn of the century, males will be infertile.
 - II. This is nature's way of controlling the population.
 - III. Females are often unjustly blamed for failing to conceive.
 - 1) Only III is implicit.
 - 2) II and III are implicit.
 - 3) All are implicit.
 - 4) None are implicit.

11. Production has fallen this year, hence profits will be lower than the last year.
 - I. Lower production leads to lower profits.
 - II. Prices haven't changed for two years now.
 - III. If profits are lower, prices must have fallen.
 - 1) Only II is implicit.
 - 2) Only I is implicit.
 - 3) Only III is implicit.
 - 4) I and II are implicit.

12. In the spruce little town of Prettimuth, the law-abiding citizens live in neat houses surrounded by manicured gardens – and have manners to match.
 - I. Prettimuth citizens have flowery manners.
 - II. Prettimuth is a town full of manicurists looking after gardens.
 - III. Prettimuth citizens are well-mannered.
 - 1) Only I is implicit.
 - 2) Only II is implicit.
 - 3) None are implicit.
 - 4) Only III is implicit.

PRACTICE EXERCISE

- I. Picasso used to work in a particular style.
II. There were other artists who could lay claim to the title of most famous exponent of the school of art which Picasso practised.
III. Picasso was a student.
- 1) Only I is implicit. 2) Only II is implicit.
3) I and II are implicit. 4) Only III is implicit.

I. Daguerre invented photography.
II. Impressionism is a form of painting which does not involve imitation of life.
III. Painters do not necessarily want to imitate life in their work.

1) Only II is implicit. 2) Both I and II are implicit.
3) Both II and III are implicit. 4) Both I and III are implicit.
5) All are implicit.

Directions: The following question has a set of sequentially ordered statements.

Each statement can be classified as one of the following:

- **Facts**, which deal with pieces of information that one has heard, seen or read, and which are open to discovery or verification (the answer option indicates such a statement with an 'F').
- **Inferences**, which are conclusions drawn about the unknown, on the basis of the known (the answer option indicates such a statement with an 'I').
- **Judgements**, which are opinions that imply approval or disapproval of persons, objects, situations and occurrences in the past, the present or the future (the answer option indicates such a statement with a 'J')

Select the answer option that best describes the set of four statements.

15.

- A. Google is testing the boundaries in so many ways, and so purposefully, it's likely to wind up at the centre of a variety of legal battles with landmark significance.
- B. Powered by brilliant engineers, mathematicians and technological visionaries, Google ferociously pushes the limits of everything it undertakes.
- C. Considering that the company collects data on you based on the searches you conduct and the websites you visit through Google, the company knows a lot more about you than you know about the company.
- D. After Google began scanning thousands of library books to make them searchable online, book publishers and authors cried foul, filing lawsuits claiming copyright infringement.

1) IJIF 2) JFFF 3) IJFF 4) JJJF

16.

- A. The government is solely responsible for the sorry state of education in the country.
- B. There is a gap between the actual achievement and the original targets of the 'Universal Elementary Education' scheme.
- C. True, there has been an increase in the number of primary schools, and also in the enrolment in the schools.
- D. But the fact remains that many children are unable to stay the course – especially girls.

1) JFFF 2) FFIJ 3) JFFI 4) IJFF

17.

- A. Satellite television has irrevocably sounded the death-knell of any hopes of good programmes for children.
- B. Of the dozens of channels on satellite TV, only a handful show programmes for children at any given time.
- C. And most of these have computer-generated animation of exploding bazooka shells dismembering bad guys, or snarling warlords from distant galaxies threatening to annihilate the earth.
- D. The censor boards should ban all programmes which encourage violence in children, especially those produced by Western TV stations.

1) JIFF 2) IFFJ 3) JFFJ 4) JIIJ

18.

- A. Mittal began making his fortune a decade ago after breaking away from his father's Calcutta based steel business and building and starting his own firm.
- B. Considering that Indian companies spent almost triple the amount of money on foreign acquisitions as compared to last year, they have finally come of age in the globally competitive market.
- C. In the end, Mittal has proved to be a far smarter tactician and a lot shrewder negotiator in the course of acquisition of Europe's largest steel maker Arcelor.
- D. It took four months for Mittal's managers to put the paperwork together.

1) FIJF 2) FJFI 3) FJFF 4) IIFJ

19.

- A. From Madison Avenue to Microsoft, Google's rapid-fire innovation and growing power pose a threat of one kind or another.
- B. Google's ad-driven marketing strategy has propelled its stock market value to \$110 million, more than the combined value of Disney, Ford, General Motors, Amazon.com and the media companies that own the New York Times, the Wall Street Journal and The Washington Post.
- C. The more books and other information that they can translate into any language through an automated, math-based process they are developing now, the more compelling the Google experience will be for everyone, and the more profits the company will make in the process.
- D. Despite its growing head count of more than 4,000 employees worldwide, Google maintains the pace of innovation in ways contrary to other corporations by continuing to work in small teams of three to five, no matter how big the undertaking.

1) JIJJ 2) FFIJ 3) JIIF 4) IFIJ

20.

- A. The Indian farmer deserves to be complimented on his performance in foodgrains production.
- B. Foodgrains production has hit an all time peak of 186 million tonnes this year.
- C. This has be so despite the virtual stagnation in investment in agriculture.
- D. The increase in production will mean an increase in per capita calorie consumption in the country.

1) FFFI 2) JFFI 3) FIFJ 4) JJIF

21.

- A. In terms of income, as in terms of economic power, there exists in almost all developed countries, an inequality pyramid which all the recent income expansions have not levelled out.
- B. A majority of the large personal spending has been on horse and dog races, alcohol, clothes, jewellery and the like.
- C. This spending on high-end items appears not only at the top, but even in the middle rungs of the pyramid.
- D. The capitalistic 'each man to himself' philosophy is clearly to blame for this phenomenon.

1) FFFJ 2) FFFI 3) IFJJ 4) IFFJ

22 .

- A. 'Maternity leave' should be available to mothers of adopted children when they first bring the child home.
- B. 'Adoption leave' it has been proved, will enable mothers to smoothen the process of home-coming, which tends to be traumatic for adopted children.
- C. Most parents of adopted children say that the initial period of adjustment for the child takes time and having a parent at home helps.
- D. 'Maternity leave' should not be linked to biological motherhood; in fact it should be given to fathers also.

1) IFFF 2) JIFI 3) IFFJ 4) JIFJ

VA-5.2 | ARGUMENTS, COURSE OF ACTION, CAUSE-EFFECT



THEORY

ARGUMENTS

In Argument Questions we are asked to evaluate arguments on issues of social relevance and identify as weak or strong/forceful. The issue is often raised through a brief narrative or through a question beginning with “should.” For example: *Should mobile phones be banned in classrooms?* This is then usually followed by several arguments for and against the issue. The arguments in favor of the issue generally begin with “Yes” and those against the issue begin with “No.”

Example

Should mobile phones be restricted in classrooms?

- I. Yes, because young children get easily distracted by their mobile phones during lessons.
- II. No, because mobile phones are children’s only helpline in the case of an emergency.

You have to evaluate each argument on its own merit and choose for your answer:

1. If only argument I is forceful/strong.
2. If only argument II is forceful/strong.
3. If both I and II are forceful/strong.
4. If neither I nor II is forceful/strong.
5. If either I or II is forceful/strong.

Solution:

The answer to the sample question is option 1. Only argument I is forceful. Argument 2 is not forceful because it may apply to situations outside the classroom. In the classroom the child is under the constant care of the teacher. Hence argument II does not directly address the issue by not taking the classroom into account while advancing a general reasoning.

Evaluating an argument to decide whether it is strong or weak can at times prove tricky. However, we can give you broad guidelines to evaluate an argument. These guidelines will definitely bring a lot of clarity to your evaluation process.

What are forceful Arguments?

A forceful argument directly addresses the issue raised by the question/case.

An argument is strong and logical only if it immediately addresses the issue. Some arguments are at times evasive, and do not address the issue at all, but we may be cornered into believing that it is strong. For example to the question whether voting age should be raised to 21 again, an argument against the issue, might say “no, voting is the political right of every citizen in our democracy.” It may appear relevant and strong at first glance, but it does not address the issue

of raising the voting age back to 21. The issue is whether that political right is to be regulated. A forceful argument must directly and immediately deal with the issue raised by the question.

A forceful argument is unbiased, precise, objective, and rational (not emotional).

Sometimes prejudices are dished out as arguments. Arguments based on prejudices lack objectivity. Hence those arguments are weak. For example: To questions relating to communal harmony, uniform civil code, reservation etc... we often confront prejudiced arguments. These are weak. Think of an issue related to women's equality, or glass ceiling, or gender disparity in wages, or the capability of women managers, dress code, etc. You will see that prejudices creep into our arguments. And we express our biased points of view as arguments. They are not forceful. Forceful arguments need to be firmly based on facts and without bias. They should be precise, and objective.

An argument has to be based on facts and reason. There are at times emotional responses to certain questions. These are weak. For example a question on Reservation requires rational analysis based on facts. A mere emotional response like, 'No, there should be no reservation because meritorious candidates will have no place to go,' is unsubstantiated and emotional. It is a weak argument.

A forceful argument will always conform to the system

The questions on strong/weak arguments apart from checking your ability to identify a forceful argument, checks your general awareness in subtle ways. For example, the issue raised may be about death penalty, or its abolition. The context in this question (or for that matter the one on Reservation) is the context we live in. That is the Indian context. Hence an argument that goes against this context/culture/ethos is not considered forceful.

