

Ref: AIMCAT1718

INSTRUCTIONS

1. Read the instructions given at the beginning/end of each section or at the beginning of a group of questions very carefully.
2. This test has a total of 100 questions in three sections: (i) Verbal Ability and Reading Comprehension – 34 Questions (ii) Data Interpretation and Logical Reasoning – 32 Questions and (iii) Quantitative Ability – 34 Questions. The total time available for the test is **180 minutes**. However, you will be allotted exactly 60 minutes for answering the questions in each section and you cannot switch from one section to another while answering the questions in a section.
3. All questions carry three marks each. Each wrong answer to any multiple-choice type question will attract a penalty of one mark. Wrong answers to any non multiple-choice type question will not attract any penalty.

SECTION – I
Number of Questions = 34

DIRECTIONS for questions 1 to 6: The passage given below is followed by a set of six questions. Choose the best answer to each question.

Somebody's going to win the lottery," reads an ad from a public-spirited corporation, "Just not you."

That's right. If any class of gamblers qualifies as super-suckers, it's the pack of dreamers who believe what their state governments tell them about a pot of gold at the end of the numbers rainbow.

Media that benefit from state lottery advertising hype the one winner (not you) in a million. They ignore the bad news of all the others who blow the bread money, or feed their compulsive-gambling habit, on the worst odds of any betting in America.

Ever since the immoralists of New Hampshire introduced a state lottery in 1964, followed quickly by New York in 1966, pusillanimous politicians have been ripping off their constituents with this "painless taxation." Now 37 states are imitating the banana republics.

The profits go to education, the gambling governors claim, as they substitute lottery money for other state education aid in a classic bait-and-switch. It's the only tax increase that conservatives support – from zero to \$43 billion in one generation – and is the only regressive tax embraced by liberals.

The bipartisan National Gambling Impact Study Commission has issued its report. At the start, members fought over whether to call gambling "gaming," but in the end, agreement on more important matters was found: 15 million Americans are "problem gamblers." The Internet is hooking teen-agers on games of chance. "Convenience gambling" with video poker terminals everywhere is a training ground for lifelong gambling.

After a decade of feckless harangues in this space, I have accepted reality: at least half the population enjoys betting. So if you want to feed quarters for hours on end to one-armed bandits in Las Vegas, or go broke on jackpot.com, that's your business.

But when the state becomes croupier, that's everybody's business.

The most telling part of the wake-up call is the criticism of lotteries. They are "the most widespread form of gambling in the United States." State governments have "irresponsibly intruded gambling into society on a massive scale," says the commission report, "through such measures as incessant advertising and the ubiquitous placement of lottery machines in neighbourhood stores."

And they're a lousy bet. "Lotteries bring out the worst in politicians," noted Richard Leone, commissioner from New Jersey. "They are heavily and misleadingly advertised; they pay back to bettors the smallest share of the take of any legal game . . . yet lotteries have proven to be catnip for elected officials who fear taxation."

Where does any state come off urging its citizens to spend their hard-earned income or welfare checks unwisely? Who is your governor to tell you to ignore your economic self-interest and take a little flier with him or her? Government is not a game, nor should it be a casino empowered to declare itself a monopoly so it can make a profit by stimulating public avarice.

State lotteries should reduce their sales dependence on low-income, less-educated gamblers, the commission recommends, and limit advertising and sales outlets in poor neighbourhoods. But that's precisely where the most business is. And because states advertise their lotteries, the Supreme Court strikes down state restrictions on advertising any gambling.

Thus does the lottery tail now wag the public-policy dog. To make a bigger profit, state-sponsored gambling must sell harder to the poor and the addicted. Your state legislator is facing the same moral conflict as the seller of tobacco and hard liquor and violent movies: trying to make what's bad for you look good to you. The difference is that the state does not permit competition in its own numbers racket.

1. Which of the following can be the primary reason for the author to refer to the state lottery as "painless taxation"?
 - (A) The people have a good chance of winning the lottery, if they participate in it, which makes paying for state lotteries painless.
 - (B) Most of the people are usually reluctant to pay taxes to the state, but will readily part with their money for participating in the state lottery.
 - (C) It is easier for the politicians to raise money through state lottery than it is through other fundraisers.
 - (D) The taxes that politicians receive from lotteries helps improve the society.
2. What does the author imply when he states that "Thus does the lottery tail now wag the public-policy dog"?
 - (A) State lotteries have become the subject of foremost importance when formulating public policy.
 - (B) The power of state lotteries has increased to such an extent that it can amend the laws of gambling.
 - (C) Public policy is being formulated without taking public interest into account.
 - (D) Public policy is now being amended to accommodate the functioning of state lotteries.
3. Which of the following is not mentioned in the passage as a part of the report of National Gambling Impact Study Commission?
 - (A) State governments have played a part in increasing the scale of gambling in America.
 - (B) The state government should not declare itself a monopoly in lotteries for making profits.
 - (C) State government should avoid targeting people from low income groups for their lotteries.
 - (D) The amount of money that the winner(s) of the state lottery is paid as a percentage of the total amount received by state lotteries is the lowest among all legal games.
4. Which of the following can be understood about gambling in America?
 - (A) The odds of winning the lottery are worse than any other form of gambling in America.
 - (B) Half the population of America, which is approximately 15 million Americans, are gamblers.
 - (C) Right from their childhood, children are encouraged by their parents to gamble.
 - (D) The first lottery in America was introduced in 1964.
5. Which of the following is not mentioned in the passage as a feature of state lotteries?
 - (A) State lotteries target the low-income and less-educated people who usually cannot afford to partake in lotteries.
 - (B) The largest share of business in state lotteries comes from the poor and the less-educated.
 - (C) The state government cannot advertise any form of gambling except state lotteries.
 - (D) Advertising state lotteries involves the same ethical dilemma as that in advertising tobacco or hard liquor.
6. Which of the following can be inferred to be a feature of banana republics?
 - (A) Banana republics are the first states in a country to introduce state lotteries.
 - (B) Banana republics are where politicians try to rip off their constituents with unnecessary taxes.
 - (C) Most of the citizens of banana republics are compulsive gamblers.
 - (D) Lotteries conducted by the state governments are prevalent in banana republics.

DIRECTIONS for questions 7 to 12: The passage given below is followed by a set of six questions. Choose the best answer to each question.

Since W. D. Ross, John Rawls, Onora O'Neill, Barbara Herman, Christine Korsgaard, Thomas Hill, Allen Wood – and most recently Derek Parfit – made Kant-oriented ethics into a serious player in mainstream contemporary analytic ethical theory, it is commonplace to distinguish between *Kant's* ethics, i.e., the ethical theory that is developed in Kant's own writings, and *Kantian* ethics, i.e., contemporary ethical theory inspired by Kant's writings in moral philosophy, which is not slavishly restricted to Kant's own doctrines and is rationally defensible on grounds independent of Kant's texts.

Correspondingly, it is very natural to see a parallel distinction between *Kant's* metaphysics and epistemology, and *Kantian* metaphysics and epistemology. But even despite the explicit endorsement of Kant-oriented metaphysics and epistemology by Peter Strawson, Wilfrid Sellars, Nicholas Rescher, and John McDowell, this way of doing metaphysics and epistemology has failed to be accorded the philosophical respect of most mainstream contemporary analytic metaphysicians and epistemologists. Indeed, *Kantian* metaphysics and epistemology is held in generally very low

esteem, and not taken seriously at all – sharply unlike, say, the not dissimilar *anti-realism* developed by Michael Dummett or the *Aufbau* period Carnap-inspired *constructive phenomenism* developed by Bas van Fraassen and more recently by David Chalmers, or for that matter the *panpsychism* or *panprotopsychism* speculatively postulated by Thomas Nagel and Chalmers, all of which are taken very seriously indeed by most of the mainstream.

