CAT 2020 Slot 1 Question Paper

Conducted by the Indian Institute of Management Indore (IIM Indore)

Time Allowed: 2 Hours | **76 Questions** | **Maximum Marks: 228**

General Instructions

(i) This paper contains **76 questions** from **CAT 2020 Slot 1**, held on **29 November 2020**. The original examination was a **computer-based test** with a **120-minute** duration.

(ii) The question groups appear in their original sequence: **Verbal Ability and Reading Comprehension** (26 questions); **Data Interpretation and Logical Reasoning** (24 questions); **Quantitative Ability** (26 questions).

(iii) Each section is timed separately: **40 minutes per section**. A candidate cannot switch between sections during the test.

(iv) The paper has **multiple choice questions (MCQs)**, each with four options and one correct answer, and **Type In The Answer (TITA)** questions.

(v) **Marking scheme: +3** for a correct answer; **-1** for an incorrect MCQ; **no negative marking** for TITA questions; and **0** for an unanswered question.

(vi) For TITA questions, enter the answer in the space provided. An on-screen calculator was available in the original test.

Verbal Ability and Reading Comprehension · Questions 1-26

1. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage. As Soviet power declined, the world became to some extent multipolar, and Europe strove to define an independent identity. What a journey Europe has undertaken to reach this point. It had in every century changed its internal structure and invented new ways of thinking about the nature of international order. Now at the culmination of an era, Europe, in order to participate in it, felt obliged to set aside the political mechanisms through which it had conducted its affairs for three and a half centuries. Impelled also by the desire to cushion the emergent unification of Germany, the new European Union established a common currency in 2002 and a formal political structure in 2004. It proclaimed a Europe united, whole, and free, adjusting its differences by peaceful mechanisms.

(A) Europe has consistently changed in keeping with the changing world order and that has culminated in a united Europe.

(B) The establishment of a formal political structure in Europe was hastened by the unification of Germany and the emergence of a multipolar world.

(C) Europe has consistently changed its internal structure to successfully adapt to the changing world order.

(D) Europe has chosen to lower political and economic heterogeneity, in order to adapt itself to an emerging multi-polar world.

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2. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage. For years, movies and television series like Crime Scene Investigation (CSI) paint an unrealistic picture of the "science of voices." In the 1994 movie Clear and Present Danger an expert listens to a brief recorded utterance and declares that the speaker is "Cuban, aged 35 to 45, educated in the [...] eastern United States." The recording is then fed to a supercomputer that matches the voice to that of a suspect, concluding that the probability of correct identification is 90%. This sequence sums up a good number of misimpressions about forensic phonetics, which have led to errors in real- life justice. Indeed, that movie scene exemplifies the so-called "CSI effect"—the phenomenon in which judges hold unrealistic expectations of the capabilities of forensic science.

(A) Although voice recognition is often presented as evidence in legal cases, its scientific basis can be shaky.

(B) Voice recognition as used in many movies to identify criminals has been used to identify criminals in real life also.

(C) Movies and televisions have led to the belief that the use of forensic phonetics in legal investigations is robust and fool proof.

(D) Voice recognition has started to feature prominently in crime-scene intelligence investigations because of movies and television series.

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3. The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

1. Relying on narrative structure alone, indigenous significances of nineteenth-century San folktales are hard to determine.

2. Using their supernatural potency, benign shamans transcend the levels of the San cosmos in order to deal with social conflict and to protect material resources and enjoy a measure of

respect that sets them apart from ordinary people.
3. Selected tales reveal that they deal with a form of spiritual conflict that has social implications and concern conflict between people and living or dead malevolent shamans.
4. Meaning can be elicited, and the tales contextualized, by probing beneath the narrative of verbatim, original-language records and exploring the connotations of highly significant words and phrases.

Type in the answer.

Questions 4 to 8

The passage below is accompanied by a set of questions. Choose the best answer to each question.

Vocabulary used in speech or writing organizes itself in seven parts of speech (eight, if you count interjections such as Oh! and Gosh! and Fuhgeddaboudit!). Communication composed of these parts of speech must be organized by rules of grammar upon which we agree. When these rules break down, confusion and misunderstanding result. Bad grammar produces bad sentences. My favorite example from Strunk and White is this one: "As a mother of five, with another one on the way, my ironing board is always up."

Nouns and verbs are the two indispensable parts of writing. Without one of each, no group of words can be a sentence, since a sentence is, by definition, a group of words containing a subject (noun) and a predicate (verb); these strings of words begin with a capital letter, end with a period, and combine to make a complete thought which starts in the writer's head and then leaps to the reader's.

Must you write complete sentences each time, every time? Perish the thought. If your work consists only of fragments and floating clauses, the Grammar Police aren't going to come and take you away. Even William Strunk, that Mussolini of rhetoric, recognized the delicious pliability of language. "It is an old observation," he writes, "that the best writers sometimes disregard the rules of rhetoric." Yet he goes on to add this thought, which I urge you to consider: "Unless he is certain of doing well, [the writer] will probably do best to follow the rules."