If democracy is discussed, the argument has to be evaluated in the context of Indian democracy. If abortion is discussed, evaluate it in the Indian context, not in the context of any other country, or from the point of view of a particular religion. The evaluation is thus not just an intellectual exercise; it has roots in the system we are in. Anything that goes against this system is to be treated as a weak argument.

A forceful argument does not leave loose ends.

A strong argument will not leave any loose ends. In other words it will not require any further explanation to make its point. Its references are specific, concise and clear. If the argument is for or against non-violence and it says 'history is witness to ...', it is weak. But a forceful argument (among other things) will have references to, say, Gandhiji's Satyagraha, or to the French revolution. Such arguments cannot be ignored.

A forceful argument influences the decision on the question.

Generally an argument with a strong fact is taken to be strong. However, it doesn't have to be. It is not the fact that makes an argument strong or weak. Sloppy presentation makes a strong fact appear weak, and vice versa. This is especially so in situations where the case itself is weak. The case itself may be so strong or weak that an argument for or against it may not be possible. The facts that you can quote in such cases will also be weak. An example will make it clear. In case

of premeditated murder, the fact that the murderer is otherwise a good human being is weak in law. However, a lawyer can present it in such a way that the judge takes note of it; this, in turn, influences the decision to bring down a death sentence to life imprisonment. Thus, a weak fact, if it is well presented can make the argument strong.

Even if the case is strong it need not be that the arguments are strong. The same is the case with weak cases. In other words weak cases can have strong arguments in its favor.

If you can imagine a courtroom while evaluating an argument it helps. Your case may be weak, but as a lawyer you will definitely try to present your case strongly. Sometimes, a strong case is lost in the court because of weak arguments.

While evaluating an argument what you need to bear in mind is that a strong argument does not always win the case in the court, but a strong argument will always influence the decision in the case. Hence, apart from all that we have discussed above, if you are able to decide, if the argument can influence the decision on the issue, mark it as strong argument. Don't think that you are deciding on the issue – the judge will make the decision. Ask if the judge will be influenced by the argument. If you think that it cannot influence the decision, term it as weak.

Finally, each argument is to be evaluated on its own merit. Each argument must be evaluated individually and not in relation to the other. That is why the option that states “either I or II etc.” is unlikely to be the answer in argument questions. It is not that if I is strong II will become weak or vice versa.

Bear all this in mind while solving Argument questions. If you make mistakes, look at the explanations and improve your analysis to factor in all that is said above. The skills, to first identify, and then, to generate strong arguments will help you in Group Discussions as well.

Sample question

Should every student in higher education be required to study humanities?

- I. Yes, because this will deepen their sources of wisdom by exposure to how others have dealt with failures, success, adversities, and triumphs.
- II. No, because a student may simply not be interested in humanities as a subject, but may have deep interest only in specialized fields such as management, finance, marketing etc.

1. If only argument I is forceful/strong.
2. If only argument II is forceful/strong.
3. If both I and II are forceful/strong.
4. If neither I nor II is forceful/strong.
5. If either I or II is forceful/strong.

Explanation: As you might have already guessed, the answer to the above is option 1 – that is, only the ‘Yes argument’ is forceful. It directly addresses the issue raised by the question that “whether every student in higher education be required to study humanities.” The argument advances a strong fact in support – the exposure to how others have dealt with the vicissitudes of life. It points to the potential deepening of the students’ sources of wisdom. The judge will have to take this into consideration while deciding on the issue. The argument is also well presented. Hence it is a forceful argument.

The ‘No argument’ is weak. It does not address the issue. The question is whether every student is required to study. The question is precisely whether even those students who are interested only in finance etc. should be required to study humanities. The “No argument” thus sidetracks the specific question. Besides, it does not advance any reasoning for why those interested in finance etc. should not study humanities. Hence it is weak. So the correct answer is option [1].

COURSES OF ACTION

Courses of action questions are small case studies. They are easy to score. Usually the format of the question is: a problematic situation/crisis is described in a short paragraph, which is then followed by several courses of action. Courses of action are intended solutions to come out of that problematic situation. The options ask you to identify the correct courses of action.

What is a course of action?

- A course of action is an administrative step (you assume the role of the administrator) undertaken to immediately tackle the problematic situation.
- The right course of action should attempt to solve the problem as quickly as possible. At times, the main problem may not be solvable immediately. In such cases the right course of action will attempt to minimize the damage.
- A course of action is not a subjective solution to a problem, so that the solution can differ from person to person.

Remember also, that you need to think positively. The steps undertaken should be constructive. It should reflect the responsibility that you have assumed under those circumstances.

Next, always treat the situation as serious and urgent, without exaggeration – do not gloss over the problem. The appropriate course of action should address the problem with the right degree of importance it deserves. For example, the problem of pollution can come in various degrees. It can say that pollution levels in the city have gone up. Sometimes the situation can say that the pollution level has gone up alarmingly. At other times, the situation may state that dozens of people have died of problems or illnesses arising out of pollution. Also, the problem of pollution can be a situation in which severe poisonous gas leak from a chemical factory has caused an entire village or city to go through the trauma of sickness, debilitation and even death. Ascertain the intensity of the problem, and then adopt the right degree of intensity to the measures you employ. When

you have understood this, you will respond to the situation with the urgency that it warrants. So, completely shutting down the polluting units becomes a drastic step when the pollution levels are causing concern. But it is the right step when deaths are attributed to pollution.

The next thing to ascertain is the authenticity of the problem itself. For example, are newspapers reporting the pollution levels or is it a report from the pollution control board? If newspapers are reporting the problem you need to verify the authenticity of the situation (appointing a committee to study the problem) before acting on it. But, when the Pollution Control Board has reported it and if a course of action states that 'a committee should be appointed to study the levels of pollution' – it will not be the right COA. In that case what is required is immediate action.

About the courses of action themselves, the first choice is the one that immediately acts on the problem itself. After such a course of action is identified, you can accommodate the long term solutions as the next steps. Do not only go for the long term solution without immediately acting upon the situation. For example, in the case of pollution do not go for a step like 'plant more trees', unless something is done first about the increasing levels of pollution.

A few more points about the right course of action: it should be practical and not idealistic. Sometimes, well-known and time tested solutions are given to you. They are practical and need to be accepted. Practicality also means that it should not be too mild or too strong. It should not in any way aggravate the problem. Also do not bring in prejudices into the solution. This prejudice may be your own or arising out of the system. For example, in our opinion the police may be corrupt or ineffective. However, where a course of action is suggested in which police participation is a must, you must not bring in this perception. The police will play the part they are supposed to play. In other words give due respect to the system.

To recapitulate:

- Identify the problem.
- Ascertain its authenticity
- Find one COA (an administrative step) that addresses the problem directly – to solve it or to minimize the damages.
- Work with the options. Choose the correct combination.

CAUSE-EFFECT

Cause-Effect questions are presented this way: we are given two statements labeled A and B. The instructions and the options explain that statements A and B are related in one of the following ways:

1. Statement (A) is the cause and statement (B) is its effect;
2. Statement (B) is the cause and statement (A) is its effect;
3. Both the statements (A) and (B) are independent causes;
4. Both the statements (A) and (B) are effects of independent causes;
5. Both the statements are effects of some common cause.

We need to choose the option that explains the relation between statements A and B.

The first thing to note is that no statement independently can be a cause. Think of any statement – I have a headache, It is raining, India is an emerging economy – any statement! We can see that, in itself, each statement is an effect! But if *I have a headache* is related to *I am not going to the classes today*, the headache becomes a Cause. Independently it is an effect. Hence we can rule out options which may state that the statements are independent causes as all statements independently evaluated will be effects and not causes.

What is a cause and what is an effect?

A factor that brings about a result is called a cause and the result is its effect.

For example,

I could crack the CAT because I studied 6 hours a day for 3 months.

In this sentence the two events have a cause effect relationship. *I studied 6 hours a day* – is the cause and *I could crack the CAT* is its effect. Observe also, that the word ‘because’ joins the two sentences.

In sentences in English, what comes immediately after the word *because* will always be a cause. While solving questions, you can check if you can meaningfully join the sentences using *because*. If you can, it becomes easy to identify the cause.

I can rephrase the above sentence as: *I studied 6 hours a day... (hence) I could crack the CAT*.

Now you notice that words like *therefore* will introduce the effect. The linguistic structure is:

1. (*Effect*) because (*Cause*) OR 2. (*Cause*) therefore (*Effect*).

While solving questions you can use both these conjunctions to correctly classify a cause or effect. However, it may not be necessary to use both. You can use either of them, and still get the same result.

We have to read both the statements and try to see if there is a possible cause-effect relationship. Sentences will generally be on the same topic or theme. That does not mean one may be causing the other. Hence be careful. If there is no relationship between the two sentences we choose the option that says: both the statements (A) and (B) are effects of independent causes. We are not bothered what those independent causes may be.

If you suspect a possible cause-effect relationship, quickly check the kind of relationship - whether A causes B, or B causes A. You may also think, whether A explains B or B explains A etc. At this point, taking the help of *because* or *therefore* will be useful if needed. Try to read the sentences with *because* in between (*A because B and B because A*). See if it makes sense.

Sample:

- A. Vast amounts of non-biodegradable materials end up in the seas.
- B. During the past years, a range of national, regional, and international measures were initiated to reduce the flow of waste into the sea and back.

Explanation: Vast amounts of non-biodegradable materials end up in the seas BECAUSE During the past years, a range of national, regional, and international measures were initiated to reduce the flow of waste into the sea and back. It does not make sense.

Vast amounts of non-biodegradable materials end up in the seas. THEREFORE During the past years, a range of national, regional, and international measures were initiated to reduce the flow of waste into the sea and back.