The reason for this sadly asymmetric state of affairs, I am afraid, is simply that *idealism* is a *taboo word* for most mainstream contemporary analytic metaphysicians and epistemologists. *Anti-realism*, *phenomenalism*, *panpsychism*, and *panprotopsychism* are all philosophically respectable, but *idealism* is unacceptable. And the thoroughly ugly label *transcendental idealism* only makes it worse. If you are an "idealist," then you are obviously a bad philosopher; and if you are a "transcendental idealist," then you are obviously a *very bad* philosopher. It is true that even if you are an idealist or a transcendental idealist, you may still be a good "historian of philosophy." But that is cold comfort indeed, especially in view of W.V.O. Quine's well-known and widely-accepted distinction between the two classes of philosophers – those who are interested in the history of philosophy, and those who are interested in philosophy. Given this sad state of philosophical affairs, it is hard to avoid the conclusion that most mainstream contemporary analytic metaphysicians and epistemologists have an unreasonable prejudice against Berkeley, Kant, Schopenhauer, Hegel, middle and later Husserl, early Heidegger, earlier and later Wittgenstein, and also against all contemporary views importantly influenced by one or another of these philosophers.

What is transcendental idealism? Idealism, as such, starts with the assumption, held by classical Rationalists and classical Empiricists alike – not to mention by all phenomenologists and many contemporary mainstream analytic philosophers – that consciousness and intentionality are primitive irreducible facts about ourselves and about the world. Consciousness is *subjective experience*, and conscious intentionality is *subjective experience of something or about something*, hence conscious intentionality, more briefly put, is *the characteristic "of-ness" or "about-ness" of the mental*. Then transcendental idealism adds to this mentalistic starting point the further classical Rationalist assumption – itself held by at least a significant minority of mainstream contemporary analytic philosophers – that normativity, apriority, and modality are also all primitive irreducible facts about ourselves and the world. Idealism, in turn, is a positive essentialist thesis about the *mind-dependence* of all the objects of conscious intentionality: All worldly things, properties, relations, and facts essentially include the actual or really possible existence of conscious intentional minds like ours.

Correspondingly, transcendental idealism is a positive essentialist thesis about the *mind-conformity* of all the formal or structural features of all the objects of *rational* conscious intentionality: All irreducibly normative, non-empirical, and modal features of all worldly things, properties, relations, and facts are essentially isomorphic with the formal or structural representations of actual or really possible rational conscious intentional minds like ours.

This two-part doctrine might be false. But, on the other hand, it also might be true. In any case, it is not in and of itself *bad philosophy*.

7. According to the contemporary analytic metaphysicians, which of the following is accurate?
 - (A) The philosophers who study Kantian ethics are very bad philosophers.
 - (B) The philosophers who study Kant's ethics are bad philosophers.
 - (C) The philosophers who study Kantian ethics are good historians of philosophy.
 - (D) The philosophers who study Kantian ethics are bad historians of philosophy.
8. What, according to the passage, is the difference between Kantian ethics and Kant's ethics?
 - (A) The former refers to the ethics that are developed by Kant whereas the latter refers to the ethics developed based on Kant's writings.
 - (B) The former refers to the ethics developed by philosophers based on the Kant's works whereas the latter refers to the ethics developed by philosophers based on the life of Kant.
 - (C) The former refers to the ethics developed by philosophers based on the Kant's works whereas the latter refers to the ethics developed by Kant.
 - (D) The former refers to the ethics developed by modern philosophers based on Kant's works whereas the latter refers to the ethics which are defensible on rational grounds.
9. Which of the following statements regarding W.V.O. Quine is true?
 - (A) Quine believed that transcendental idealists had the potential to be good historians of philosophy but cannot be good philosophers.
 - (B) Quine considered philosophers who are interested in philosophy to be superior to the philosophers interested in the history of philosophy.
 - (C) Quine considered Berkeley, Kant, Schopenhauer, Hegel, among others, to be historians of philosophy.
 - (D) Quine was responsible for Kantian epistemology to be held in low esteem.
10. Which of the following can be inferred from the passage regarding idealism?
 - (A) Kant's ethics is based on idealism whereas Kantian ethics is based on transcendental idealism.
 - (B) Most of the contemporary analytic metaphysicians are idealists but only a few are transcendental idealists.
 - (C) Kantian ethics is based on transcendental idealism which is not highly regarded by contemporary analytic metaphysicians.
 - (D) Transcendental idealists are held in low esteem by contemporary analytic metaphysicians because they study Kantian metaphysics and epistemology.

11. According to the passage, what is the difference between idealism and transcendental idealism?
- Idealism holds only consciousness and intentionality as primitive irreducible facts while transcendental idealism holds only normativity, modality and apriority as primitive irreducible facts.
 - While idealism asserts that all worldly perceptions depend on mental constructs of our consciousness, transcendental idealism emphasizes that only such features which are, or are akin to, normative, non-empirical and modal, depend on the considered mental constructs of our consciousness.
 - While the assumptions of idealism are held by most contemporary mainstream analytic philosophers, the assumptions of transcendental idealism are not held by any contemporary mainstream analytic philosophers.
 - While idealism deals with the mind-conformity of objects of conscious intentionality, transcendental idealism deals with the mind-dependence of objects of conscious intentionality.
12. Which of the following can be inferred to be the opinion of the author regarding transcendental idealism?
- The author feels that the two-part doctrine of transcendental idealism is more likely to be false and finds it justified that contemporary analytic metaphysicians hold it in low regard.
 - The author believes that transcendental idealism is not as bad a philosophy as idealism but unfortunately transcendental idealism is considered worse than idealism by contemporary analytic metaphysicians.
 - The author opines most of the rationalist contemporary analytic metaphysicians hold the same assumptions as those in transcendental idealism.
 - According to the author, transcendental idealism is unfairly regarded as bad philosophy by contemporary analytic metaphysicians.

DIRECTIONS for questions 13 to 15: The passage given below is followed by a set of three questions. Choose the best answer to each question.

One terrible truth has emerged from the last fortnight of jingoistic breast-beating in Athens, one that strikes fear and loathing in newspapers like the Times, whose Olympic team of journalists toiled so hard to predict disaster: the games in Athens have gone quite well.

The transport system did not screech to a grinding halt. The roof was up and gleaming and almost everything else got built. Athletes and spectators were whisked around Athens in air-conditioned buses and trams, more efficiently than they would currently be in London or Paris. Athenians were polite and helpful. Their infamous taxi drivers did not rip off passengers and the security was not too intrusive. All of the dramas generated – doping scandals, the appeals, and the antics of an Irish ex-priest – were Olympic ones. If this Olympics set the record for the number of athletes kicked out or stripped of their titles for drugs offences, this had little to do with the host nation.

But another nation emerges with some honour from the games – Britain. It was not simply the fact that Team Great Britain had exceeded expectations by getting more medals than at any games since Paris in 1924, leaving aside the boycotted games in 1984. It was also the enthusiasm and number of British fans who turned up in Athens who became unofficial cheerleaders at every venue. If the International Olympic Committee likes to give the games to countries who are enthused by the Olympics, then British fans have made a large inroad into Paris's bid to stage the 2012 games. There were plenty of other nationalities – Russians, Chinese, Koreans, Ukrainians, Americans – but hardly any French fans to be seen.

London still lurks 100 metres behind Paris in the marathon run. Its head is bobbing up and down and it may still crash out in spite of the promised £600m from the government and £3bn from the lottery. Britain was one of seven countries advising the Greeks on security. Now surely it is time for Britain to eat humble pie and invite the Greeks to advise us on how to make a successful bid for the games. Because, the fact is, they now know more about it than we do.

13. What is the "terrible truth" that the first paragraph in the passage talks about?
- Even though there were low expectations from Britain in the Athens Olympics, their team had performed quite well.
 - The Athens Olympics was rife with doping scandals as predicted by the Olympic team of journalists at the Times newspaper.
 - The Olympics at Athens went quite well, even though some of the journalists at the Times newspaper predicted disaster at the Olympics.
 - The Olympics at Athens had various administrative issues because of which it was declared a disaster.
14. Which of the following can be inferred about the race for hosting the Olympics in 2012?
- Paris has been overtaken by London in the bid for Olympics because of the enthusiasm of British fans.
 - Paris leads the race for hosting the Olympics with London in the second place.
 - The chances of London hosting the Olympics have increased because of the enthusiasm of the British fans at the Athens Olympics.
 - Britain has to humbly learn from the Greeks on how to successfully bid for hosting the Olympics.

