

CAT 2023

Shift-1

QUESTION  
PAPER

Time: 120 Mins

Maximum Marks: 198

**Important Instructions**

- (i) Total Number of Questions: 66
- (ii) Number of Questions in Verbal Ability and Reading Comprehension (VARC): 24
- (iii) Number of Questions in Data Interpretation and Logical Reasoning (DILR): 20
- (iv) Number of Questions in Quantitative Ability (QA): 22
- (v) 40 minutes are allotted to attempt each section.
- (vi) 4 answer options for each MCQ type question.
- (vii) Answers are typed in the given space on the computer screen for Non-MCQ.
- (viii) For each correct answer: + 3 marks
- (ix) Negative marking (Applicable for wrong answers in MCQs): - 1 mark

**Verbal Ability and Reading Comprehension (VARC)**

**Passage 1**

**Directions (Q. 1 to 4):** Read the following passage carefully and answer the questions that follow.

The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.

For early postcolonial literature, the world of the novel was often the nation. Postcolonial novels were usually [concerned with] national questions. Sometimes the whole story of the novel was taken as an allegory of the nation, whether India or Tanzania. This was important for supporting anti-colonial nationalism, but could also be limiting – land-focused and inward-looking.

My new book “Writing Ocean Worlds” explores another kind of world of the novel: not the village or nation, but the Indian Ocean world. The book describes a set of novels in which the Indian Ocean is at the centre of the story. It focuses on the novelists Amitav Ghosh, Abdulrazak Gurnah, Lindsey Collen and Joseph Conrad [who have] centred the Indian Ocean world in the majority of their novels. . . . Their work reveals a world that is outward-looking – full of movement, border-crossing and South-South interconnection. They are all very different – from colonially inclined (Conrad) to radically anti-capitalist (Collen), but together draw on and shape a wider sense of Indian Ocean space through themes, images, metaphors and language. This has the effect of remapping the world in the reader’s mind, as centred in the interconnected global south. . . .

The Indian Ocean world is a term used to describe the very long-lasting connections among the coasts of East Africa, the Arab coasts, and South and East Asia. These connections were made possible by the geography of the Indian Ocean. For much of history, travel by sea was much easier than by land, which meant that port cities very far apart were often more easily connected to each other than to much closer inland cities. Historical and archaeological evidence suggests that what we now call globalisation first appeared in the Indian Ocean. This is the interconnected oceanic world referenced and produced by the novels in my book. . . .

For their part Ghosh, Gurnah, Collen and even Conrad reference a different set of histories and geographies than the ones most commonly found in fiction in English. Those [commonly found ones] are mostly centred in Europe or the US, assume a background of Christianity and whiteness, and mention places like Paris and New York. The novels in [my] book highlight instead a largely Islamic space, feature characters of colour and centralise the ports of Malindi, Mombasa, Aden, Java and Bombay. . . . It is a densely imagined, richly sensory image of a southern cosmopolitan culture which provides for an enlarged sense of place in the world.

This remapping is particularly powerful for the representation of Africa. In the fiction, sailors and travellers are not all European. . . . African, as well as Indian and Arab characters, are traders, nakhodas (dhow ship captains), runaways, villains, missionaries and activists. This does not mean that Indian Ocean Africa is romanticised. Migration is often a matter of force; travel is portrayed as abandonment rather than adventure, freedoms are kept from women and slavery is rife. What does it mean is that the African part of the Indian Ocean world plays an active role in its long, rich history and therefore in that of the wider world.

- Q. 1.** All of the following claims contribute to the “remapping” discussed by the passage, EXCEPT:
1. Indian Ocean novels have gone beyond the specifics of national concerns to explore rich regional pasts.
  2. Cosmopolitanism originated in the West and travelled to the East through globalisation.
  3. The global South, as opposed to the global North, was the first centre of globalisation.
  4. The world of early international trade and commerce was not the sole domain of white Europeans.
- Q. 2.** On the basis of the nature of the relationship between the items in each pair below, choose the odd pair out:
1. Postcolonial novels : Border-crossing
  2. Indian Ocean novels : Outward-looking
  3. Indian Ocean world : Slavery
  4. Postcolonial novels : Anti-colonial nationalism
- Q. 3.** All of the following statements, if true, would weaken the passage’s claim about the relationship between mainstream English-language fiction and Indian Ocean novels EXCEPT:
1. Very few mainstream English-language novels have historically been set in American and European metropolitan centres.
  2. The depiction of Africa in most Indian Ocean novels is driven by an Orientalist imagination of its cultural crudeness.
  3. The depiction of Africa in most Indian Ocean novels is driven by a postcolonial nostalgia for an idyllic past.
  4. Most mainstream English-language novels have historically privileged the Christian, white, male experience of travel and adventure.
- Q. 4.** Which one of the following statements is not true about migration in the Indian Ocean world?
1. Migration in the Indian Ocean world was an ambivalent experience.
  2. Geographical location rather than geographical proximity determined the choice of destination for migrants.
  3. The Indian Ocean world’s migration networks connected the global north with the global south.
  4. The Indian Ocean world’s migration networks were shaped by religious and commercial histories of the region.