This makes sense. And, we know that therefore introduces the effect. So A is the cause and B is the effect.

The option 'A and B are effects of a common cause' can be evaluated after evaluating and eliminating the other options. If you suspected a cause effect relationship between the statements in the beginning and found that neither $A \rightarrow B$ nor $B \rightarrow A$ is logical, you are most likely looking at a pair of sentences with a common cause.



CLASS EXERCISE

Directions: Each of the following questions has an argument followed by two statements that either support or go against the argument.

Mark (1), if only statement I is strong.

Mark (2), if only statement II is strong.

Mark (3), if both I and II are strong statements.

Mark (4), if both I and II are weak statements.

1. The ongoing boom in personal loan disbursements by commercial banks in India is a boon.
 - I. No: The retail loan surge will accentuate the indebtedness of households.
 - II. Yes: The traditional conservative mind-set has been broken and borrowing against future income has become a widespread phenomenon in India.
2. Influential politicians should be prevented from visiting disaster sites.
 - I. Yes: With police personnel concentrating on the security of the politicians, the focus shifts away from the actual work of disaster relief.
 - II. Yes: Politicians should be satisfied with aerial surveys.
3. There should be a large presence of women in the police force.
 - I. Yes: The police force would be more balanced in terms of gender.
 - II. Yes: A woman in uniform serves as a role model for other women and girls.
4. Reservation for the poor in the education sector, as proposed by the government, is not a welcome measure.
 - I. No: Private education institutions, which are accruing huge profits and owning no responsibilities, feel no obligation to the downtrodden.
 - II. No: Reservation in the education sector would give adequate opportunities to the downtrodden to get a good education.
5. Sentencing a youth, who robbed an auto driver of Rs.100, to seven years imprisonment is an unfair judgement passed by a court.
 - I. No: The amount of money being meagre does not lessen the gravity of the crime for which this is the usual punishment.
 - II. Yes: Stealing such small amounts is only a minor offence and does not deserve a punishment of such magnitude.

6. The government should spend more on the healthcare sector by offering quality health services.
 - I. Yes: Investing in the healthcare system not only saves lives, it is also a crucial investment as it affects human capital development.
 - II. No: The government already has a Healthcare Index based on various crucial indicators which reflects the healthcare development of a particular state.
7. Indian cities are facing water crises and we need to find a holistic solution to this water shortage.
 - I. Yes: Due to an ever-increasing population, wetlands, water bodies and even rivers have been encroached upon in each and every city and village of India.
 - II. No: Rain water harvesting has been implemented in many countries to address water shortage problems.

Directions: You are given two statements, A and B.

Mark [1], if statement A is the cause and statement B is the effect.

Mark [2], if statement B is the cause and statement A is the effect.

Mark [3], if statements A and B are independent causes.

Mark [4], if statements A and B are effects of independent causes.

Mark [5], if statements A and B are effects of a common cause.

8. A: The Indian Government has granted a licence to Supreme Industries Limited to explore oil and gas resources in the country.
B: The Government of Poland has invited Supreme Industries to set up an iron-ore smelting plant in their country.
9. A: The Gujarat government has received 25 applications from foreign companies for investments amounting to Rs.2500 crores.
B: The government of Gujarat has decided to provide special incentives to foreign companies investing in Gujarat.
10. A: The Maharashtra Board of Education has decided not to come out with the Merit List of Std. X toppers.
B: The Maharashtra Board has introduced a host of new topics like Banking, Insurance and Capital Markets in the curriculum of Std.X.
11. A: The status of women in male-dominated India has not improved substantially since Independence.
B: The Parliament, constituting predominantly of males, has not passed any Bill related to the development of women.

12. A. The Grass is green in colour.
B. The Grass can prepare its own food.
13. A. The finance minister is expected to reduce excise duty on certain goods.
B. The income tax exemption limits for personal taxation have been increased.
14. A. India is set to become the most populous nation.
B. The government is in favour of stabilising population numbers.
15. A. Many children fell sick after eating the mid-day meal in school.
B. Doctors came up with alternative explanations for the high-fever and even pointed to the heat wave.

Directions: *The question below is followed by four arguments. You have to classify them into strong and weak arguments.*

16. Advertising is a wasteful expenditure.
 - I. Yes: How many people can read?
 - II. No: If it was wasteful, then nobody would advertise.
 - III. No: The Advertising industry employs a lot of people.
 - IV. No: Pleasant pictures are worth a thousand words.
 - 1) I and IV are weak.
 - 2) Only IV is weak.
 - 3) All are weak.
 - 4) II and III weak.

Directions: *A statement and two actions are given. An action is a step to be taken for improvement or follow up in regard to the problem mentioned in the statement. On the basis of the information given in the statement, and assuming that the statement is true, decide which action/s logically follow/s.*

17. **Statement:** The Government of Rajasthan, in a report, revealed that due to social disturbances and bomb blasts in Jaipur, the number of foreign tourists has decreased considerably, resulting in a loss of Rs. 200 crores.

Actions:

- I. The government should provide financial support to the tourism sector.
 - II. Foreign tourists should be advised to visit the country at their risk.
- 1) I only
 - 2) II only
 - 3) Both I or II
 - 4) Neither I nor II

18. **Statement:** The Indian textile industry venturing into the Western European market faces tough competition from China.

Actions:

- I. India should search for other international markets for its textile products.
II. India should improve quality and reduce costs to compete with China in capturing the Western European market.

- 1) I only 2) II only 3) Both I and II 4) Neither I nor II

Directions: In the following questions, a problematic situation is followed by courses of action intended to solve the problem or to minimize damages. Study these and choose the most appropriate combination from the options.

19. Habitats of wild animals are increasingly being encroached upon by development projects such as roads, canals and railways. Conflict between humans and wild animals is also a continued threat. Animosity towards these animals, provoked by attacks on humans or the killing of cattle, has led some communities to attack the animals. There needs to be some action to stop these animals from being killed.

- I. Compensation should be provided if cattle are killed by wild animals.
II. We should preserve our natural heritage even amid fast-paced economic growth.
III. The forest department should formulate strategies to minimise human-animal conflicts.

- 1) Only I 2) Only II 3) Both I and II
4) Both I and III 5) Both II and III

20. The police have warned of a rise in crypto-currency fraud as hundreds of people reported losing thousands of rupees. Given that crypto-currencies are not regulated, consumers are unlikely to get their money back.

- I. Government should make an effort to repay any person who has lost his money in a fraudulent transaction.
II. Banks should warn the public of the risks associates in dealing with crypto-currencies.
III. People should not be allowed to deal online to decrease the incidents of fraud.

- 1) Only I 2) Only III 3) Only II
4) Both II and III 5) I, II and III



PRACTICE EXERCISE

Directions: Each question has two statements. Identify the nature of relationship between them and Mark (1), if statement A is the cause and statement B is the effect.
Mark (2), if statement B is the cause and statement A is the effect.
Mark (3), if statements A and B are effects of independent causes.
Mark (4), if statements A and B are effects of a common cause.
Mark (5), if statements A and B are independent causes.

1. A. The Right to Education Act proposes to put children three years and older in a stimulating pre-school environment.
B. As per an expert report, the pre-school phase is crucial to stimulate a child's curiosity and help her prepare for schooling at age six.
2. A. Containing the spread of swine flu is important as it has a high mortality rate and spreads due to contact.
B. The government has set up isolation wards in all government hospitals in the state after a few cases of swine flu were reported.
3. A. The drive of the Election Commission against malpractices led to seizures worth Rs. 2,426 crore of items meant to unduly influence voters.
B. Due to high enthusiasm, voter turnout was very high in the elections.
4. A. India's largest passenger vehicle manufacturer has decided to eliminate diesel models from the next financial year.
B. The price differential between petrol and diesel is very narrow.

Directions: In the following questions, a problematic situation is followed by courses of action intended to solve the problem or to minimize damages. Study these and choose the most appropriate combination from the options.

5. Reports of violence against doctors, sometimes leading to grievous hurt or murder, are making headlines across India. However, this menace has not been highlighted adequately. Recently, the attack on a doctor over the death of a patient has sparked a nationwide agitation. The doctors demanded stringent action against anyone who assaults doctors.
 - I. People who have assaulted the doctors should be arrested and punished according to law.
 - II. Doctors should be made sensitive to developing better communication skills, taking note of patients who could be violent, and being cautious at potentially violent venues.
 - III. Courts should ensure that all the cases related to medical negligence are given top-priority.
 - 1) Only I
 - 2) I and II
 - 3) II and III
 - 4) I, II and III
 - 5) None of the above

6. Antibiotic overuse is when antibiotics are used when they're not needed. Overprescribing them has led to resistant bacteria. According to a report, nearly 10 million people are estimated to die annually from resistant infections by 2050. The currently used antibiotics may no longer be useful to treat diseases.
 - I. Medical practitioners should be cautioned against prescribing antibiotics for illnesses that do not require antibiotics.
 - II. Doctors should educate patients that the wrong and improper use of antibiotics is harmful.
 - III. The government should put an end to over the counter sale of antibiotics.
 - 1) Only I
 - 2) I and II
 - 3) II and III
 - 4) I and III
 - 5) I, II and III

7. The serious errors in the Intermediate Education results, which have triggered 21 student suicides, show that policymakers and the bureaucracy can badly fail at meeting their responsibilities. A few hundred students were declared absent and passed, without their marks being displayed, and in other cases, as absent and failed, although the candidates had taken the examination. This distressing annual phenomenon is witnessed in many states, but governments have not addressed it with any degree of alarm.
 - I. The government should look into the lapses, identify the people responsible for the errors and initiate strict action against them.
 - II. The government should appoint a committee specifically to look into problems faced by students because of incorrect results.
 - III. The results should be independently verified and reviewed before being published.
 - 1) Only I
 - 2) Both I and II
 - 3) Only II
 - 4) Both II and III
 - 5) Only III

8. Many people lost their lives when a foot-over bridge collapsed in a major city. This is the third such incident in the city this year.
- I. The reasons for the collapse should be studied and people responsible for negligence, if any, should be suspended and proceeded against.
 - II. An immediate audit of the safety of other foot over bridges in the city should be carried out.
 - III. People should be advised to avoid foot over bridges as much as possible.
- 1) Only I 2) Only II 3) Only III
- 4) I and II 5) II and III

Directions: Each of the following statements below is followed by four arguments, I, II, III and IV. You have to classify them into strong and weak arguments.