15. Which of the following is not true regarding Athens during the Olympics?
- (A) The taxi drivers in Athens, who are known for ripping off their passengers, did not do so during the Olympics.
 - (B) The transport service provided for the people who came for the Olympics was more efficient than that in London or Paris.
 - (C) The infrastructure provided for hosting the Olympics was not lacking.
 - (D) The doping scandals in the Olympics can be attributed to the free availability of drugs in Athens.

DIRECTIONS for questions 16 to 18: The passage given below is followed by a set of three questions. Choose the best answer to each question.

Autism and Asperger syndrome are part of a range of conditions known as autistic spectrum disorders. They affect the way the brain processes information.

Autism is a developmental disorder that can cause problems with social interaction, language skills and physical behaviour. People with autism tend to have far more activity in the amygdala when looking at other people's faces and have difficulty maintaining eye-contact. Specific nerve cells in the brain called neurones, and mirror neurones – which help us mimic useful behaviour so we can learn from others – respond differently in people with autism.

Asperger syndrome is a developmental disorder characterized by significant difficulties in social interaction and nonverbal communication, along with restricted and repetitive patterns of behaviour and interests. As a milder autism spectrum disorder, it differs from other ASDs by relatively normal language and intelligence though physical clumsiness, unusual use of language and difficulties with fine movement control are common.

To people with autism and Asperger syndrome the world can appear chaotic with no clear boundaries, order or meaning. These disorders can vary from very mild, where the person can function as well as anyone else around them, to so severe that they are completely unable to communicate and take part in normal society. Because of the range of severity and symptoms, the conditions are collectively known as autistic spectrum disorders. Children display repetitive behaviour and resistance to changes in routine, lack of imaginative play and have a tendency to spend time alone. They have problems of verbal and non-verbal communication.

People with Asperger syndrome are usually more mildly affected than those with autism. Many people with milder symptoms are never diagnosed at all, and some argue that Asperger syndrome is simply a variation of normal rather than a medical condition or disorder. Many do encounter particular problems getting on in the world and they become aware they are different from others. This can result in isolation, confusion, depression, all of which could be defined as 'disease'.

Some children with Asperger syndrome manage very well in mainstream schools especially if extra support is available. However, even when children cope well academically, they may have problems socialising and are likely to suffer teasing or bullying. More severely affected children need the specialist help provided by schools for children with learning disabilities.

With the right sort of support and encouragement, many with Asperger syndrome can lead a relatively normal life. Helping them develop some insight into the condition is an important step towards adjusting to, or at least coping with, the way the rest of the world works. Some do very well, especially in an environment or job where they can use their particular talents.

Autism tends to produce more severe symptoms. For example, a child with autism may fail to develop normal speech (the development of spoken language is usually normal in Asperger's syndrome) and as many as 75 per cent of people with autism have accompanying learning disabilities.

Seizures are also a common problem, affecting between 15 and 30 per cent of those with autism. Conversely, autistic children are sometimes found to have an exceptional skill, such as an aptitude for drawing, mathematics, or playing a musical instrument.

16. Which of the following questions could serve to reflect the primary purpose of the passage?
- (A) What are the causes, risk factors and recovery mechanisms for Autism and Asperger syndromes?
 - (B) What are the symptoms of Autism and Asperger syndromes?
 - (C) Why is Autism more severe than Asperger syndrome?
 - (D) What are Autism and Asperger syndromes?
17. It can be inferred from the passage that
- (A) physical clumsiness, unusual use of language and difficulties with fine movement control are more common in other ASDs than Asperger syndrome.
 - (B) specialist help and support can only marginally relieve a person suffering from the debilitating Asperger's syndrome.
 - (C) people suffering from autistic spectrum disorders may have difficulties understanding gestures, body language, facial expression and tone of voice.
 - (D) Autism and Asperger syndromes are two mutually exclusive disorders without symptoms of isolation, confusion and depression.

18. Which of the following can be a reason that some believe that Asperger syndrome is not a clinical condition?
- (A) The symptoms are so mild that they cannot be diagnosed by available technologies.
 - (B) The symptoms can be similar to individual peculiarities or mannerisms.
 - (C) The symptoms are so mild that they lie in the borderline spectrum between 'normalcy' and 'abnormality'.
 - (D) The symptoms are much milder than autism and many people with milder symptoms are never diagnosed at all.

DIRECTIONS for questions 19 to 24: The passage given below is followed by a set of six questions. Choose the best answer to each question.

The first power station to produce electricity by using heat from the splitting of uranium atoms began operating in the 1950s. Some isotopes of atoms are 'unstable' since their nucleus changes over time – from milliseconds to millennia – as they emit charged particles or waves, making them 'radioactive'. It is the radioactive nature of these unstable atoms (radioisotopes), which gives them so many applications in nuclear energy, agriculture, medicine and industry.

In 1911 George de Hevesy was a young Hungarian student working in Manchester with naturally radioactive materials. Not having much money he took his meals with his landlady. He suspected that some of the meals might be made from leftovers from the preceding days. To confirm his suspicions de Hevesy put a small amount of radioactive material into the remains of a meal. Few days later when the same dish was served again he used a gold leaf electroscope and observed that the food was radioactive. History has forgotten the landlady, but George de Hevesy won the Nobel prize in 1943. His was the first use of radioactive tracers.

Radioisotopes play an important part in technologies that provide us with basic needs like food, water and good health. Radioisotopes and radiation used in agriculture are helping to reduce the number of people worldwide who die of malnutrition and hunger. Fertilisers are expensive and if not properly used can damage the environment. It is important that as much of the fertiliser as possible finds its way into plants and that a minimum is lost to the environment. Fertilisers 'labelled' with a particular isotope, such as nitrogen-15 and phosphorus-32 provide a means of finding out how much is taken up by the plant and how much is lost.

Crop losses caused by insects may amount to more than 10% of the total harvest worldwide. Stock losses due to tsetse in Africa and screwworm in Mexico have also been sizeable. Chemical insecticides have not always been effective in reducing the losses. Some insects have become resistant to the chemicals used, and some insecticides leave poisonous residues on the crops. Insecticides can contaminate soil, water, turf, and other vegetation and can also pose risks to non-target organisms. One solution has been the use of sterile insects.

The Sterile Insect Technique (SIT) involves rearing large numbers of insects and then irradiating their eggs with gamma radiation before hatching, to sterilise them. Sterile males are released in large numbers in infested areas. When they mate with females, no offspring are produced. With repeated releases of sterilised males, insect pest population in the project area is drastically reduced.

Ionising radiation to induce mutations in plant breeding has been used for several decades to produce new genetic lines of sorghum, garlic, wheat, bananas, beans and peppers, cereals and oil seed crops which are more resistant to pests and more adaptable to harsh climatic conditions. Some 25-30% of the food harvested in many countries is lost as a result of spoilage by microbes and pests. Today, in over 40 countries health and safety authorities have approved irradiation of more than 60 kinds of food, ranging from spices, grains and grain products to fruit, vegetables and meat. On their trips into space, astronauts eat foods preserved by irradiation.

Adequate potable water is essential for life but fresh water is becoming scarce. Isotope hydrology techniques enable accurate tracing and measurement of the extent of underground water resources. Such techniques provide important analytical tools in the management and conservation of existing supplies of water and in the identification of new, renewable sources of water. They provide answers to questions about origin, age and distribution of groundwater, as well as the interconnections between ground and surface water and aquifer recharge systems. The results permit planning and sustainable management of these water resources. For surface waters they can give information about leakages through dams and irrigation channels, the dynamics of lakes and reservoirs, flow rates, river discharges and sedimentation rates.