## Passage 2

**Directions (Q. 5 to 8):** Read the following passage carefully and answer the questions that follow.

The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.

[Fifty] years after its publication in English [in 1972], and just a year since [Marshall] Sahlins himself died—we may ask: why did [his essay] “Original Affluent Society” have such an impact, and how has it fared since? . . . Sahlins’s principal argument was simple but counterintuitive: Before being driven into marginal environments by colonial powers, hunter-gatherers, or foragers, were not engaged in a desperate struggle for meager survival. Quite the contrary, they satisfied their needs with far less work than people in agricultural and industrial societies, leaving them more time to use as they wished. Hunters, he quipped, keep bankers’ hours. Refusing to maximise, many were “more concerned with games of chance than with chances of game.” . . . The so-called Neolithic Revolution, rather than improving life, imposed a harsher work regime and set in motion the long history of growing inequality . . .

Moreover, foragers had other options. The contemporary Hadza of Tanzania, who had long been surrounded by farmers, knew they had alternatives and rejected them. To Sahlins, this showed that foragers are not simply examples of human diversity or victimhood but something more profound: they demonstrated that societies make real choices. Culture, a way of living oriented around a distinctive set of values, manifests a fundamental principle of collective self-determination. . . .

But the point [of the essay] is not so much the empirical validity of the data—the real interest for most readers, after all, is not in foragers either today or in the Paleolithic—but rather its conceptual challenge to contemporary economic life and bourgeois individualism. The empirical served as a philosophical and political project, a thought experiment and stimulus to the imagination of possibilities.

With its title's nod toward *The Affluent Society* (1958), economist John Kenneth Galbraith's famously skeptical portrait of America's postwar prosperity and inequality, and dripping with New Left contempt for consumerism, "*The Original Affluent Society*" brought this critical perspective to bear on the contemporary world. It did so through the classic anthropological move of showing that radical alternatives to the readers' lives really exist. If the capitalist world seeks wealth through ever greater material production to meet infinitely expansive desires, foraging societies follow "The Zen road to affluence": not by getting more, but by wanting less. If it seems that foragers have been left behind by "progress," this is due only to the ethnocentric self-congratulation of the West. Rather than accumulate material goods, these societies are guided by other values: leisure, mobility, and above all, freedom. . . .

Viewed in today's context, of course, not every aspect of the essay has aged well. While acknowledging the violence of colonialism, racism, and dispossession, it does not thematise them as heavily as we might today. Rebuking evolutionary anthropologists for treating present-day foragers as "left behind" by progress, it too can succumb to the temptation to use them as proxies for the Paleolithic. Yet these characteristics should not distract us from appreciating Sahlins's effort to show that if we want to conjure new possibilities, we need to learn about actually inhabitable worlds.

- Q. 5.** The author of the passage mentions Galbraith's "*The Affluent Society*" to:
1. show how Galbraith's theories refute Sahlins's thesis on the contentment of pre-huntergatherer communities.
  2. document the influence of Galbraith's cynical views on modern consumerism on Sahlins's analysis of pre-historic societies.
  3. contrast the materialist nature of contemporary growth paths with the pacifist content ways of living among the foragers.
  4. show how Sahlins's views complemented Galbraith's criticism of the consumerism and inequality of contemporary society.
- Q. 6.** The author mentions Tanzania's Hadza community to illustrate:
1. that hunter-gatherer communities' subsistence-level techniques equipped them to survive well into contemporary times.
  2. how pre-agrarian societies did not hamper the emergence of more advanced agrarian practices in contiguous communities.
  3. that forager communities' lifestyles derived not from ignorance about alternatives, but from their own choice.
  4. how two vastly different ways of living and working were able to coexist in proximity for centuries.
- Q. 7.** The author of the passage criticises Sahlins's essay for its:
1. critique of anthropologists who disparage the choices of foragers in today's society.
  2. cursory treatment for effects of racism and colonialism on societies.
  3. failure to supplement its thesis with robust empirical data.
  4. outdated values regarding present-day foragers versus ancient foraging communities.
- Q. 8.** We can infer that Sahlins's main goal in writing his essay was to:
1. counter Galbraith's pessimistic view of the inevitability of a capitalist trajectory for economic growth.
  2. holds a mirror to an acquisitive society, with examples of other communities that have chosen successfully to be non-materialistic.
  3. put forth the view that, despite egalitarian origins, economic progress brings greater inequality and social hierarchies.
  4. highlight the fact that while we started off as a fairly contented egalitarian people, we have progressively degenerated into materialism.