The telling clause here is Unless he is certain of doing well. If you don't have a rudimentary grasp of how the parts of speech translate into coherent sentences, how can you be certain that you are doing well? How will you know if you're doing ill, for that matter? The answer, of course, is that you can't, you won't. One who does grasp the rudiments of grammar finds a comforting simplicity at its heart, where there need be only nouns, the words that name, and verbs, the words that act.

Take any noun, put it with any verb, and you have a sentence. It never fails. Rocks explode. Jane transmits. Mountains float. These are all perfect sentences. Many such thoughts make little rational sense, but even the stranger ones (Plums deify!) have a kind of poetic weight that's nice. The simplicity of noun-verb construction is useful—at the very least it can provide a safety net for your writing. Strunk and White caution against too many simple sentences in a row, but simple sentences provide a path you can follow when you fear getting lost in the tangles of rhetoric—all those restrictive and nonrestrictive clauses, those modifying phrases, those appositives and compound-complex sentences. If you start to freak out at the sight of such unmapped territory (unmapped by you, at least), just remind yourself that rocks explode, Jane transmits, mountains float, and plums deify. Grammar is . . . the pole you grab to get your thoughts up on their feet and walking.

4. Which one of the following statements, if false, could be seen as supporting the arguments in the passage?

(A) An understanding of grammar helps a writer decide if she/he is writing well or not.

(B) Regarding grammar, women writers tend to be more attentive to method and accuracy.

(C) It has been observed that writers sometimes disregard the rules of rhetoric.

(D) Perish the thought that complete sentences necessarily need nouns and verbs!

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5. "Take any noun, put it with any verb, and you have a sentence. It never fails. Rocks explode. Jane transmits. Mountains float." None of the following statements can be seen as similar EXCEPT:

(A) Take any vegetable, put some spices in it, and you have a dish

(B) Take an apple tree, plant it in a field, and you have an orchard.

(C) A group of nouns arranged in a row becomes a sentence.

(D) A collection of people with the same sports equipment is a sports team.

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6. Which one of the following quotes best captures the main concern of the passage?

(A) "The telling clause here is Unless he is certain of doing well."

(B) "Bad grammar produces bad sentences."

(C) "Strunk and White caution against too many simple sentences in a row, but simple sentences provide a path you can follow when you fear getting lost in the tangles of rhetoric . . ."

(D) "Nouns and verbs are the two indispensable parts of writing. Without one of each, no group of words can be a sentence . . ."

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7. All of the following statements can be inferred from the passage EXCEPT that:

(A) sentences do not always have to be complete.

(B) the subject-predicate relation is the same as the noun-verb relation.

(C) the primary purpose of grammar is to ensure that sentences remain simple.

(D) "Grammar Police" is a metaphor for critics who focus on linguistic rules.

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8. Inferring from the passage, the author could be most supportive of which one of the following practices?

(A) The availability of language software that will standardise the rules of grammar as an aid to writers.

(B) A campaign demanding that a writer's creative license should allow the breaking of grammatical rules.

(C) A Creative Writing course that focuses on how to avoid the use of rhetoric.

(D) The critique of standardised rules of punctuation and capitalisation.

Questions 9 to 12

The passage below is accompanied by a set of questions. Choose the best answer to each question.

Few realise that the government of China, governing an empire of some 60 million people during the Tang dynasty (618-907), implemented a complex financial system that recognised grain, coins and textiles as money. . . . Coins did have certain advantages: they were durable, recognisable and provided a convenient medium of exchange, especially for smaller transactions. However, there were also disadvantages. A continuing shortage of copper meant that government mints could not produce enough coins for the entire empire, to the extent that for most of the dynasty's history, coins

constituted only a tenth of the money supply. One of the main objections to calls for taxes to be paid in coin was that peasant producers who could weave cloth or grow grain - the other two major currencies of the Tang - would not be able to produce coins, and therefore would not be able to pay their taxes. . . .

As coins had advantages and disadvantages, so too did textiles. If in circulation for a long period of time, they could show signs of wear and tear. Stained, faded and torn bolts of textiles had less value than a brand new bolt. Furthermore, a full bolt had a particular value. If consumers cut textiles into smaller pieces to buy or sell something worth less than a full bolt, that, too, greatly lessened the value of the textiles. Unlike coins, textiles could not be used for small transactions; as [an official] noted, textiles could not "be exchanged by the foot and the inch" . . .

But textiles had some advantages over coins. For a start, textile production was widespread and there were fewer problems with the supply of textiles. For large transactions, textiles weighed less than their equivalent in coins since a string of coins . . . could weigh as much as 4 kg. Furthermore, the dimensions of a bolt of silk held remarkably steady from the third to the tenth century: 56 cm wide and 12 m long . . . The values of different textiles were also more stable than the fluctuating values of coins. . . .

The government also required the use of textiles for large transactions. Coins, on the other hand, were better suited for smaller transactions, and possibly, given the costs of transporting coins, for a more local usage. Grain, because it rotted easily, was not used nearly as much as coins and textiles, but taxpayers were required to pay grain to the government as a share of their annual tax obligations, and official salaries were expressed in weights of grain. . . .