Strong Arguments must be both important and directly related to the question.

Weak Arguments may not be directly related or may be related to only trivial aspects of the question and may be of minor importance.

9. Reading comic books is detrimental to the mental development of teenagers.
- Yes: Comic books contain ideas that are immoral or may even actively encourage deviant behaviour.
 - No: Comic books are so popular that they are effectively used to convey desirable knowledge to teenagers.
 - Yes: Their popularity implies that students have less time to spend on reading their more important study material.
 - No: Any reading indicates a willingness to spend time on the written word and should therefore be encouraged.
- 1) Only I and II are strong.
 - 2) Only II and IV are weak.
 - 3) Only II is strong.
 - 4) None are strong.
10. In a democracy, there should be no ban on any kind of literature.
- No: Perverse literature subverts the psyche of the readers and therefore should be banned.
 - No: Literature that hurts the sentiments of the people cannot be encouraged as democracy is essentially for the people.
 - Yes: Democracy stands for the freedom of expression and any ban would be against the spirit of this freedom.
 - Yes: Such a ban amounts to denying the right to information essential in a democracy.
- 1) Only II, III and IV are strong.
 - 2) Only I and III are strong.
 - 3) Only IV is weak.
 - 4) None are weak.

11. Capital punishment should be banned.
 - I. No: The fear of capital punishment dissuades people from committing crimes that lead to such a punishment.
 - II. Yes: Such methods of punishment indicate a lack of mercy and compassion in society.
 - III. Yes: It is better to let the criminal live and suffer the consequences of his action in prison.
 - IV. No: The punishment has to match the severity of the crime and offences like murder must be awarded the death penalty.
 - 1) Only I, III and IV are strong.
 - 2) Only II and IV are strong.
 - 3) Only I, II and III are strong.
 - 4) Only III is weak.

12. Children should not be sent to school before they reach the age of five.
 - I. Yes: Before the age of five, children need to be in the familiar environment of home as they are psychologically unprepared to deal with the new environment of school.
 - II. No: Vital learning principles are best grasped when children are below five years of age.
 - III. Yes: Children learn the most important lessons of life only within the home.
 - IV. No: After children reach five years of age, they are unlikely to wish to leave their homes, which they have become used to.
 - 1) Only I and III are strong.
 - 2) Only II and IV are strong.
 - 3) Only I and II are strong.
 - 4) Only III and IV are strong.

13. Television has made people passive by reducing the urge to spend time on more active and healthier activities.
 - I. No: Even before television became a popular mode of entertainment, people spent a substantial amount of their time listening to the radio.
 - II. Yes: People today hardly ever go out on picnics or treks.
 - III. No: Television has merely fulfilled a need for entertainment of a better quality.
 - IV. Yes: The quality of the medium is such that it encourages people to sit and watch for long periods.
 - 1) Only IV is strong.
 - 2) Only II and III are strong.
 - 3) Only I and II are weak.
 - 4) Only II is strong.

14. A candidate's capacity to obtain funds is more important than his political integrity during an election campaign.
 - I. No: Candidates with far less funds than their adversaries have had more effective election campaigns.
 - II. No: Funds are only available to honest political candidates.
 - III. Yes: Voters are more impressed by the freebies offered by the campaigning politicians than by their professed intentions or political background.
 - IV. No: Fewer people campaign on their own funds – most of the times, the funds are provided by well wishers of the party or the candidate.
 - 1) Only I and II are strong.
 - 2) Only I, II and III are strong.
 - 3) Only I, II and IV are weak.
 - 4) Only II is strong.

15. The private lives of public figures must not be discussed in the press.
- I. Yes: The press has no right to invade the privacy of an individual, public or otherwise.
 - II. No: Public figures must be used to curiosity about their private lives.
 - III. Yes: The press has a pressing need to be relevant and balanced.
 - IV. No: Public figures are not very sensitive people.
- 1) Only I is strong. 2) All are strong.
3) All are weak. 4) I and II are strong.
16. Child marriages must be strongly discouraged, and violators punished severely.
- I. Yes: They are an evil affecting children, who need the most protection.
 - II. No: The custom is a part of Indian culture; a fine is sufficient punishment.
 - III. Yes: Strong and effective legislation is definitely a deterrent to such social crimes.
 - IV. No: Child marriages are but children's play, after all.
- 1) I and II are strong. 2) Only IV is weak.
3) All are strong. 4) Only III is weak.
17. Voting must be made compulsory.
- I. Yes: Then the results will be more representative of the choice of the people.
 - II. No: Compulsion is no fun.
 - III. Yes: Then the leaders will govern better.
 - IV. Yes: India is a democracy.
- 1) I and II strong. 2) I and III strong.
3) Only IV strong. 4) Only I strong.

Directions: Strong Arguments must be both important and directly related to the question. Weak Arguments may not be directly related or may be related to only trivial aspects of the question and may be of minor importance. Each of the following statements below is followed by two arguments, A and B. Classify the arguments into strong and weak arguments, and Mark [1] if only argument A is strong. Mark [2] if only argument B is strong. Mark [3] if neither A nor B is strong. Mark [4] if both A and B are strong.

18. Reckless drivers should be fined very heavily.
- A. Yes: This will instil fear in all drivers.
- B. Yes: This is a very good source of revenue for the government.

19. India displayed a poor performance at the Hockey World Cup in Spain.
 - A. Yes: India should participate only up to the Asia-level competitions.
 - B. Yes: The Indian players should practise more and undergo rigorous training to meet international standards.
20. Sports should be made compulsory in school.
 - A. Yes: Students who exercise regularly have both a healthy mind and a healthy body.
 - B. No: Being forced to participate in sports will put additional burden on the already overstressed students.

Directions: In each of the following questions, a statement is followed by two possible courses of action. Consider the information in the statement to be true, and:

Mark [1], if only A is to be the course of action.

Mark [2], if only B is to be the course of action.

Mark [3], if either A or B is to be the course of action.

Mark [4], if neither A nor B is to be the course of action.

Mark [5], if both A and B are to be the courses of action.

21. Many small-scale industries are shutting down due to lack of electricity.
 - A. Industries should be exempted from power cuts.
 - B. Subsidized power to the deserving small-scale industries should be provided.
22. Due to lack of irrigation facilities, the agricultural yield per acre in India is very low compared to world standards.
 - A. Indian farmers should adopt the model of multiple farming practised in the United States.
 - B. Measures should be implemented for rain water harvesting which helps in irrigation.
23. The tourism sector in India is showing negligible growth due to poor transportation facilities and non-availability of quality hotels.
 - A. The Government should provide incentives to reputed international hotel chains to set up their hotels in India.
 - B. The Government should declare the coming year as 'Visit India Year'.
24. The Polar Ice is melting rapidly due to harmful emissions by industries.
 - A. Industries that release harmful emissions should be penalized.
 - B. Industries emitting harmful gases should be made to adopt pollution control measures.

25. The North-Eastern part of India has been declared an earthquake-prone zone.
- A. The Government should sell more Life Insurance policies in the North East.
 - B. An early warning system for earthquakes should be installed.
26. In the last month, amateur investors lost a lot of money on the stock market.
- A. People should take professional help while investing.
 - B. Investors should invest in real estate in metro-cities.
27. India's share in world trade is barely 1.5%.
- A. The quality of goods produced in India should be improved to make them globally competitive.
 - B. Non-conventional items of export should be identified and promoted in India.
28. Due to the heavy rain, the dam on the river burst, flooding the villages on the riverbanks.
- A. The villagers must be evacuated immediately.
 - B. The dam must be rebuilt, using stronger materials and a better design.

Visual Reasoning

VisR-5.1 | VISUAL REASONING



Basic Concepts

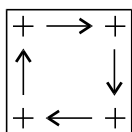
This chapter discusses in detail the various types of visual reasoning questions. Do remember that the underlying principles are more or less similar for all visual reasoning questions. This means that even though there are a lot of things you have to look for solving these questions, the method of approaching specific types of questions varies.

We will now familiarise you with the various concepts/terminology needed to solve these questions and then go into detail about specific questions in the following chapters.

Clockwise Movement

As the hands of a clock move.

e.g., ← Begin

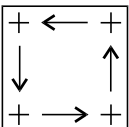


The direction in which the '+' moves is clockwise.

Anticlockwise Movement

Movement in the reverse direction of clockwise movement. [ceiling fans move in this fashion].

e.g., ← Begin



Taking the same example, the movement of '+' is in the reverse direction.

Rotation

The object rotates by certain degrees in the movement specified. The most commonly used movements are: rotations by 45°, 90° and 135°. Remember that these are identifiable with just visual inspection – a precise measurement is not required. e.g.,

- 1] Rotate 90° clockwise ⇒

original position

after rotation

to
- 2] Rotate 45° anticlockwise ⇒

original position

after rotation

to
- 3] Rotate 135° clockwise ⇒

original position




after rotation

to

When movements/rotations are different from the ones mentioned above you will have clues – like multiples of 30° in a clock.