19. The passage cites the episode of George de Hevesy and the landlady to
- (A) explore the usefulness of radioactive isotopes in the area of food irradiation.
 - (B) humorously introduce the subject of peaceful applications of isotopes.
 - (C) point out the beginnings of the practical application of isotopes.
 - (D) show that isotopes can be used for unimaginative or silly experiments too.
20. Which of the following has been suggested in the passage as a bane of chemical insecticides?
- (A) They can indirectly produce new mutations in the genetic lines of root and tuber crops, cereals and oil seed crops.
 - (B) Chemical insecticides can be toxic to a host of other organisms including birds, fish, beneficial insects, and non-target plants.
 - (C) They catalyze the crop losses caused by insects.
 - (D) They can act only on a localized area and cannot affect different types of insects with the same efficiency.

21. Which of the following statements can be understood from the passage?
- Fertilizers "labelled" with radioactive isotopes use isotopes as an ingredient to aid fertilization.
 - Adapting plants to harsh environments is made possible through acclimatization to irradiation.
 - Isotopic techniques have been used in water management to gauge the origin of the water, make seasonal adjustments in dams and find an interconnection between ground and surface water.
 - The passage highlights the use of radioactive isotopes in improving the quality of life.
22. Which of the following factors plays a pertinent role in determining the success rate of the Sterile Insect Technique (SIT) program as discussed in the passage?
- The number of laboratory-bred male insects in comparison to normal male insects in infested areas
 - The number of laboratory-bred male insects in infested areas which do not become resistant to the chemical pesticides used
 - A higher ratio of laboratory-bred female insects to wild type male insects in infested areas
 - Homogeneous cohorts of laboratory-bred insects which are similar to wild type male insects and can replace the latter when the latter are not available
23. What will the author possibly discuss in a paragraph which follows the last paragraph of the given passage?
- The specific uses of radioisotopes in crop management.
 - The various options available for managing water resources by using isotopes.
 - The use of isotopes in electricity research and space research.
 - The use of isotopes in the field of health.
24. The attitude or response of the author of the passage towards the idea of radioisotope technology can be best described as one of
- guarded appreciation
 - implied skepticism
 - positive enthusiasm
 - pointed criticism
- DIRECTIONS for questions 25 to 29:** Five sentences (labelled 1, 2, 3, 4 and 5) are given in the following question. Four of them can be put together to form a meaningful and coherent short paragraph and **one sentence is the odd one out**. Decide on the proper logical order for the sentences and key in the sequence of **four numbers** as your answer, even as you **omit the contextually unrelated sentence**.
25. (1) Any licensed architect can also make a personal application for the prize before 1st November every year.
 (2) Today, winners get US\$100,000, a citation certificate and a bronze medallion.
 (3) The Pritzker Architecture Prize is the top prize in architecture, and it is often called the Nobel Prize of architecture.
- (4) Jay A. Pritzker and his wife Cindy began the award in 1979 and the Pritzker family pays for the prize.
 (5) This recognition is for the talented architect who has created great projects throughout his life.
26. (1) The seed of a simple, yet profound idea was planted: song style reflects and reinforces cultural style.
 (2) The significance of Cantometrics to ethnomusicology is manifold.
 (3) Lomax's nurturance of this seminal concept grew into Cantometrics, a system of measuring world song styles and correlating them with cultural data.
 (4) He was struck by the differences between the singing styles and culture of northern and southern Spain.
 (5) In 1953, Alan Lomax made a field recording trip to Spain.
27. (1) Boiling water to make coffee helped decrease the incidence of disease among workers and the caffeine kept them from falling asleep.
 (2) It's hardly a coincidence that coffee caught on in Europe just as the first factories were ushering in the industrial revolution.
 (3) In a sense, caffeine is the psychoactive drug that made the modern world and its 24-hour society possible.
 (4) The widespread use of coffee, a caffeinated drink, facilitated the great transformation of human economic endeavor from the farm to the factory.
 (5) When the nature of work changed from a schedule built around the sun to an indoor job timed by a clock, humans had to adapt.
28. (1) However, at around the same time, William Fitz Stephen praised it as a place of thrilling spectacles and exciting pastimes.
 (2) But on the other, they saw their many dangerous temptations: their dirty taverns and gambling dens.
 (3) Medieval writers were unsure about towns: on one hand, they saw them as vital hubs of economic and cultural activity.
 (4) Normally enclosed by protective walls, access to medieval towns was regulated through gates.
 (5) In the 1190s, Richard Devizes wrote of London: "whatever evil thing that can be found in any part of the world, you will find it in that one town".
29. (1) Diacritic symbols are used to change or mute the inherent vowel, and separate vowel letters may be used when vowels occur at the beginning of a syllable or on their own.
 (2) Syllables are built up of consonants, each of which has an inherent vowel, e.g. ka, kha, ga, gha.

- (3) The contemporary Japanese language uses two syllabaries together called kana, namely hiragana and katakana.
- (4) Syllabic alphabets, alphasyllabaries or abugidas are writing systems in which the main element is the syllable.
- (5) When two or more consonants occur together, special conjunct symbols are often used which add the essential parts of first letter or letters in the sequence to the final letter.

DIRECTIONS for questions 30 to 32: In the following question, there are sentences or fragments of sentences that form a paragraph. Identify the sentence(s) or fragments of sentence(s) that is/ are **correct** in terms of grammar and usage, including spelling, punctuation and logical consistency. Enter the letters corresponding to the sentence(s) or fragments of sentence(s) in the input box provided below the question. (Note: Enter your answer in increasing order only. For example, if you think that the fragments (3) and (5) are **correct**, then enter 35 (but not 53) in the input box.)

30. (1) With the massive success of both *The Avengers* franchise as well as *Guardians of the Galaxy*,
- (2) Marvel has now produced some of the high grossing movies of all times.
- (3) Of course, the Disney owned company is eager to repeat again that achievement.
- (4) More superhero films have now been mapped out up until 2019.
- (5) The company is no stranger to converting 2D superheroes into 3D.

31. (1) Two NASA radios aboard European Space Agency's Mars mission that launched today are engineered to
- (2) providing communication relay service for rovers and landers on Mars. ESA's ExoMars 2016 mission, combining the Trace Gas Orbiter (TGO)
- (3) with the Schiaparelli landing demonstrator, began a seven-months journey to Mars with today's launch from Kazakhstan.
- (4) The twin Electra UHF (ultra-high frequency) radios from NASA are slated on a first in-flight test in about six weeks.
- (5) NASA is on an ambitious journey to Mars that will include sending humans to the Red Planet.

32. (1) Gone are the days when house sparrows were the most common amongst bird species in India.
- (2) The chirpy sounds made by these small birds are rarely heard today and their absence even though tiny is
- (3) becoming increasing noticeable. Due to decrease in numbers, a bird as common as the sparrow was included by
- (4) the IUCN in its Red Data List's of threatened species in 2002 alongside the glamorous snow leopard, tiger and red panda.

- (5) How and why did these common birds that were regarded once as dominant bird species, suddenly disappear?

DIRECTIONS for questions 33 and 34: Four alternative summaries are given below the text. Choose the option that best captures the essence of the text.

33. A young man from a small provincial town -- a man without independent wealth, without powerful family connections and without a university education -- moved to London in the late 1580's and, in a remarkably short time, became the greatest playwright not of his age alone but of all time. Shakespeare's works appeal to the learned and the unlettered, to urban sophisticates and provincial first-time theatregoers. He makes his audiences laugh and cry; he turns politics into poetry; he recklessly mingles vulgar clowning and philosophical subtlety. He grasps with equal penetration the intimate lives of kings and of beggars; he seems at one moment to have studied law, at another theology, at another ancient history, while at the same time he effortlessly mimics the accents of country bumpkins and takes delight in old wives' tales. Virtually all his rivals in the highly competitive theater business found themselves on the straight road to starvation; this one playwright by contrast made enough money to buy one of the best houses in the hometown to which he retired when he was around 50, the self-made protagonist of an amazing success story that has resisted explanation for 400 years.

(A) Shakespeare is for everyone. His works evoke a rich tapestry of emotions. One of the prime characteristics of Shakespeare's art is the touch of the real. People rarely feel closer to understanding how the playwright's achievements came about.

(B) Shakespeare's multifaceted works appeal to a variety of people and elicit a range of emotions. He was a person without much affiliations or wealth or education, yet he became wealthy unlike his rivals. He is considered the greatest playwright of all times. His success story is a mystery.