In actuality, our own currency system today has some similarities even as it is changing in front of our eyes. . . . We have cash - coins for small transactions like paying for parking at a meter, and banknotes for other items; cheques and debit/credit cards for other, often larger, types of payments. At the same time, we are shifting to electronic banking and making payments online. Some young people never use cash [and] do not know how to write a cheque . . .

9. During the Tang period, which one of the following would not be an economically sound decision for a small purchase in the local market that is worth one-eighth of a bolt of cloth?

(A) Making the payment with the appropriate weight of grain.

(B) Paying with a faded bolt of cloth that has approximately the same value.

(C) Using coins issued by the government to make the payment.

(D) Cutting one-eighth of the fabric from a new bolt to pay the amount.

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10. When discussing textiles as currency in the Tang period, the author uses the words "steady" and "stable" to indicate all of the following EXCEPT:

(A) reliable transportation.

(B) reliable quality.

(C) reliable measurements.

(D) reliable supply.

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11. In the context of the passage, which one of the following can be inferred with regard to the use of currency during the Tang era?

(A) Currency that deteriorated easily was not used for official work.

(B) Copper coins were more valuable and durable than textiles.

(C) Grains were the most used currency because of government requirements.

(D) Currency usage was similar to that of modern times.

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12. According to the passage, the modern currency system shares all the following features with that of the Tang, EXCEPT that:

(A) it uses different materials as currency.

(B) it uses different currencies for different situations.

(C) its currencies fluctuate in value over time.

(D) it is undergoing transformation.

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13. **Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer:**

1. Talk was the most common way for enslaved men and women to subvert the rules of their bondage, to gain more agency than they were supposed to have.
2. Even in conditions of extreme violence and unfreedom, their words remained ubiquitous, ephemeral, irrepressible, and potentially transgressive.
3. Slaves came from societies in which oaths, orations, and invocations carried great potency, both between people and as a connection to the all-powerful spirit world.
4. Freedom of speech and the power to silence may have been preeminent markers of white liberty in Colonies, but at the same time, slavery depended on dialogue: slaves could never be completely muted.
5. Slave-owners obsessed over slave talk, though they could never control it, yet feared its power to bind and inspire—for, as everyone knew, oaths, whispers, and secret conversations bred conspiracy and revolt.

Type in the answer.

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14. **Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer:**

1. For feminists, the question of how we read is inextricably linked with the question of what we read.
2. Elaine Showalter's critique of the literary curriculum is exemplary of this work.
3. Androcentric literature structures the reading experience differently depending on the gender of the reader.
4. The documentation of this realization was one of the earliest tasks undertaken by feminist critics.
5. More specifically, the feminist inquiry into the activity of reading begins with the realization that the literary canon is androcentric, and that this has a profoundly damaging effect on women readers.

Type in the answer.

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15. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage. For nearly a century most psychologists have embraced one view of intelligence. Individuals are born with more or less intelligence potential (I.Q.); this potential is heavily influenced by heredity and difficult to alter; experts in measurement can determine a person's intelligence early in life, currently from paper-and-pencil measures, perhaps eventually from examining the brain in action or even scrutinizing his/her genome. Recently, criticism of this conventional wisdom has mounted. Biologists ask if speaking of a single entity called "intelligence" is coherent and question the validity of measures used to estimate heritability of a trait in humans, who, unlike plants or animals, are not

conceived and bred under controlled conditions.

(A) Biologists have questioned the long-standing view that ‘intelligence’ is a single entity and the attempts to estimate it's heritability.

(B) Biologists have criticised that conventional wisdom that individuals are born with more or less intelligence potential.

(C) Biologists have started questioning psychologists' view of 'intelligence' as a measurable immutable characteristic of an individual.

(D) Biologists have questioned the view that ‘intelligence’ is a single entity and the ways in which what is inherited

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Questions 16 to 20

The passage below is accompanied by a set of questions. Choose the best answer to each question.

The word ‘anarchy’ comes from the Greek '*anarkhia*', meaning contrary to authority or without a ruler, and was used in a derogatory sense until 1840, when it was adopted by Pierre-Joseph Proudhon to describe his political and social ideology. Proudhon argued that organization without government was both possible and desirable. In the evolution of political ideas, anarchism can be seen as an ultimate projection of both liberalism and socialism, and the differing strands of anarchist thought can be related to their emphasis on one or the other of these.

Historically, anarchism arose not only as an explanation of the gulf between the rich and the poor in any community, and of the reason why the poor have been obliged to fight for their share of a common inheritance, but as a radical answer to the question ‘What went wrong?’ that followed the ultimate outcome of the French Revolution. It had ended not only with a reign of terror and the emergence of a newly rich ruling caste, but with a new adored emperor, Napoleon Bonaparte, strutting through his conquered territories.

The anarchists and their precursors were unique on the political Left in affirming that workers and peasants, grasping the chance that arose to bring an end to centuries of exploitation and tyranny, were inevitably betrayed by the new class of politicians, whose first priority was to re-establish a centralized state power. After every revolutionary uprising, usually won at a heavy cost for ordinary populations, the new rulers had no hesitation in applying violence and terror, a secret police, and a professional army to maintain their control.