Lateral Inversion



This is basically a mirror reflection or if you like, think of it as turning over an object on its side while keeping it vertical.

e.g., B to  or D to 
original position laterally inverted original position laterally inverted
But, some figures remain the same. e.g., A,  etc.

Vertical Inversion



This is inverting an object vertically - think of it as a reflection of trees in a pond.

e.g.,  to  or  to 
original position vertically inverted original position vertically inverted



Again, some figures may remain the same even when vertically inverted. e.g., ,  etc.

Spatial Inversion

When you invert an object laterally or vertically, one of two things can happen. One, the object is inverted and is placed in the original position; two, the object is inverted on its axis and placed below or to the side of the original position as the case may be.



e.g.,  to 

This is vertical inversion, but the inverted object is placed in the same position as the original object.

But  to 

Here, the object is inverted and moves down.

This movement is what we call spatial inversion. There is no fixed type of visual reasoning question. Any or all of the types discussed may be asked. You could find all three forms of inversion together.

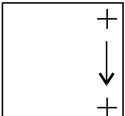
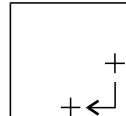
e.g.,  to 

Here, the object is vertically and laterally inverted; it also moves down.

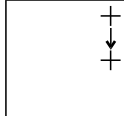
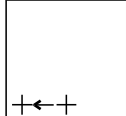
By the end of this section, you should not have any difficulty recognising these movements.

Move 1 space or move 1/2 space

This is purely our terminology coined for visual reasoning questions.

e.g.,  or 

This is moving one space - from a corner to the other corner, or from a particular place on one side to the same place on the adjoining side.

e.g.,  or 

This is half space movement - half of what you would move in moving one space.

These are the basics you need to know for now. Practice will increase your familiarity with these, and you will find it easier to recognise patterns/sequences in future.

Just one last word before we attack the questions themselves: though there are certain 'rules' you can follow to solve a question, visual reasoning is slightly subjective and you may find it easier to solve some problems in a different manner. You can work out what suits your requirements/reasoning processes best.

Thus, for attempting a question in visuals, compare the various figures with respect to the movement of elements in terms of distance (1/2 space or 1 space) and direction (clockwise or anticlockwise) or degree of rotation and inversions which all will help you discern the answer confidently.

Now, we discuss various types of Visual Reasoning questions.

Series Completion

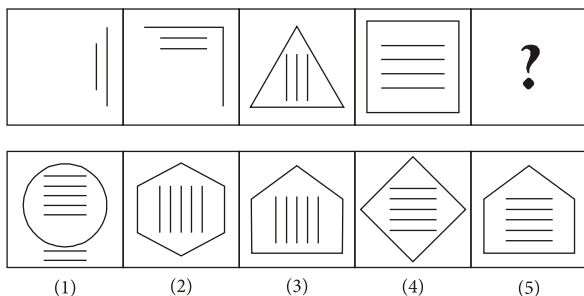
Here, you are required to discuss a pattern in the given figures - to define the manner in which each figure changes. Then you must choose, from the alternatives provided, a figure that will continue the series in the defined pattern.

What do you do? Compare each figure to the preceding one and find out the difference - something very similar to what you would do to complete a number series question. What you would look for is: numbers of elements increasing or decreasing; rotary movements in one or more elements; elements changing in a definite pattern; common properties in all figures, and so on. But, remember that everything is not quantifiable - you may have to deal with horizontal lines or vertical lines, shading etc. also.

Let us now see these questions with the help of examples.

SOLVED EXAMPLES

1.



There are two things happening here. The number of lines in the outer figure is increasing by one, every step. Thus, your answer will have a pentagon as the outermost figure. The only possible answer would be one of [3] and [5]. Secondly, the number of lines inside, not only increases by one but also alternates horizontally and vertically, since in the last figure the lines are horizontal, therefore, the figure will have vertical lines. Thus, the answer is [3].

The ideal strategy for these kinds of questions is elimination. If you can eliminate 2 or 3 alternatives using a defined pattern, then your task is that much simpler. You do not need to consider each alternative for all elements.

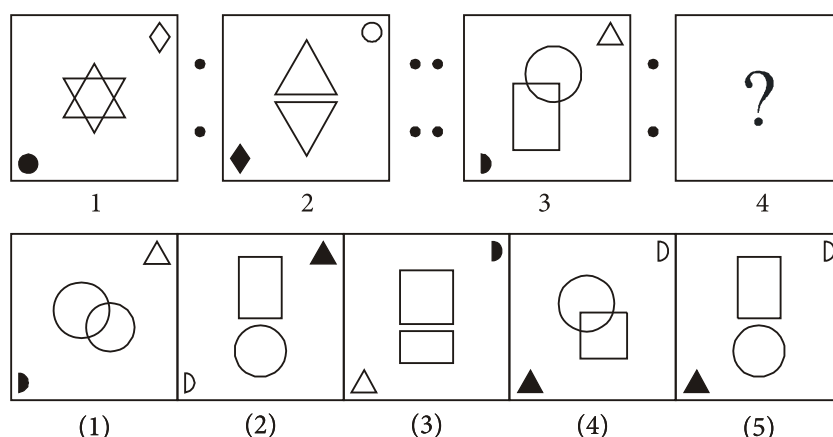
Analogies

You are again familiar with these types of questions in verbal reasoning. Given two words which are related to each other in a specific way, you have to find a pair of words which exhibits the same relationship or form among a group, or find the pair which does not exhibit the same relationship. Similarly in these questions – there exists a defined relationship between two figures and given that you have to identify a pair which exhibits/does not exhibit the same relationship.

Before moving on to examples, just remember that the underlying principles remain the same, only the approach is different and once you identify the relationship, these questions will not seem tough.

SOLVED EXAMPLES

2.



Figures 1 and 2 exhibit a definite relationship, you need to find the figure which will establish a similar relationship with figure 3. Figure 1 is made up of 2 triangles, placed one over the other. From figure 1 to 2, the two elements are separated. Similarly in figure 3, the two central elements have to be separated to get figure 4. The two small symbols in figure 1, interchange places and the shaded figures become unshaded and vice versa. Hence, figure [e] is the answer as all conditions are satisfied.

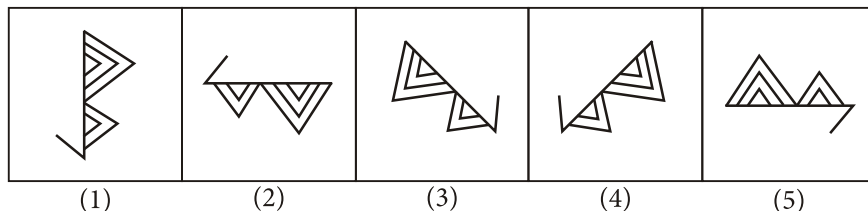
Odd Figure Out

You have to identify similarities/patterns in a group of figures and make the figure which does not fit in with the group. A variation of this type of questions is identifying the odd figure in a sequence – think of this as the wrong term in a number series. You have to identify the figure which does not follow the set rules of the sequence.

The things you would look for remain the same – number of elements, angles, number of straight lines or curves, arrangements and such. We do not need to elaborate upon sequences as we have covered these in the preceding sections. Let us look at examples to give you a better idea of these questions.

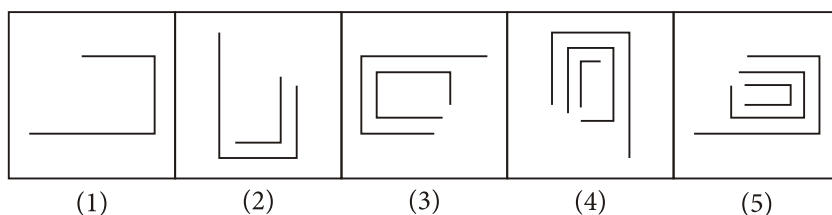
SOLVED EXAMPLES

3.



Does this look like a sequence? Or are all these figures to be taken individually? If you cannot discern a series, look for differences. This also depends on the directions given for a particular question. In this question, in all figures except [3], the triangles are on the right of the straight line or [3] is the mirror image of the other figures and hence is the odd one out.

4.



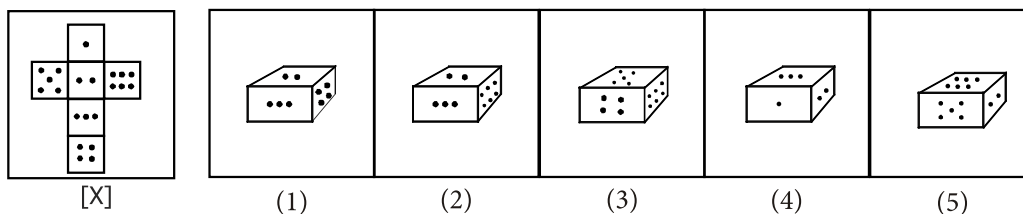
This by now should be a fairly simple question for you. A sequence where the central figure rotates 90° clockwise in each step and 2 lines are added inside. Hence, your answer is [5], where only 1 line is added.

Always remember that the key to the series can vary tremendously. Do not get stuck on only one-two decision rules.

Cubes

Another type of question, used to test the visual ability of an individual, is by identifying his capacity to form cubes. In these type of questions, generally a paper has to be folded so as to form a complete cube with six sides. This involves lot of imagination and visualising in the correct direction. For e.g., choose the option that will unfold to give a figure shown in [X].