(C) Shakespeare's works are characterized by extreme and apparent polarities: simple and elaborate, organic and synthetic, whimsical and profound. How Shakespeare became Shakespeare is a mystery.

(D) Shakespeare is surprisingly accomplished. Very little is understood about the experiences, either then or now, that make such creative leaps possible.

34. It seems incredible, but in a country that keeps around 30% of the fresh water, and shelters the largest rain forest, in the world, we can find a "desert". Located in the State of Maranhão, on the north shore of Brazil, the Lençóis Maranhenses National Park is an area of about 300 square kilometers of blinding white dunes and deep blue lagoons, forming one of the most beautiful and unique places in the world. The dunes invade the continent over 50 km from the coast, creating a

landscape that reminds a white bed sheet, when seen from above. What distinguishes this region from a desert is the amount of rain that drops over the dunes, creating ponds of crystal clear water on the depressions between dunes. It records an annual rainfall of 1,600 mm, 300 times more than in the Sahara. During drought, the lagoons evaporate and become completely dried. After the rainy season, the lagoons are home to many species of fish, turtles and clams. The mystery lies in the fact that when the lagoons fill up, life comes back, as if they had never left the place. The eggs of the fish and crabs are probably maintained alive in the sand, exploding when rain comes back.

- (A) The Lençóis Maranhenses is certainly a unique place you will never forget. It has 30% of the fresh water of Brazil and shelters the largest rain forest in the world. The most famous lagoon in the park, due to its beauty, is the Blue Lagoon. The lagoons are dry during drought but after the rains, they support a lot of marine life.
- (B) Spread over 300 sq km in Maranhão, to the north of Brazil, the Lençóis Maranhenses

National Park has deep blue lagoons and blinding white dunes resembling a white bed sheet for over 50 km from the coast. Though it is a desert and the lagoons become totally dried during drought, the park records 1600 mm of annual rainfall. After the rains; fish, turtle and clams reappear in the lagoons because the eggs of fish and crabs are preserved alive.

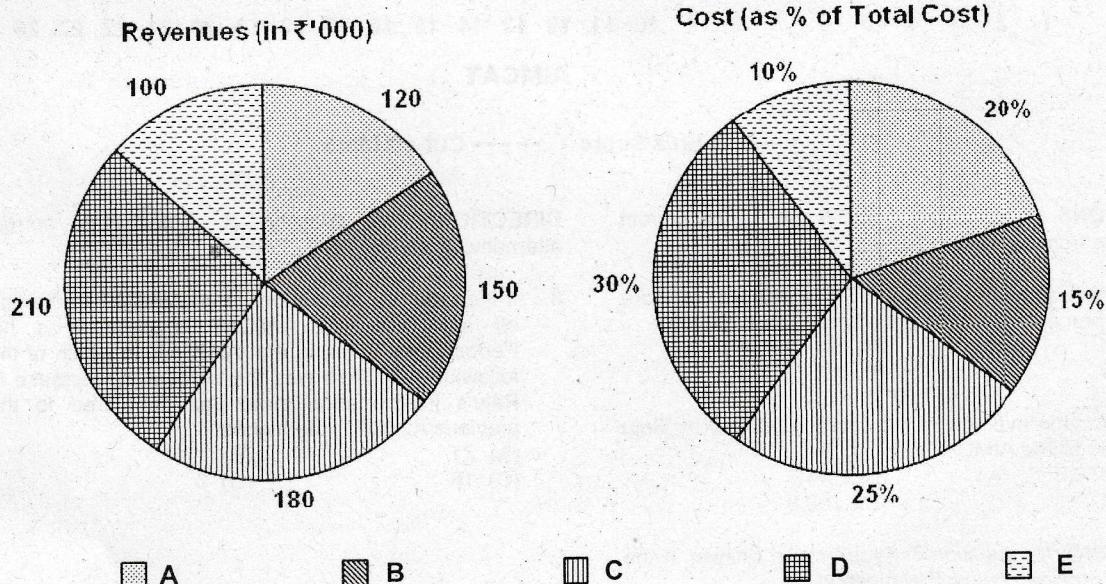
- (C) The Lençóis Maranhenses National Park is one of the most beautiful and unique places in the world. It functions both as a desert and a lagoon and supports life. It gets 1600 mm of rainfall every year and covers an area of 300 square kms. The park is housed in Maranhão in Brazil.
- (D) Despite its desert like appearance, the Lençóis Maranhenses National Park, located in Maranhão, on the north shore of Brazil, records an annual rainfall of 1,600 mm. The lagoons of the park evaporate when there is drought but during the rains; species like fish, turtles and clams thrive. This is because the eggs of fish and crabs are, perhaps, buried alive in the sand even during the drought.

SECTION – II

Number of Questions = 32

DIRECTIONS for questions 1 to 4: Answer these questions on the basis of the information given below.

The revenues and costs of five companies – A through E –are presented in the pie charts below. The first pie chart presents the revenues (in ₹'000) of each company and the second pie chart gives the costs incurred by each company as a percentage of the total costs of the five companies combined.



DIRECTIONS for questions 1 and 2: Type in your answer in the input box provided below the question.

1. If the total costs incurred by all the five companies combined were ₹710,000, how many of the five companies would have incurred a loss?

2. If company C neither made a profit nor incurred a loss, what was the profit (in ₹) of company B?

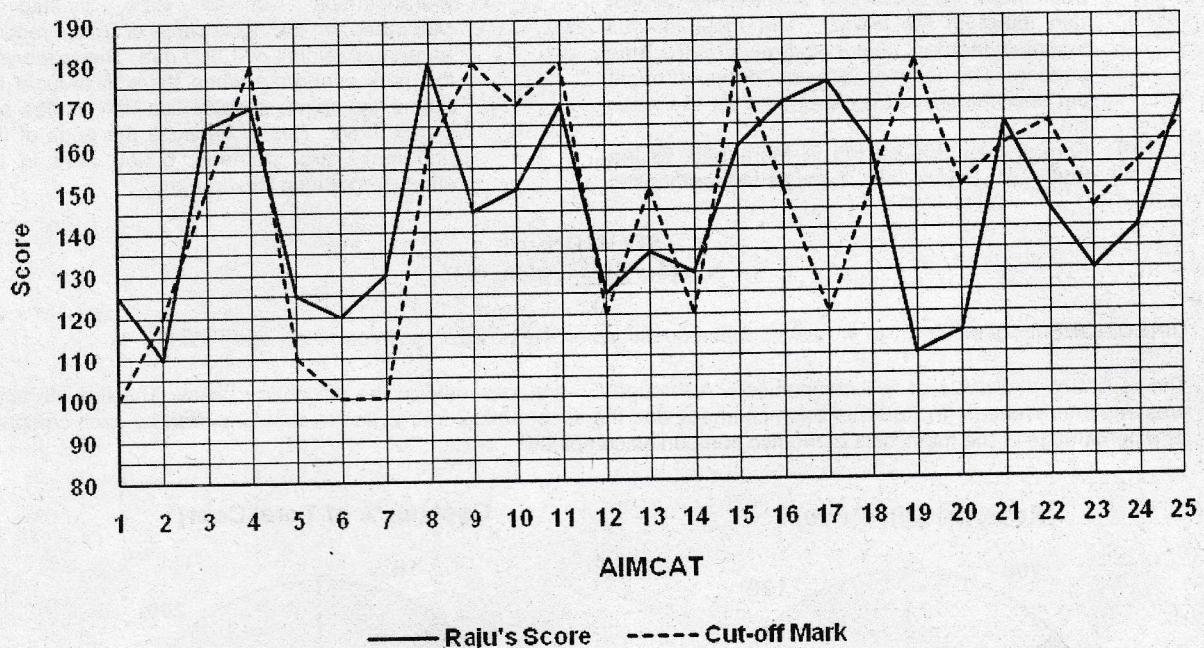
DIRECTIONS for questions 3 and 4: Select the correct alternative from the given choices.