For anarchists the state itself is the enemy, and they have applied the same interpretation to the outcome of every revolution of the 19th and 20th centuries. This is not merely because every state keeps a watchful and sometimes punitive eye on its dissidents, but because every state protects the privileges of the powerful.

The mainstream of anarchist propaganda for more than a century has been anarchist- communism, which argues that property in land, natural resources, and the means of production should be held in mutual control by local communities, federating for innumerable joint purposes with other communes. It differs from state socialism in opposing the concept of any central authority. Some anarchists prefer to distinguish between anarchist-communism and collectivist anarchism in order to stress the obviously desirable freedom of an individual or family to possess the resources needed for living, while not implying the right to own the resources needed by others. . . .

There are, unsurprisingly, several traditions of individualist anarchism, one of them deriving from the ‘conscious egoism’ of the German writer Max Stirner (1806-56), and another from a remarkable series of 19th-century American figures who argued that in protecting our own autonomy and

associating with others for common advantages, we are promoting the good of all. These thinkers differed from free-market liberals in their absolute mistrust of American capitalism, and in their emphasis on mutualism.

16. The author makes all of the following arguments in the passage, EXCEPT:

(A) The failure of the French Revolution was because of its betrayal by the new class of politicians who emerged from it.

(B) For anarchists, the state is the enemy because all states apply violence and terror to maintain their control.

(C) Individualist anarchism is actually constituted of many streams, all of which focus on the autonomy of the individual.

(D) The popular perception of anarchism as espousing lawlessness and violence comes from a mainstream mistrust of collectivism.

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17. The author believes that the new ruling class of politicians betrayed the principles of the French Revolution, but does not specify in what way. In the context of the passage, which statement below is the likeliest explanation of that betrayal?

(A) The new ruling class was constituted mainly of anarchists who were against the destructive impact of the Revolution on the market.

(B) The anarchists did not want a new ruling class, but were not politically strong enough to stop them.

(C) The new ruling class struck a deal with the old ruling class to share power between them.

(D) The new ruling class rode to power on the strength of the workers' revolutionary anger, but then turned to oppress that very class.

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18. Which one of the following best expresses the similarity between American individualist anarchists and free-market liberals as well as the difference between the former and the latter?

(A) Both prioritise individual autonomy; but the former also emphasise mutual dependence, while the latter do not do so.

(B) Both reject the regulatory power of the state; but the former favour a people's state, while the latter favour state intervention in markets.

(C) Both have sophisticated arguments for capitalism; but the former argue for a morally upright capitalism, while the latter argue that the market is the only morality

(D) Both are founded on the moral principles of altruism; but the latter conceive of the market as a force too mystical for the former to comprehend.

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19. Of the following sets of concepts, identify the set that is conceptually closest to the concerns of the passage.

(A) Anarchism, State, Individual, Freedom.

(B) Revolution, State, Strike, Egoism.

(C) Revolution, State, Protection, Liberals.

(D) Anarchism, Betrayal, Power, State.

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20. According to the passage, what is the one idea that is common to all forms of anarchism?

(A) They all derive from the work of Pierre-Joseph Proudhon.

(B) They are all opposed to the centralisation of power in the state.

(C) They all focus on the primacy of the power of the individual.

(D) There is no idea common to all forms of anarchism; that is why it is anarchic.

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21. The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

1. Man has used poisons for assassination purposes ever since the dawn of civilization, against individual enemies but also occasionally against armies.
2. These dangers were soon recognized, and resulted in two international declarations—in 1874 in Brussels and in 1899 in The Hague—that prohibited the use of poisoned weapons.
3. The foundation of microbiology by Louis Pasteur and Robert Koch offered new prospects for those interested in biological weapons because it allowed agents to be chosen and designed on a rational basis.
4. Though treaties were all made in good faith, they contained no means of control, and so fail

Type in the answer.

Questions 22 to 25

The passage below is accompanied by a set of questions. Choose the best answer to each question.

In the late 1960s, while studying the northern-elephant-seal population along the coasts of Mexico and California, Burney Le Boeuf and his colleagues couldn't help but notice that the threat calls of males at some sites sounded different from those of males at other sites. . . . That was the first time dialects were documented in a nonhuman mammal. . . .

All the northern elephant seals that exist today are descendants of the small herd that survived on Isla Guadalupe [after the near extinction of the species in the nineteenth century]. As that tiny population grew, northern elephant seals started to recolonize former breeding locations. It was precisely on the more recently colonized islands where Le Boeuf found that the tempos of the male vocal displays showed stronger differences to the ones from Isla Guadalupe, the founder colony.

In order to test the reliability of these dialects over time, Le Boeuf and other researchers visited Año Nuevo Island in California—the island where males showed the slowest pulse rates in their calls—every winter from 1968 to 1972. "What we found is that the pulse rate increased, but it still remained relatively slow compared to the other colonies we had measured in the past" Le Boeuf told me.