5.

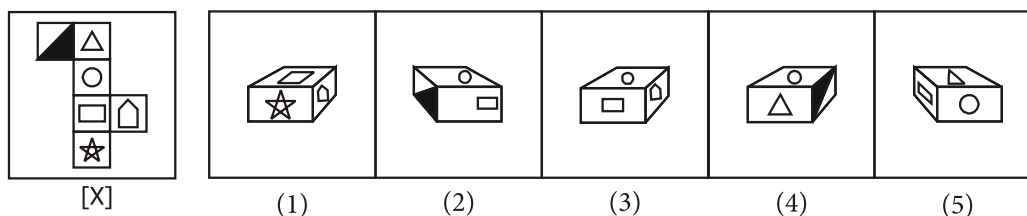


Considering figure [X], if surface with 2 circles is on top face, then the one with 3 circles will be the front face and the one with just 1 circle will be on the backside i.e., faces having 1

circle and 3 circles will be opposite to each other.

In other words, the faces which are alternate in figure [X] will be opposite to each other when folded to form a cube i.e., faces having 2 circles and 4 circles will be opposite to each other in a cube. Obviously, the faces having 5 and 6 circles are bound to fall opposite to one another. Since, we can see only 3 adjacent faces of a cube at a time, 2 faces which are opposite to each other cannot be viewed in the same cube. Thus, options [1], [3], [4] and [5] are ruled out, as each of the option has 2 faces which are opposite to each other and should not be viewed in the same cube. The answer is therefore option [2].

6.



From figure [X], we can determine the opposite faces: triangle will be opposite the rectangle, circle will be opposite the star, therefore pentagon will be opposite the shaded sector. Thus, option [5] is ruled out, as triangle and rectangle, cannot be adjacent to each other. Option [4] is wrong, as the triangle should be inverted, thus one should keep track of the orientation of elements in case they are asymmetrical. Option [2] is wrong, as the shading is not proper. Also option [1] is wrong, as the orientation of pentagon is wrong. Thus, answer is option [3].



PRACTICE EXERCISE

DIRECTIONS for questions 1 to 4: Choose the alternative that will replace the missing term represented by the question mark (?) in the series.

1.

| | | | | |
|---|-----|----------|------------|---|
| □ | □ + | K □ + | K □ ↑ + | ? |
|---|-----|----------|------------|---|

| | | | | |
|------------|------------|--------------|--------------|--------------|
| ↑ + □ K | ↑ + □ K | ↑ + □ K ↓ | ↑ + □ K ↓ | ↑ + □ x ↓ |
| (1) | (2) | (3) | (4) | (5) |

2.

| | | | | |
|--|--|--|--|---|
| | | | | ? |
|--|--|--|--|---|

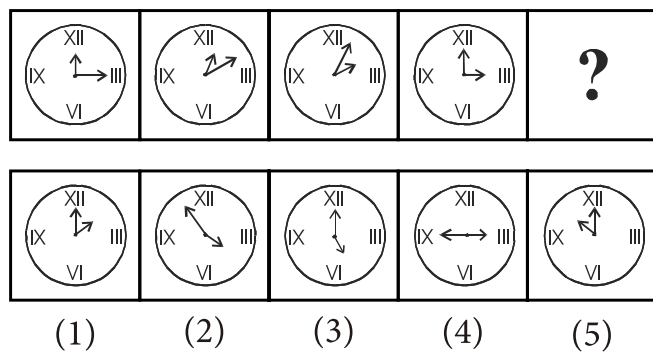
| | | | | |
|-----|-----|-----|-----|-----|
| | | | | |
| (1) | (2) | (3) | (4) | (5) |

3.

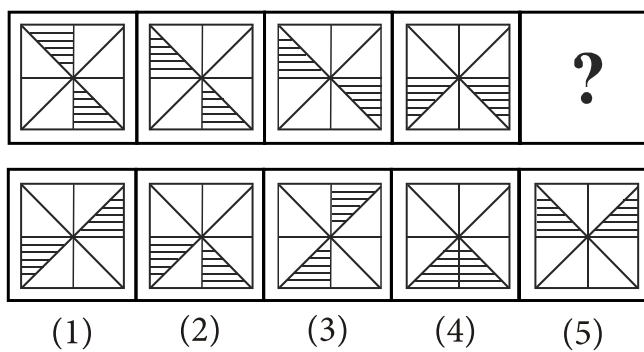
| | | | | |
|--|--|--|--|---|
| | | | | ? |
|--|--|--|--|---|

| | | | | |
|-----|-----|-----|-----|-----|
| | | | | |
| (1) | (2) | (3) | (4) | (5) |

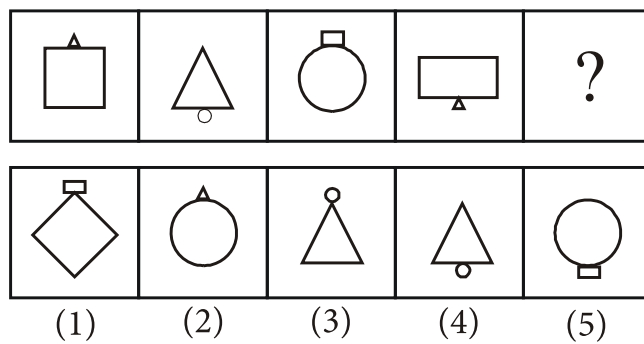
4.



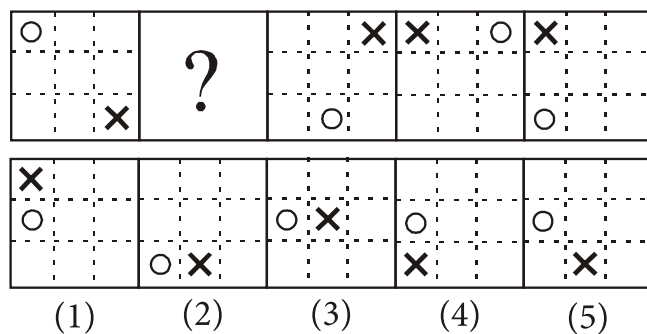
5.



6.

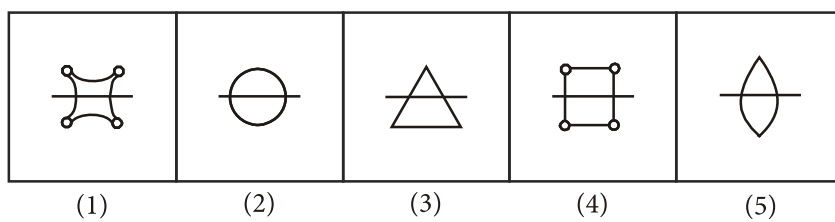


7.

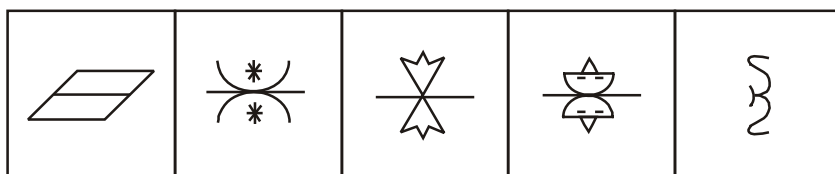


DIRECTIONS for questions 8 to 13: From among the five figures given below, choose the figure that does not fit into the group.

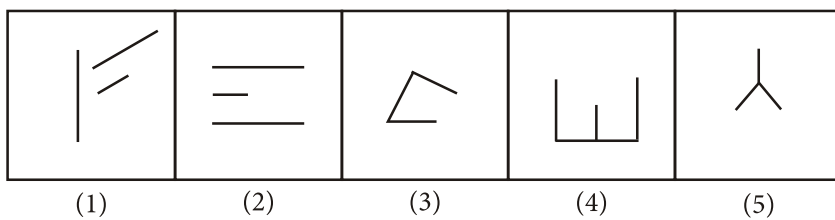
8.



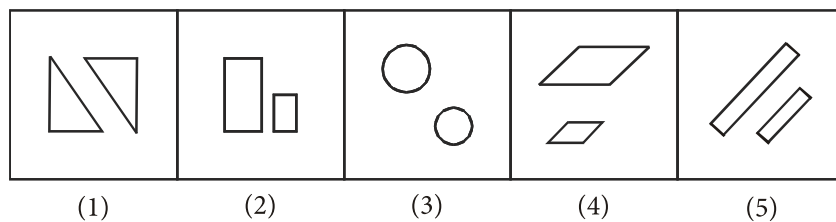
9.



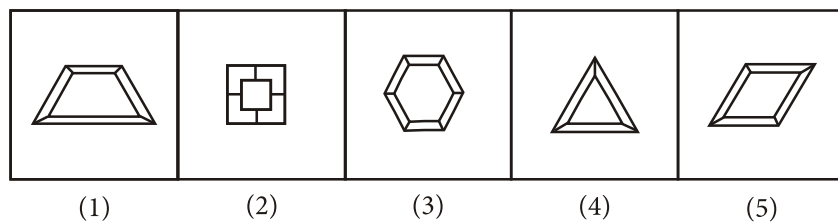
10.



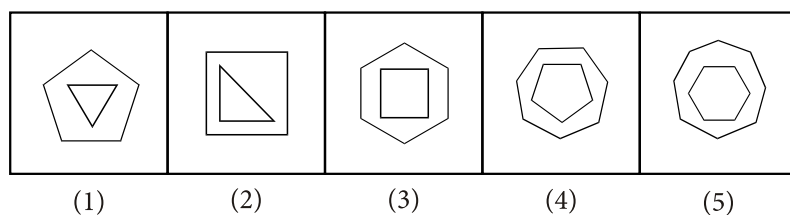
11.