3. Among the five companies, if exactly two companies made a profit, while all the other companies incurred a loss, which of the following could have been the costs incurred by company C?
 (A) ₹170,000 (B) ₹260,000
 (C) ₹290,000 (D) ₹200,000

4. If each of company C and company D made a profit, such that the profit made by company C is greater than the profit made by company D, which of the following could have been the total costs incurred by all the five companies combined?
 (A) ₹550,000 (B) ₹610,000
 (C) ₹705,000 (D) ₹750,000

DIRECTIONS for questions 5 to 8: Answer these questions on the basis of the information given below.

Raju, an MBA aspirant, attempted 25 All India Mock CATs (AIMCATs) during a year. The AIMCATs are numbered from 1 to 25 and for each AIMCAT, the mark corresponding to the 85th percentile is called the cut-off mark for that AIMCAT. The following line graph presents Raju's score and the cut-off mark for each AIMCAT:



DIRECTIONS for questions 5 and 6: Select the correct alternative from the given choices.

5. In which of the following AIMCATs was Raju's score as a percentage of the cut-off mark the highest?
 (A) 1 (B) 6
 (C) 7 (D) 17
6. What is the average of the scores obtained by Raju across all the AIMCATs?
 (A) 156.8 (B) 144.8
 (C) 132.8 (D) 162.8

DIRECTIONS for question 8: Select the correct alternative from the given choices.

8. If the ratio of Raju's score in an AIMCAT to the cut-off mark for that AIMCAT is defined as his Performance Index in that AIMCAT, in which of the following AIMCATs was the percentage increase in Raju's Performance Index (as compared to the previous AIMCAT) the highest?
 (A) 21 (B) 17
 (C) 16 (D) 3

DIRECTIONS for question 7: Type in your answer in the input box provided below the question.

7. What is the highest difference between Raju's score and the cut-off mark in any AIMCAT?

DIRECTIONS for questions 9 to 12: Answer these questions on the basis of the information given below.

In a bank, if a customer approaches the teller to withdraw money from the bank, the teller immediately services the customer, if and only if sufficient cash is available in the bank. If sufficient cash is not available in the bank, the cash in the bank is replenished in one of the two ways:

- Procure additional cash from their currency chest
- Service any customer who wants to deposit money in the bank

Meanwhile, the customer who wants to withdraw money (but could not be serviced due to insufficient cash) has to wait until sufficient cash is available in the bank, after which he is serviced immediately by the teller. However, a customer who approaches the teller to deposit money is always serviced immediately.

On a particular day, fifteen customers visited the bank at different times for depositing or withdrawing money from the bank. At the beginning of that day, the cash available in the bank was ₹2,50,000.

The first table given below presents the time at which each customer approached the teller and the amount that he wanted to deposit/withdraw. The second table provides the times at which the cash in the bank was replenished from the currency chest on that day and the amount of cash replenished each time.

Note: Assume that the time taken to service a withdrawal or a deposit or to procure cash is negligible.

Customer	Time	Deposit/Withdrawal	Amount (in ₹)
1	10:05 am	Withdrawal	1,00,000
2	10:15 am	Withdrawal	3,25,000
3	10:18 am	Deposit	15,000
4	10:21 am	Deposit	10,000
5	10:35 am	Withdrawal	1,25,000
6	11:45 am	Deposit	75,000
7	11:50 am	Withdrawal	85,000
8	12:25 pm	Deposit	25,000
9	12:50 pm	Withdrawal	1,25,500
10	02:30 pm	Deposit	1,35,500
11	02:50 pm	Withdrawal	45,000
12	03:20 pm	Withdrawal	1,25,000
13	03:35 pm	Withdrawal	1,40,000
14	03:40 pm	Withdrawal	54,000
15	03:55 pm	Deposit	39,000

Time	Amount procured from Currency Chest (in ₹)
10:30 am	2,25,000
12:05 pm	1,00,000
03:30 pm	2,50,000

DIRECTIONS for questions 9 to 12: Select the correct alternative from the given choices.

9. At which of the following times was the cash available in the bank the maximum?

(A) 3:00 pm	(B) 10:20 am
(C) 11:00 am	(D) 3:56 pm
10. What is the average time for which a customer waited after approaching the teller to withdraw or deposit money?

(A) 8 minutes 56 seconds
(B) 12 minutes 20 seconds
(C) 13 minutes 40 seconds
(D) 15 minutes
11. For how many minutes between 10:00 am and 4:00 pm was the cash available in the bank not sufficient to service the customers who approached the teller?

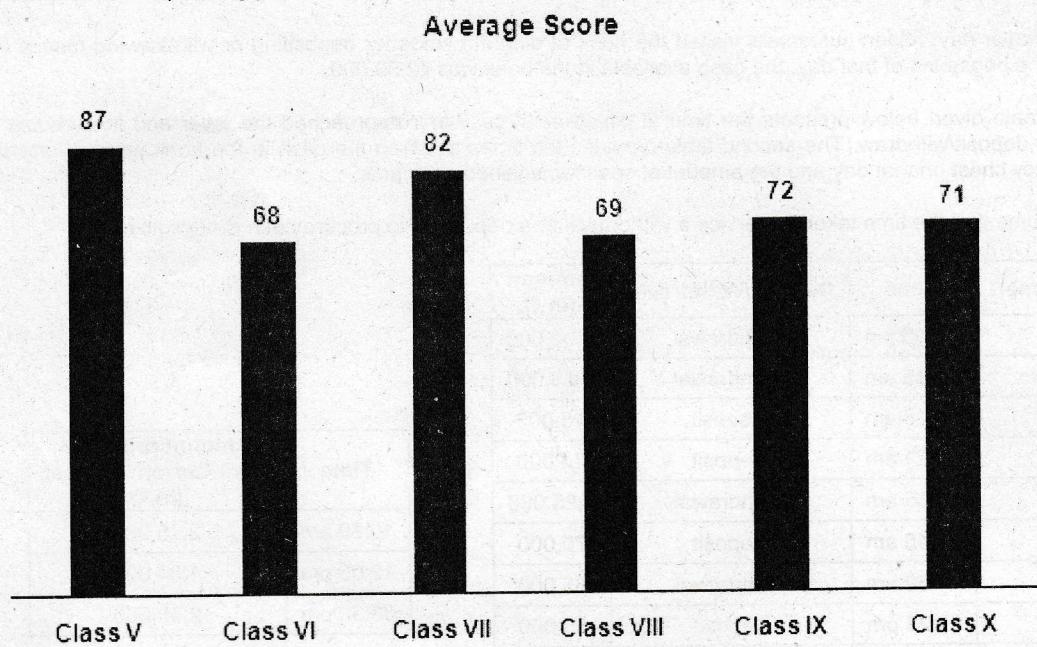
(A) 230 minutes	(B) 225 minutes
(C) 235 minutes	(D) 240 minutes
12. Which of the following customers waited the longest for withdrawing cash?

(A) Customer 2	(B) Customer 7
(C) Customer 5	(D) Customer 14

DIRECTIONS for questions 13 to 16: Answer these questions on the basis of the information given below.

A school allows students to enrol only in the fifth class. After the end of every academic year, all the students write a final exam for 100 marks. Any student who scores less than 40% in the final exam of any class will be expelled from the school and will not be allowed to continue to study there. All the other students clear that class and will be promoted to the next class.

At the beginning of a particular year, exactly 50 students joined the school in the fifth class. Each of these fifty students studied in the same school until they finished tenth class, unless they were expelled. The following bar graph provides the average of the marks scored by these students in the final exam at the end of each academic year, through the five years for which they studied in the school. The table below the graph provides the total marks scored by all the students combined in each corresponding year:



DIRECTIONS for questions 13 to 16: Select the correct alternative from the given choices.

13. What is the total number of students expelled from the school from Class V to Class IX?
 - (A) 20
 - (B) 25
 - (C) 35
 - (D) 30

14. How many students scored less than 40% in the final exam of Class VIII?
 - (A) 6
 - (B) 5
 - (C) 4
 - (D) 8

15. In the final exam of which class did the maximum number of students score less than 40%?
 - (A) Class V
 - (B) Class VII
 - (C) Class X
 - (D) Cannot be determined

16. The highest possible average marks scored by the students who cleared Class VI in the final exam can be (approximately)
 - (A) 65.4.
 - (B) 75.5.
 - (C) 68.
 - (D) 84.5.