At the individual level, the pulse of the calls stayed the same: A male would maintain his vocal signature throughout his lifetime. But the average pulse rate was changing. Immigration could have been responsible for this increase, as in the early 1970s, 43 percent of the males on Año Nuevo had come from southern rookeries that had a faster pulse rate. This led Le Boeuf and his collaborator, Lewis Petrinovich, to deduce that the dialects were, perhaps, a result of isolation over time, after the breeding sites had been recolonized. For instance, the first settlers of Año Nuevo could have had, by chance, calls with low pulse rates. At other sites, where the scientists found faster pulse rates, the opposite would have happened—seals with faster rates would have happened to arrive first.

As the population continued to expand and the islands kept on receiving immigrants from the original population, the calls in all locations would have eventually regressed to the average pulse rate of the founder colony. In the decades that followed, scientists noticed that the geographical variations reported in 1969 were not obvious anymore. . . . In the early 2010s, while studying northern elephant seals on Año Nuevo Island, [researcher Caroline] Casey noticed, too, that what Le Boeuf had

heard decades ago was not what she heard now. . . . By performing more sophisticated statistical analyses on both sets of data, [Casey and Le Boeuf] confirmed that dialects existed back then but had vanished. Yet there are other differences between the males from the late 1960s and their great-great-grandsons: Modern males exhibit more individual diversity, and their calls are more complex. While 50 years ago the drumming pattern was quite simple and the dialects denoted just a change in tempo, Casey explained, the calls recorded today have more complex structures, sometimes featuring doublets or triplets. . . .

22. All of the following can be inferred from Le Boeuf's study as described in the passage EXCEPT that:

(A) male northern elephant seals might not have exhibited dialects had they not become nearly extinct in the nineteenth century.

(B) changes in population and migration had no effect on the call pulse rate of individual male northern elephant seals.

(C) the influx of new northern elephant seals into Año Nuevo Island would have soon made the call pulse rate of its male seals exceed that of those at Isla Guadalupe.

(D) the average call pulse rate of male northern elephant seals at Año Nuevo Island increased from the early 1970s till the disappearance of dialects.

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23. Which one of the following conditions, if true, could have ensured that male northern elephant seal dialects did not disappear?

(A) Besides Isla Guadalupe, there was one more surviving colony with the same average male call tempo from which no migration took place.

(B) The call tempo of individual male seals in host colonies changed to match the average call tempo of immigrant male seals.

(C) Besides Isla Guadalupe, there was one more founder colony with the same average male call tempo from which male seals migrated to various other colonies.

(D) The call tempo of individual immigrant male seals changed to match the average tempo of resident male seals in the host colony.

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24. Which one of the following best sums up the overall history of transformation of male northern elephant seal calls?

(A) Owing to migrations in the aftermath of near species extinction, the average call pulse rates in the recolonised breeding locations exhibited a gradual increase until they matched the tempo at the founding colony.

(B) The calls have transformed from exhibiting simple composition, less individual variety, and great regional variety to complex composition, great individual variety, and less regional variety.

(C) Owing to migrations in the aftermath of near species extinction, the calls have transformed from exhibiting complex composition, less individual variety, and great regional variety to simple composition, less individual variety, and great regional variety.

(D) The calls have transformed from exhibiting simple composition, great individual variety, and less regional variety to complex composition, less individual variety, and great regional variety.

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25. From the passage it can be inferred that the call pulse rate of male northern elephant seals in the southern rookeries was faster because:

(A) the male northern elephant seals of Isla Guadalupe with faster call pulse rates might have been the original settlers of the southern rookeries.

(B) a large number of male northern elephant seals migrated from the southern rookeries to Año Nuevo Island in the early 1970s.

(C) a large number of male northern elephant seals from Año Nuevo Island might have migrated to the southern rookeries to recolonise them.

(D) the calls of male northern elephant seals in the southern rookeries have more sophisticated structures, containing doublets and triplets.

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26. The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

1. Tensions and sometimes conflict remain an issue in and between the 11 states in South East Asia (Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor-Leste and Vietnam).

2. China's rise as a regional military power and its claims in the South China Sea have become an increasingly pressing security concern for many South East Asian states.

3. Since the 1990s, the security environment of South East Asia has seen both continuity and profound changes.

4. These concerns cause states from outside the region to take an active interest in South East Asian security.

Type in the answer.

Questions 27 to 32

In a certain board examination, students were to appear for examination in five subjects: English, Hindi, Mathematics, Science and Social Science. Due to a certain emergency situation, a few of the examinations could not be conducted for some students. Hence, some students missed one examination and some others missed two examinations. Nobody missed more than two examinations.

The board adopted the following policy for awarding marks to students. If a student appeared in all five examinations, then the marks awarded in each of the examinations were on the basis of the scores obtained by them in those examinations.

If a student missed only one examination, then the marks awarded in that examination was the average of the best three among the four scores in the examinations they appeared for. If a student missed two examinations, then the marks awarded in each of these examinations was the average of the best two among the three scores in the examinations they appeared for. The marks obtained by six students in the examination are given in the table below. Each of them missed either one or two examinations.