12.

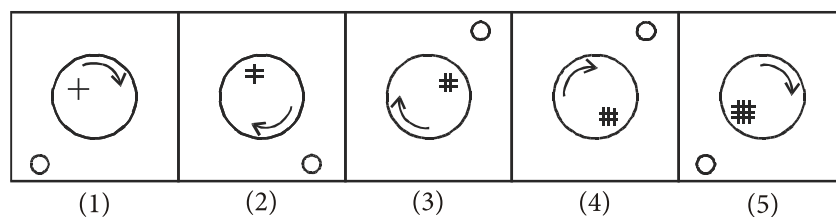


13.

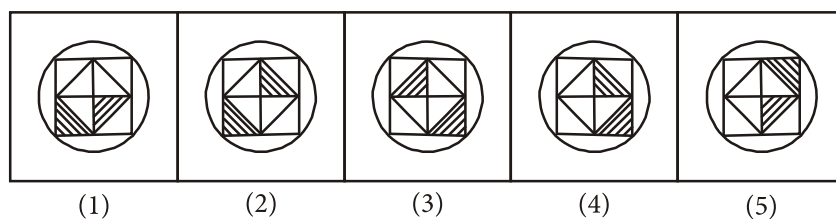


DIRECTIONS for questions 14 and 15: Each question contains five figures numbered [1] to [5] which are in a series. Choose the figure that does not fit in with the rest.

14.

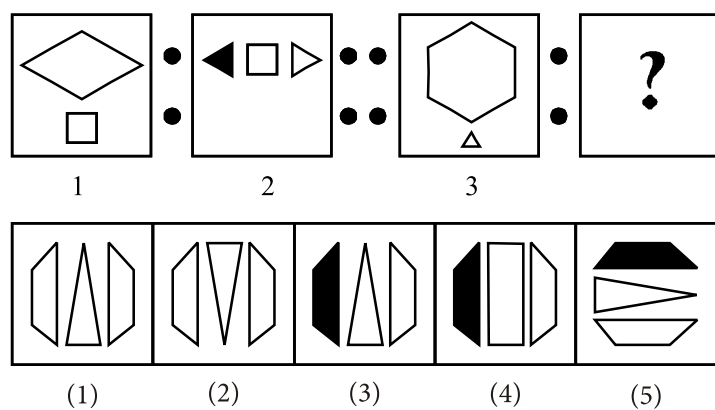


15.

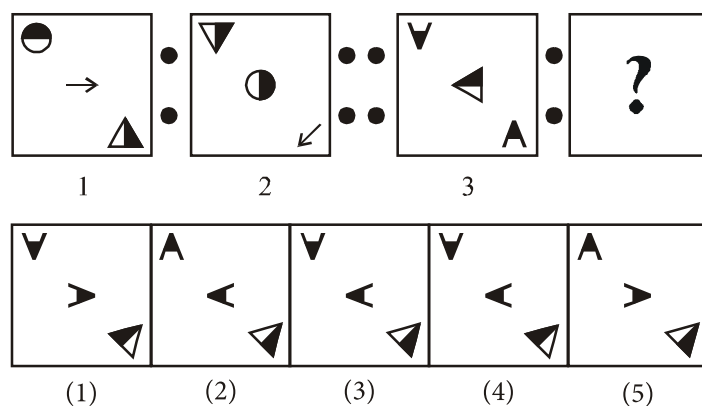


Directions for questions 16 to 19: Each question has three figures. Figure 2 bears a certain relationship with figure 1. Choose the option that bears an identical relationship with figure 3.

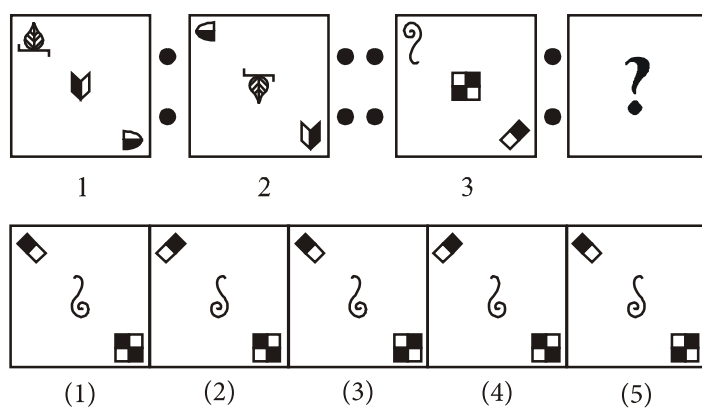
16.



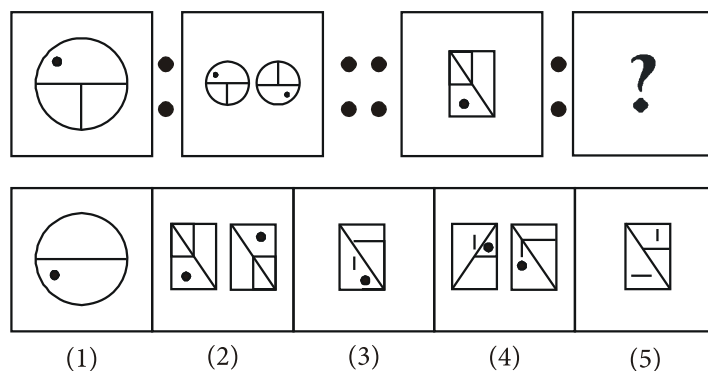
17.



18.

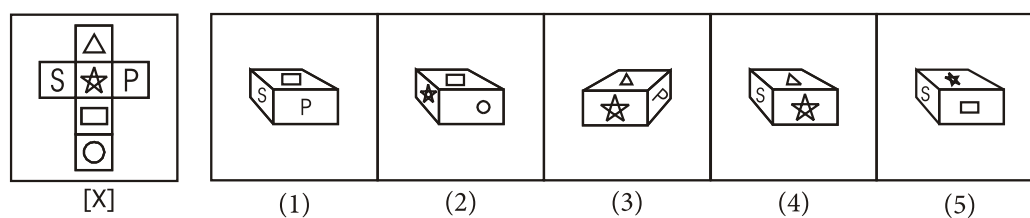


19.

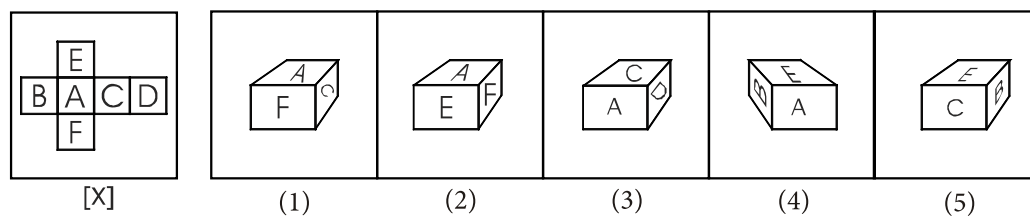


DIRECTIONS for questions 20 to 29: Choose the cube from the options that will unfold to give the figure in [X].

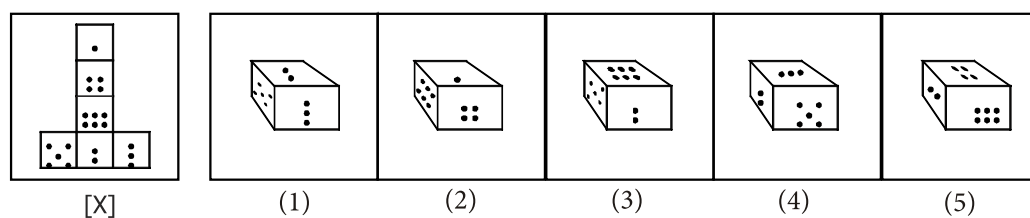
20.



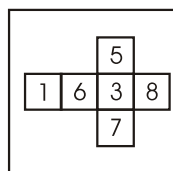
21.



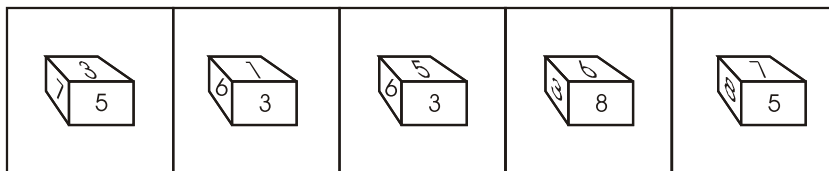
22.



23.



[X]



(1)

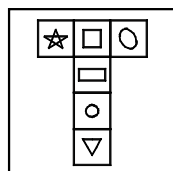
(2)

(3)

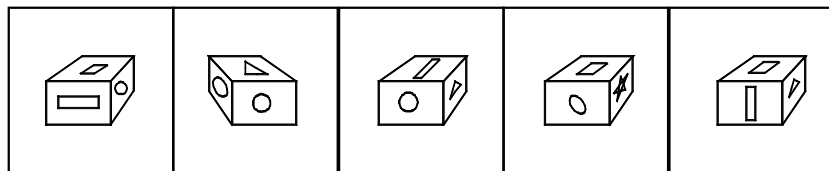
(4)

(5)

24.



[X]



(1)

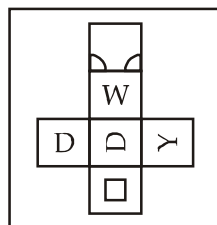
(2)

(3)

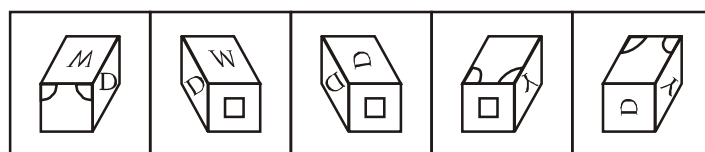
(4)

(5)

25.