DIRECTIONS for questions 17 to 20: Answer these questions on the basis of the information given below.

Five persons – Gaurav, Pavan, Ramesh, Suresh and Tarun – participated in three events, running, cycling and hurdles. In each event, the five persons finished in different positions from first to fifth. The following information is known about their final positions in the three events:

- (i) None of the five persons finished in the same position in any two events.
- (ii) In each of the three events, there were at least two persons who finished in a better position than Pavan.
- (iii) Tarun finished in the fifth position in cycling and in the third position in another event.
- (iv) Only for Suresh was the difference between his best position and the worst position more than three.
- (v) Ramesh was the first in the event in which Gaurav was the second.
- (vi) Gaurav finished in the fourth position in cycling and Tarun finished in the fourth position in hurdles.

DIRECTIONS for questions 17 to 20: Select the correct alternative from the given choices.

17. What is the position of Ramesh in running?
(A) First (B) Second
(C) Third (D) Fourth
18. What is the position of Suresh in the event that Gaurav came first?
(A) Fifth (B) Fourth
(C) Third (D) Second
19. Who among the following did not come last in any of the three events?
(A) Pavan (B) Gaurav
(C) Tarun (D) Suresh
20. The sum of the positions of which of the following persons across the three events is the lowest?
(A) Pavan (B) Suresh
(C) Ramesh (D) Gaurav

DIRECTIONS for questions 21 to 24: Answer these questions on the basis of the information given below.

Six managers – Amar, Bobby, Kalyan, Praveen, Raja, and Tarun – attended a meeting, with each of them arriving for the meeting at a different time. During the meeting, they sat around a circular table with six equally spaced chairs, such that every person sat adjacent to the person who arrived immediately before him. Each of them was wearing a shirt of a different colour among Red, Blue, Green, Yellow, Orange and Maroon. The following information is known about their seating order and the colours of their shirts:

- (i) The person wearing a blue shirt was sitting to the right of Tarun and neither of them arrived last.
(ii) Bobby, who was wearing a yellow shirt, was not the last to arrive and he was sitting opposite the person who wore a green shirt.
(iii) Amar was sitting opposite the person wearing a blue shirt and Praveen, who was wearing a maroon shirt, arrived immediately before Tarun.

DIRECTIONS for questions 21 to 23: Select the correct alternative from the given choices.

21. What was the colour of the shirt that Tarun was wearing?
(A) Orange (B) Green
(C) Red (D) Maroon
22. Who among the following could have been the first to arrive?
(A) Praveen (B) Kalyan
(C) Raja (D) Amar
23. If Kalyan was wearing an orange shirt, who was sitting opposite Amar?
(A) Bobby (B) Raja
(C) Praveen (D) Tarun

DIRECTIONS for question 24: Type in your answer in the input box provided below the question.

24. In how many different ways could they have arrived at the meeting, if Amar was wearing an orange shirt?

DIRECTIONS for questions 25 to 28: Answer these questions on the basis of the information given below.

On a particular day, each of five persons – Dev, Harvey, Jatin, Kiran and Lateef – purchased one unit of a stock and sold the stock later on the same day. No two persons made the same amount of profit (or loss) in their transactions during the day and the price of the stock is always positive. Further, the price (in ₹) at which each person purchased or sold the stock was a multiple of 10 and no person sold the stock at the same price as that at which he purchased it. The following information is known about the price movement of the stock and the profits made by the five people:

- (i) Dev made a profit of ₹40, and the price at which he purchased the stock was the same as that at which Kiran sold the stock.
(ii) The maximum profit made by any of the five persons was ₹50 and the maximum loss was ₹30.
(iii) Jatin purchased the stock at ₹60.
(iv) The highest price at which any person sold the stock was ₹60 and the highest loss was not incurred by Lateef.
(v) Both Dev and Jatin sold the stock at the same price, while the price at which Lateef purchased the stock was the same as that at which Harvey sold the stock.
(vi) The price at which Lateef sold the stock was the same as that at which Kiran purchased the stock.

DIRECTIONS for question 25: Type in your answer in the input box provided below the question.

25. What is the price (in ₹) at which Lateef purchased the stock?

DIRECTIONS for questions 26 and 27: Select the correct alternative from the given choices.

26. Who among the following sold the stock for ₹40?
(A) Kiran (B) Jatin
(C) Lateef (D) Harvey
27. Who among the following incurred the highest loss?
(A) Jatin
(B) Kiran
(C) Harvey
(D) Cannot be determined

DIRECTIONS for question 28: Type in your answer in the input box provided below the question.

28. How many persons among the five incurred a loss?

DIRECTIONS for questions 29 to 32: Answer these questions on the basis of the information given below.

One day, six flatmates – Akbar, Aurangazeel, Babur, Humayun, Jahangir and Shahjahan – went out to buy six different items among a broom, a deodorant, a water bottle, a pen, a pack of batteries and a scented candle. Each person went to a different store among BigBazaar, Walmart, Hypercity, Spar, More and Spencers. The

following information is known about the stores that they visited and the items that they purchased:

- Akbar did not go to Walmart but he bought a deodorant.
- Hypercity does not sell water bottles and the person who visited Spar purchased a pen.
- Aurangazeb visited Spencers and Jahangir bought a water bottle.
- Humayun did not buy a pen and the person who visited More bought a pack of batteries.
- Babur visited BigBazaar and bought a broom.

DIRECTIONS for questions 29 to 32: Select the correct alternative from the given choices.

29. Who visited Spar?

- (A) Shahjahan (B) Jahangir
(C) Akbar (D) Humayun

SECTION – III

Number of Questions = 34

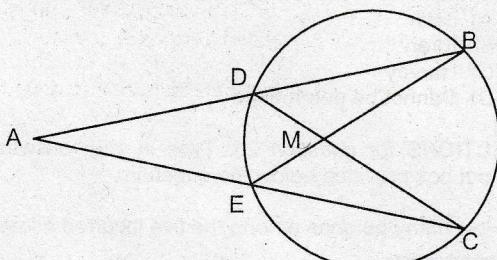
DIRECTIONS for questions 1 and 2: Type in your answer in the input box provided below the question.

1. If $y = \sqrt{13}\sqrt{13}\sqrt{13}\dots\infty$, then find the value of $y - 8$.

2. Ajay had N coins with him and he gave one more than half the number of coins with him to Bulu and then gave two more than one-third of the remaining number of coins to Chintu. If N is a two-digit number, how many distinct values can N assume?

DIRECTIONS for questions 3 and 4: Select the correct alternative from the given choices.

3. In the figure below, if $DM = 4$ cm, $MC = 18$ cm and $\frac{AE}{AD} = \frac{9}{11}$, then find the measure (in cm) of MB.



- (A) 6 (B) 8
(C) 10 (D) 12

4. Maalda Reddy bequeathed his property comprising 'A' acres of land to his three sons, such that the areas of the shares of land given to the sons were in geometric progression. If the maximum difference between the shares of any two sons is 385 acres

30. Who bought the pack of batteries?

- (A) Aurangazeb
(B) Humayun
(C) Jahangir
(D) Cannot be determined

31. The water bottle was bought at which store?

- (A) BigBazaar (B) Walmart
(C) Spencers (D) Hypercity

32. Which item did Aurangazeb buy?

- (A) Pen (B) Pack of Batteries
(C) Scented Candle (D) Broom

and the least possible sum of the shares of any two sons is 770 acres, then find the value of A.

- (A) 650 (B) 975
(C) 1463 (D) 1580

DIRECTIONS for question 5: Type in your answer in the input box provided below the question.

5. A number has six factors, of which three are even. If the sum of all the odd factors of the number is 57 less than the sum of all its even factors, then what is the sum of all its factors?

DIRECTIONS for questions 6 to 8: Select the correct alternative from the given choices.

6. Every morning, on his way to office, Kapil crosses a bus, coming from the opposite direction, at a certain point on the highway, at a fixed time. If one day, he left for his office ten minutes before his usual time and met the bus two minutes before the usual time, find the ratio of the speed of the bus to the speed at which Kapil travels to office.