	English	Hindi	Mathematics	Science	Social Science
Alva	80	75	70	75	60
Bithi	90	80	55	85	85
Carl	75	80	90	100	90
Deep	70	90	100	90	80
Esha	80	85	95	60	55
Foni	83	72	78	88	83

The following facts are also known.
I. Four of these students appeared in each of the English, Hindi, Science, and Social Science examinations.
II. The student who missed the Mathematics examination did not miss any other examination.
III. One of the students who missed the Hindi examination did not miss any other examination. The other student who missed the Hindi examination also missed the Science examination.

27. Who among the following did not appear for the Mathematics examination?

(A) Alva
(B) Carl
(C) Foni
(D) Esha

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28. Which students did not appear for the English examination?

(A) Carl and Deep
(B) Cannot be determined
(C) Alva and Bithi
(D) Esha and Foni

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29. What BEST can be concluded about the students who did not appear for the Hindi examination?

(A) Deep and Esha
(B) Alva and Deep

(C) Alva and Esha

(D) Two among Alva, Deep and Esha

30. What BEST can be concluded about the students who missed the Science examination?

(A) Bithi and one out of Alva and Deep

(B) Alva and Bithi

(C) Deep and Bithi

(D) Alva and Deep

31. How many out of these six students missed exactly one examination?

Type in the answer.

32. For how many students can we be definite about which examinations they missed?

Type in the answer.

Questions 33 to 36

Ten musicians (A, B, C, D, E, F, G, H, I and J) are experts in at least one of the following three percussion instruments: tabla, mridangam, and ghatam. Among them, three are experts in tabla but not in mridangam or ghatam, another three are experts in mridangam but not in tabla or ghatam, and one is an expert in ghatam but not in tabla or mridangam. Further, two are experts in tabla and mridangam but not in ghatam, and one is an expert in tabla and ghatam but not in mridangam.

The following facts are known about these ten musicians.
1. Both A and B are experts in mridangam, but only one of them is also an expert in tabla.
2. D is an expert in both tabla and ghatam.
3. Both F and G are experts in tabla, but only one of them is also an expert in mridangam.
4. Neither I nor J is an expert in tabla.
5. Neither H nor I is an expert in mridangam, but only one of them is an expert in ghatam.

33. Who among the following is DEFINITELY an expert in tabla but not in either mridangam or ghatam?

(A) F

(B) C

(C) A

(D) H

34. Who among the following is DEFINITELY an expert in mridangam but not in either tabla or ghatam?

(A) B

(B) J

(C) G

(D) E

35. Which of the following pairs CANNOT have any musician who is an expert in both tabla and mridangam but not in ghatam?

(A) F and G

(B) C and E

(C) A and B

(D) C and F

36. If C is an expert in mridangam and F is not, then which are the three musicians who are experts in tabla but not in either mridangam or ghatam?

(A) E, F and H

(B) C, G and H

(C) E, G and H

(D) C, E and G

Questions 37 to 40

The local office of the APP-CAB company evaluates the performance of five cab drivers, Arun, Barun, Chandan, Damodaran, and Eman for their monthly payment based on ratings in five different parameters (P1 to P5) as given below:
P1: timely arrival
P2: behaviour
P3: comfortable ride
P4: driver's familiarity with the route
P5: value for money

Based on feedback from the customers, the office assigns a rating from 1 to 5 in each of these parameters. Each rating is an integer from a low value of 1 to a high value of 5. The final rating of a driver is the average of his ratings in these five parameters. The monthly payment of the drivers has two parts - a fixed payment and final rating-based bonus. If a driver gets a rating of 1 in any of the parameters, he is not eligible to get bonus. To be eligible for bonus a driver also needs to get a rating of five in at least one of the parameters. The partial information related to the ratings of the drivers in different parameters and the monthly payment structure (in rupees) is given in the table below:

	P1	P2	P3	P4	P5	Fixed Payment	Bonus
Arun				4		Rs.1000	Rs.250× Final Rating
Barun	3					Rs.1200	Rs.200× Final Rating
Chandan			2			Rs.1400	Rs.100× Final Rating
Damodaran		3				Rs.1300	Rs.150× Final Rating
Eman					2	Rs.1100	Rs.200× Final Rating

The following additional facts are known.
1. Arun and Barun have got a rating of 5 in exactly one of the parameters. Chandan has got a rating of 5 in exactly two parameters.
2. None of drivers has got the same rating in three parameters.

37. If Damodaran does not get a bonus, what is the maximum possible value of his final rating?

(A) 3.4
(B) 3.2
(C) 3.6
(D) 3.8

---

38. If Eman gets a bonus, what is the minimum possible value of his final rating?

(A) 3.2
(B) 2.8
(C) 3.4
(D) 3.0

---

39. If all five drivers get bonus, what is the minimum possible value of the monthly payment (in rupees) that a driver gets?

(A) 1750
(B) 1600
(C) 1740
(D) 1700

---

40. If all five drivers get bonus, what is the maximum possible value of the monthly payment (in rupees) that a driver gets?