[X]



(1)

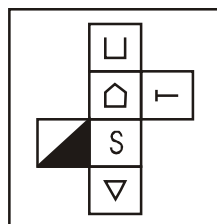
(2)

(3)

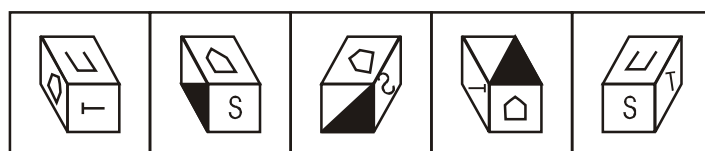
(4)

(5)

26.



[X]



(1)

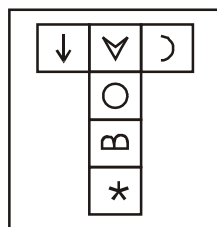
(2)

(3)

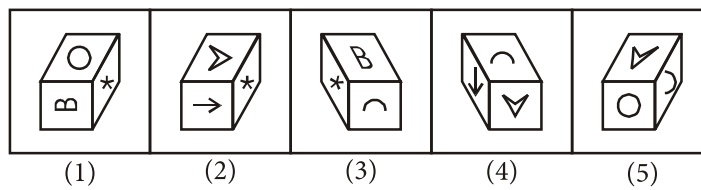
(4)

(5)

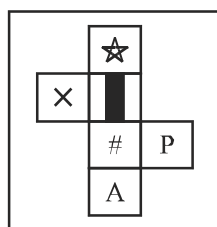
27.



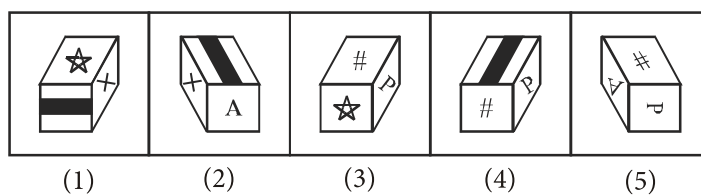
[X]



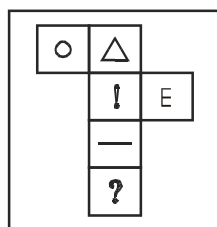
28.



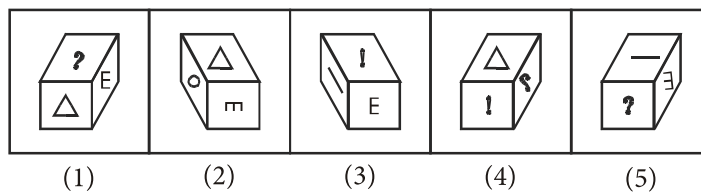
[X]



29.



[X]



Answer Key

Practice Exercises

ANSWER KEY
PRACTICE EXERCISES – DECISION MAKING

CHAPTER DM 5.1

| Practice Exercise 1 | | | | | | | | | |
|----------------------------|------|------|------|------|------|------|------|------|------|
| 1-4 | 2-2 | 3-1 | 4-5 | 5-4 | 6-5 | 7-5 | 8-4 | 9-3 | 10-4 |
| 11-3 | 12-3 | 13-5 | 14-3 | 15-5 | 16-1 | 17-5 | 18-3 | 19-5 | 20-2 |
| 21-3 | 22-1 | | | | | | | | |
| Practice Exercise 2 | | | | | | | | | |
| 1-3 | 2-3 | 3-1 | 4-3 | 5-3 | 6-1 | 7-3 | 8-3 | 9-1 | 10-3 |
| 11-2 | 12-4 | 13-3 | | | | | | | |

CHAPTER DM 5.2

| Practice Exercise | | | | | | | | | |
|--------------------------|------|------|------|------|------|------|-----|-----|------|
| 1-3 | 2-1 | 3-4 | 4-4 | 5-3 | 6-4 | 7-3 | 8-3 | 9-1 | 10-5 |
| 11-2 | 12-3 | 13-5 | 14-2 | 15-4 | 16-2 | 17-4 | | | |

ANSWER KEY
PRACTICE EXERCISES – LOGICAL REASONING

CHAPTER LR 5.1

| Practice Exercise 1 | | | | | | | | | |
|----------------------------|------|------|------|------|------|------|------|------|------|
| 1-4 | 2-2 | 3-3 | 4-3 | 5-1 | 6-5 | 7-3 | 8-3 | 9-4 | 10-1 |
| 11-2 | 12-3 | 13-2 | 14-4 | 15-2 | 16-3 | 17-1 | 18-2 | 19-4 | 20-3 |
| 21-3 | 22-4 | 23-1 | 24-3 | 25-4 | 26-1 | 27-4 | 28-2 | | |
| Practice Exercise 2 | | | | | | | | | |
| 1-2 | 2-4 | 3-3 | 4-3 | 5-3 | 6-3 | 7-1 | 8-4 | 9-2 | 10-1 |
| 11-1 | 12-3 | 13-3 | 14-2 | 15-3 | 16-4 | 17-1 | 18-3 | 19-2 | 20-1 |
| 21-3 | 22-2 | 23-2 | 24-2 | 25-4 | 26-3 | 27-2 | | | |

CHAPTER LR 5.2

| Practice Exercise 1 | | | | | | | | | |
|----------------------------|------|------|------|------|------|------|------|------|------|
| 1-4 | 2-3 | 3-4 | 4-2 | 5-2 | 6-3 | 7-4 | 8-4 | 9-4 | 10-3 |
| 11-1 | 12-3 | 13-5 | 14-2 | 15-2 | 16-2 | 17-2 | 18-3 | 19-2 | |
| Practice Exercise 2 | | | | | | | | | |
| 1-3 | 2-2 | 3-4 | 4-1 | 5-5 | 6-1 | 7-1 | 8-3 | 9-4 | 10-3 |
| 11-3 | 12-1 | 13-1 | 14-2 | 15-3 | 16-1 | 17-1 | 18-2 | 19-4 | 20-4 |
| 21-4 | 22-3 | 23-1 | | | | | | | |

ANSWER KEY
PRACTICE EXERCISES – DATA SUFFICIENCY

CHAPTER DS 5.1

| Practice Exercise 1 | | | | | | | | | |
|---------------------|------|------|------|------|------|------|------|------|------|
| 1-4 | 2-3 | 3-1 | 4-4 | 5-3 | 6-4 | 7-3 | 8-2 | 9-1 | 10-2 |
| 11-2 | 12-3 | 13-3 | 14-1 | 15-3 | 16-1 | 17-1 | 18-4 | 19-3 | 20-1 |

| Practice Exercise 2 | | | | | | | | | |
|---------------------|------|------|------|------|------|------|------|------|------|
| 1-5 | 2-4 | 3-2 | 4-4 | 5-1 | 6-2 | 7-4 | 8-5 | 9-3 | 10-4 |
| 11-3 | 12-5 | 13-5 | 14-1 | 15-4 | 16-4 | 17-1 | 18-4 | 19-3 | 20-5 |

ANSWER KEY
PRACTICE EXERCISES – VERBAL ABILITY

CHAPTER VA 5.1

| Practice Exercise 1 | | | | | | | | | |
|---------------------|------|------|------|------|------|------|------|------|------|
| 1-3 | 2-1 | 3-3 | 4-3 | 5-1 | 6-1 | 7-4 | 8-1 | 9-2 | 10-4 |
| 11-4 | 12-1 | 13-4 | 14-2 | 15-1 | 16-2 | 17-3 | 18-2 | 19-1 | 20-3 |
| 21-4 | 22-2 | | | | | | | | |

| Practice Exercise 2 | | | | | | | | | |
|---------------------|------|------|------|------|------|------|------|------|------|
| 1-2 | 2-3 | 3-3 | 4-2 | 5-1 | 6-1 | 7-3 | 8-3 | 9-4 | 10-4 |
| 11-2 | 12-4 | 13-3 | 14-5 | 15-1 | 16-1 | 17-3 | 18-1 | 19-3 | 20-2 |
| 21-1 | 22-4 | | | | | | | | |

CHAPTER VA 5.2

| Practice Exercise | | | | | | | | | |
|-------------------|------|------|------|------|------|------|------|------|------|
| 1-2 | 2-1 | 3-3 | 4-3 | 5-2 | 6-5 | 7-2 | 8-4 | 9-4 | 10-1 |
| 11-4 | 12-3 | 13-1 | 14-2 | 15-1 | 16-1 | 17-4 | 18-3 | 19-3 | 20-4 |
| 21-4 | 22-2 | 23-4 | 24-5 | 25-2 | 26-1 | 27-5 | 28-5 | | |

ANSWER KEY
PRACTICE EXERCISES – VISUAL REASONING

CHAPTER VisR 5.1

| Practice Exercise | | | | | | | | | |
|-------------------|------|------|------|------|------|------|------|------|------|
| 1-4 | 2-2 | 3-2 | 4-2 | 5-1 | 6-3 | 7-4 | 8-3 | 9-1 | 10-4 |
| 11-1 | 12-2 | 13-2 | 14-4 | 15-4 | 16-3 | 17-3 | 18-1 | 19-2 | 20-4 |
| 21-1 | 22-3 | 23-3 | 24-2 | 25-1 | 26-2 | 27-3 | 28-4 | 29-5 | |