- (A) 4 : 1 (B) 3 : 1
(C) 2 : 1 (D) 5 : 1

7. Two painters, Arjo and Bulu, together got a contract to paint a house for ₹6000. On the day of the work, Arjo started the work as scheduled but Bulu turned up one hour late and as a result they took 45 minutes more to complete the job. What would be Bulu's share in the total amount had they both worked for an equal amount of time?

- (A) ₹2400 (B) ₹3600
(C) ₹4000 (D) ₹4500

8. Find the value of k for which the following pair of equations have an infinite number of solutions for (x, y) :

$$3x + 5y = 24$$

$$ky + 4x = 32$$

- (A) 4 (B) $2\frac{2}{5}$
(C) $6\frac{2}{3}$ (D) 8

DIRECTIONS for question 9: Type in your answer in the input box provided below the question.

9. Find the percentage profit made on an item, if its cost price is first marked up by 50% and then it is sold at a discount of 20%.

DIRECTIONS for question 10: Select the correct alternative from the given choices.

10. What is the remainder when $81^a + 9^a + 1$ is divided by $9^a + 3^a$?
(A) 0
(B) $9^a - 2$
(C) $9^a - 3^a + 1$
(D) $9^a + 3^a - 5$

DIRECTIONS for question 11: Type in your answer in the input box provided below the question.

11. If $f(n) = 1(1!) + 2(2!) + 3(3!) + \dots + n(n!)$, find the remainder when $f(117) + f(111)$ is divided by 100.

DIRECTIONS for questions 12 to 14: Select the correct alternative from the given choices.

12. If $\log_{2x}3y \left(\log_3x \left(\log_2y(64) \right) \right) = 0$, where x and y are positive integers, find the product xy.
(A) 2 (B) 4
(C) 6 (D) 8

13. How many factors of 720 are divisible by 4 but not by 16?
(A) 6 (B) 12
(C) 8 (D) 18

14. If the product of all the factors of N is equal to N^8 , which of the following cannot be a factor of N?
(A) $2^2 \times 3^1 \times 5^1$ (B) $2^3 \times 3^2$
(C) $2^6 \times 5^1$ (D) $2^2 \times 3^2 \times 5^1$

DIRECTIONS for question 15: Type in your answer in the input box provided below the question.

15. Each of Sharmistha and Devjani has a certain number of chocolates with her. If Sharmistha gives 40% of the number of chocolates she has to Devjani, the ratio of the number of chocolates with them gets reversed. If the number of chocolates that Devjani initially had was $p\%$ of those with Sharmistha, find the value of $12p$.

DIRECTIONS for question 16: Select the correct alternative from the given choices.

16. In how many ways can a committee comprising three men and two women be formed from ten couples, such that no husband-wife pair is present in the committee?

- (A) 2400 (B) 2420
(C) 2520 (D) 2880

DIRECTIONS for question 17: Type in your answer in the input box provided below the question.

17. Find the maximum number of distinct regions into which the area inside a circle can be divided by drawing six chords.

DIRECTIONS for question 18: Select the correct alternative from the given choices.

18. If the ratio of the sum of the first n terms of two arithmetic progressions is given by $5n + 7 : 3n - 8$, find the ratio of the 12th terms of the two arithmetic progressions.
(A) 3 : 2 (B) 2 : 1
(C) 3 : 1 (D) 5 : 2

DIRECTIONS for question 19: Type in your answer in the input box provided below the question.

19. If the roots of the equation $x^3 - 21x^2 + ax - 168 = 0$ are in arithmetic progression, find the value of a .

DIRECTIONS for question 20: Select the correct alternative from the given choices.

20. A certain sum lent under simple interest doubles itself in five years. After how many years will the sum become four times itself, if the rate of interest at which it is lent is increased by 5 percentage points?
(A) 12 (B) 16
(C) 20 (D) 15

DIRECTIONS for questions 21 and 22: Type in your answer in the input box provided below the question.

21. Find the total number of prime factors of the number $40C_{30}$.

22. There are three sets – A, B and C. The number of elements in $A \cap B \cap C$ is three, whereas the number of elements in $A \cup B \cup C$ is 30. If the number of elements in $A \cap B$, $B \cap C$ and $A \cap C$ are equal and each of A, B and C has 16 elements, find the number of elements in $A \cap B$.

DIRECTIONS for questions 23 to 27: Select the correct alternative from the given choices.

23. Simplify

$$45.5 \times \left[\frac{1}{31 \times 60} + \frac{1}{32 \times 59} + \frac{1}{33 \times 58} + \dots + \frac{1}{60 \times 31} \right]$$

- (A) $\frac{1}{16} + \frac{1}{17} + \frac{1}{18} + \dots + \frac{1}{45}$
 (B) $1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{30}$
 (C) $\frac{1}{31} + \frac{1}{32} + \frac{1}{33} + \dots + \frac{1}{60}$
 (D) None of the above

24. From the top of a tower, the angles of depression of the top and bottom of a building are observed to be 30° and 60° respectively. If the building is 40 m away from the tower, then what is the height of the building?

- (A) $40\sqrt{3}$ m (B) $\frac{40}{\sqrt{3}}$ m
 (C) 60 m (D) $\frac{80}{\sqrt{3}}$ m

25. By selling two items, each at the same selling price, a shopkeeper made an overall profit of 20%. If one item was sold at a profit of 50%, then the other was sold at
 (A) a loss of 10%.
 (B) a loss of 30%.
 (C) a profit of 10%.
 (D) no profit no loss.

26. If $2a = 3b = 5c$ and $4c = 5d = 6e$, then $\frac{bcd}{ae} =$
 (A) a. (B) b.
 (C) c. (D) d.

27. In a huge pile of bananas and chikus, 60% of the fruits were ripe. If 55% of the chikus were not ripe and 70% of the bananas were ripe, find the ratio of the number of bananas and chikus present in the pile.
 (A) 3 : 2 (B) 2 : 3
 (C) 3 : 4 (D) 4 : 3

DIRECTIONS for questions 28 and 29: Type in your answer in the input box provided below the question.

28. Five men can complete a certain work in six days, while nine women take five days to complete the same work. If two men and x women completed the same work in five days, then find the value of x.

29. The ages of Aditi and her mother were both two-digit numbers comprising the same pair of digits. If fifteen years ago, Aditi was one-third the age of her mother, find the sum of their present ages (in years).

DIRECTIONS for question 30: Select the correct alternative from the given choices.

30. Find the area (in sq. units) bound by the curves

$$|x+y|=2 \text{ and } |x-y|=2.$$

- (A) 8 (B) $8\sqrt{2}$
 (C) 16 (D) $4\sqrt{2}$

DIRECTIONS for question 31: Type in your answer in the input box provided below the question.

31. If the maximum value of $\sin^2\theta - 2\sin^3\theta$ is $\frac{1}{A}$, for $0^\circ < \theta < 90^\circ$, find the value of A.

DIRECTIONS for question 32: Select the correct alternative from the given choices.

32. Each of three friends, A, B and C, has a certain number of marbles with him, such that the number of marbles with B is 12% more than that with C and 12% less than that with A and C together. If the number of marbles with B is less than 500, then find the total number of marbles with all the three friends.
 (A) 658 (B) 940
 (C) 846 (D) Cannot be determined

DIRECTIONS for question 33: Type in your answer in the input box provided below the question.

33. Raghu, Ram and Rajan work in ABC Pvt. Ltd. If their monthly salaries are in the ratio 2 : 3 : 5, and sum of their monthly salaries is ₹720000, find Raghu's monthly salary (in ₹).

DIRECTIONS for question 34: Select the correct alternative from the given choices.

34. A boy is running on a circular track around a playground. There is a tower situated outside the playground. The boy observes that while making one complete round along the track, the angle of elevation of the top of the tower is 45° at two points on the track and 60° at two other points on the track. If these four points, when joined, from a square, the area of which is $800(12 - 6\sqrt{2})$ sq. m., find the height (in m) of the tower.

- (A) 90. (B) 100.
 (C) 120. (D) 150.