(A) 1960
(B) 2050
(C) 1950
(D) 1900

Questions 41 to 44

1000 patients currently suffering from a disease were selected to study the effectiveness of treatment of four types of medicines — A, B, C and D. These patients were first randomly assigned into two groups of equal size, called treatment group and control group. The patients in the control group were not treated with any of these medicines; instead they were given a dummy medicine, called placebo, containing only sugar and starch. The following information is known about the patients in the treatment group.

a. A total of 250 patients were treated with type A medicine and a total of 210 patients were treated with type C medicine.
b. 25 patients were treated with type A medicine only. 20 patients were treated with type C medicine only. 10 patients were treated with type D medicine only.
c. 35 patients were treated with type A and type D medicines only. 20 patients were treated with type A and type B medicines only. 30 patients were treated with type A and type C medicines only. 20 patients were treated with type C and type D medicines only.
d. 100 patients were treated with exactly three types of medicines.
e. 40 patients were treated with medicines of types A, B and C, but not with medicines of type D. 20 patients were treated with medicines of types A, C and D, but not with medicines of type B.
f. 50 patients were given all the four types of medicines. 75 patients were treated with exactly one type of medicine.

41. How many patients were treated with medicine type B?

Type in the answer.

42. The number of patients who were treated with medicine types B, C and D, but not type A was:

Type in the answer.

43. How many patients were treated with medicine types B and D only?

Type in the answer.

44. The number of patients who were treated with medicine type D was:

Type in the answer.

Questions 45 to 50

Four institutes, A, B, C, and D, had contracts with four vendors W, X, Y, and Z during the ten calendar years from 2010 to 2019. The contracts were either multi-year contracts running for several consecutive years or single-year contracts. No institute had more than one contract with the same vendor. However, in a calendar year, an institute may have had contracts with multiple vendors, and a vendor may have had contracts with multiple institutes. It is known that over the decade, the institutes each got into two contracts with two of these vendors, and each vendor got

into two contracts with two of these institutes.

The following facts are also known about these contracts.
I. Vendor Z had at least one contract in every year.
II. Vendor X had one or more contracts in every year up to 2015, but no contract in any year after that.
III. Vendor Y had contracts in 2010 and 2019. Vendor W had contracts only in 2012.
IV. There were five contracts in 2012.
V. There were exactly four multi-year contracts. Institute B had a 7-year contract, D had a 4-year contract, and A and C had one 3-year contract each. The other four contracts were single-year contracts.
VI. Institute C had one or more contracts in 2012 but did not have any contract in 2011.
VII. Institutes B and D each had exactly one contract in 2012. Institute D did not have any contract in 2010.

45. In which of the following years were there two or more contracts?

(A) 2017
(B) 2016
(C) 2015
(D) 2018

46. Which of the following is true?

(A) B had a contract with Z in 2017
(B) B had a contract with Y in 2019
(C) D had a contract with X in 2011
(D) D had a contract with Y in 2019

47. In how many years during this period was there only one contract?

(A) 3
(B) 2
(C) 4
(D) 5

48. What BEST can be concluded about the number of contracts in 2010?

(A) exactly 4
(B) exactly 3
(C) at least 3
(D) at least 4

49. Which institutes had multiple contracts during the same year?

(A) A only
(B) B and C only
(C) A and B only
(D) B only

50. Which institutes and vendors had more than one contracts in any year?

(A) B, W, X, and Z
(B) A, B, W, and X
(C) A, D, W, and Z
(D) B, D, W, and X

51. If Y is a negative number such that $2^{Y^2(\log_3 5)} = 5^{\log_2 3}$, then Y equals to:

(A) $\log_2(\frac{1}{5})$

(B) $\log_2(\frac{1}{3})$

(C) $-\log_2(\frac{1}{5})$

(D) $-\log_2(\frac{1}{3})$

---

52. A gentleman decided to treat a few children in the following manner. He gives half of his total stock of toffees and one extra to the first child, and then the half of the remaining stock along with one extra to the second and continues giving away in this fashion. His total stock exhausts after he takes care of 5 children. How many toffees were there in his stock initially?

Type in the answer.

---

53. How many 3-digit numbers are there, for which the product of their digits is more than 2 but less than 7?

Type in the answer.

---

54. The number of real-valued solutions of the equation $2^x + 2^{-x} = 2 - (x-2)^2$ is:

(A) 1

(B) 2

(C) infinite

(D) 0

---

55. How many disticnt positive integer-valued solutions exist to the equation $(x^2 - 7x + 11)^{(x^2-13x+42)} = 1$?

(A) 8

(B) 4

(C) 2

(D) 6

---

56. A solid right circular cone of height 27 cm is cut into two pieces along a plane parallel to its base at a height of 18 cm from the base. If the difference in volume of the two pieces is 225 cc, the volume, in cc, of the original cone is

(A) 243

(B) 232

(C) 256

(D) 264

---

57. The area of the region satisfying the inequalities $|x| - y \leq 1, y \geq 0$ and $y \leq 1$ is

Type in the answer.

---

58. On a rectangular metal sheet of area 135 sq in, a circle is painted such that the circle touches two opposite sides. If the area of the sheet left unpainted is two-thirds of the painted area then the perimeter of the rectangle in inches is

(A) $3\sqrt{\pi}(5 + \frac{12}{\pi})$

(B) $4\sqrt{\pi}(3 + \frac{9}{\pi})$

(C) $3\sqrt{\pi}(\frac{5}{2} + \frac{6}{\pi})$

(D) $5\sqrt{\pi}(3 + \frac{9}{\pi})$

---

59. A circle is inscribed in a rhombus with diagonals 12 cm and 16 cm. The ratio of the area of circle to the area of rhombus is

(A) $\frac{6\pi}{25}$
(B) $\frac{5\pi}{18}$
(C) $\frac{3\pi}{25}$
(D) $\frac{2\pi}{15}$

---

60. Among 100 students, x_1 have birthdays in January, X_2 have birthdays in February, and so on. If $x_0 = max(x_1, x_2, ..., x_{12})$, then the smallest possible value of x_0 is

(A) 8
(B) 9
(C) 10
(D) 12

---

61. A straight road connects points A and B. Car 1 travels from A to B and Car 2 travels from B to A, both leaving at the same time. After meeting each other, they take 45 minutes and 20 minutes, respectively, to complete their journeys. If Car 1 travels at the speed of 60 km/hr, then the speed of Car 2, in km/hr, is

(A) 100
(B) 90
(C) 80
(D) 70

---

62. A person spent Rs 50000 to purchase a desktop computer and a laptop computer. He sold the desktop at 20% profit and the laptop at 10% loss. If overall he made a 2% profit then the purchase price, in rupees, of the desktop is

Type in the answer.

---

63. A solution, of volume 40 litres, has dye and water in the proportion 2 : 3. Water is added to the solution to change this proportion to 2 : 5. If one fourths of this diluted solution is taken out, how many litres of dye must be added to the remaining solution to bring the proportion back to 2 : 3?

Type in the answer.

---

64. If $x = (4096)^{7+4\sqrt{3}}$, then which of the following equals to 64?

(A) $\frac{x^7}{x^{2\sqrt{3}}}$
(B) $\frac{x^{\frac{7}{2}}}{x^{\frac{4}{\sqrt{3}}}}$
(C) $\frac{x^{\frac{7}{2}}}{x^{2\sqrt{3}}}$
(D) $\frac{x^7}{x^{4\sqrt{3}}}$

---

65. An alloy is prepared by mixing three metals A, B and C in the proportion 3 : 4 : 7 by volume. Weights of the same volume of the metals A. B and C are in the ratio 5 : 2 : 6. In 130 kg of the alloy, the weight, in kg. of the metal C is

(A) 48
(B) 84
(C) 70
(D) 96

---

66. The number of distinct real roots of the equation $(x + \frac{1}{x})^2 - 3(x + \frac{1}{x}) + 2 = 0$ equals

Type in the answer.

---

67. If $\log_4 5 = (\log_4 y)(\log_6 \sqrt{5})$, then y equals

Type in the answer.

---

68. Leaving home at the same time, Amal reaches the office at 10:15 am if he travels at 8 km/hr, and at 9:40 am if he travels at 15 km/hr. Leaving home at 9.10 am, at what speed, in km/hr, must he travel so as to reach office exactly at 10 am?

(A) 13
(B) 12
(C) 14
(D) 11

---

69. A train travelled at one-thirds of its usual speed, and hence reached the destination 30 minutes after the scheduled time. On its return journey, the train initially travelled at its usual speed for 5 minutes but then stopped for 4 minutes for an emergency. The percentage by which the train must now increase its usual speed so as to reach the destination at the scheduled time, is nearest to

(A) 50
(B) 58
(C) 67
(D) 61

---

70. The mean of all 4-digit even natural numbers of the form 'aabb',where $a > 0$, is

(A) 4466
(B) 5050
(C) 4864
(D) 5544

---

71. Two persons are walking beside a railway track at respective speeds of 2 and 4 km per hour in the same direction. A train came from behind them and crossed them in 90 and 100 seconds, respectively. The time, in seconds, taken by the train to cross an electric post is nearest to

(A) 87
(B) 82
(C) 78
(D) 75

---

72. If a, b and c are positive integers such that ab = 432, bc = 96 and c < 9, then the smallest possible value of a + b + c is

(A) 49
(B) 56
(C) 59
(D) 46

---

73. In a group of people, 28% of the members are young while the rest are old. If 65% of the members are literates, and 25% of the literates are young, then the percentage of old people among the illiterates is nearest to

(A) 62
(B) 55
(C) 59
(D) 66

---

74. Veeru invested Rs 10000 at 5% simple annual interest, and exactly after two years, Joy invested Rs 8000 at 10% simple annual interest. How many years after Veeru's investment, will their balances, i.e., principal plus accumulated interest, be equal?

Type in the answer.

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75. If $f(5+x) = f(5-x)$ for every real x, and $f(x) = 0$ has four distinct real roots, then the sum of these roots is

(A) 0
(B) 40
(C) 10
(D) 20

76. Let A, B and C be three positive integers such that the sum of A and the mean of B and C is 5. In addition, the sum of B and the mean of A and C is 7. Then the sum of A and B is

(A) 5
(B) 4
(C) 6
(D) 7

- End of Question Paper -