### Passage 3

**Directions (Q. 9 to 12):** Read the following passage carefully and answer the questions that follow.

The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.

RESIDENTS of Lozere, a hilly department in southern France, recite complaints familiar to many rural corners of Europe. In remote hamlets and villages, with names such as Le Bacon and Le Bacon Vieux, mayors grumble about a lack of local schools, jobs, or phone and internet connections. Farmers of grazing

animals add another concern: the return of wolves. Eradicated from France last century, the predators are gradually creeping back to more forests and hillsides. "The wolf must be taken in hand," said an aspiring parliamentarian, Francis Palombi, when pressed by voters in an election campaign early this summer. Tourists enjoy visiting a wolf park in Lozere, but farmers fret over their livestock and their livelihoods. . . .

As early as the ninth century, the royal office of the Luparii—wolf-catchers—was created in France to tackle the predators. Those official hunters (and others) completed their job in the 1930s, when the last wolf disappeared from the mainland. Active hunting and improved technology such as rifles in the 19<sup>th</sup> century, plus the use of poison such as strychnine later on, caused the population collapse. But in the early 1990s the animals reappeared. They crossed the Alps from Italy, upsetting sheep farmers on the French side of the border. Wolves have since spread to areas such as Lozere, delighting environmentalists, who see the predators' presence as a sign of wider ecological health. Farmers, who say the wolves cause the deaths of thousands of sheep and other grazing animals, are less cheerful. They grumble that green activists and politically correct urban types have allowed the return of an old enemy.

Various factors explain the changes of the past few decades. Rural depopulation is part of the story. In Lozere, for example, farming and a once-flourishing mining industry supported a population of over 140,000 residents in the mid-19<sup>th</sup> century. Today the department has fewer than 80,000 people, many in its towns. As humans withdraw, forests are expanding. In France, between 1990 and 2015, forest cover increased by an average of 102,000 hectares each year, as more fields were given over to trees. Now, nearly one-third of mainland France is covered by woodland of some sort. The decline of hunting as a sport also means more forests fall quiet. In the mid-to-late 20<sup>th</sup> century over 2 m hunters regularly spent winter weekends tramping in woodland, seeking boars, birds and other prey. Today the Federation Nationale des Chasseurs, the national body, claims 1.1m people hold hunting licences, though the number of active hunters is probably lower. The mostly protected status of the wolf in Europe—hunting them is now forbidden, other than when occasional culls are sanctioned by the state—plus the efforts of NGOs to track and count the animals, also contribute to the recovery of wolf populations.

As the lupine population of Europe spreads westwards, with occasional reports of wolves seen closer to urban areas, expect to hear more clashes between farmers and those who celebrate the predators' return. Farmers' losses are real, but are not the only economic story. Tourist venues, such as parks where wolves are kept and the animals' spread is discussed, also generate income and jobs in rural areas.

**Q. 9.** Which one of the following has NOT contributed to the growing wolf population in Lozere?

1. An increase in woodlands and forest cover in Lozere.
2. The granting of a protected status to wolves in Europe.
3. A decline in the rural population of Lozere.
4. The shutting down of the royal office of the Luparii.

**Q. 10.** The author presents a possible economic solution to an existing issue facing Lozere that takes into account the divergent and competing interests of:

1. farmers and environmentalists.
2. tourists and environmentalists.
3. environmentalists and politicians.
4. politicians and farmers.

**Q. 11.** The inhabitants of Lozere have to grapple with all of the following problems, EXCEPT:

1. lack of educational facilities.
2. poor rural communication infrastructure.
3. livestock losses.
4. decline in the number of hunting licences.

**Q. 12.** Which one of the following statements, if true, would weaken the author's claims?

1. Unemployment concerns the residents of Lozere.
2. The old mining sites of Lozere are now being used as grazing pastures for sheep.
3. Having migrated out in the last century, wolves are now returning to Lozere.
4. Wolf attacks on tourists in Lozere are on the rise.

#### Passage 4

**Directions (Q. 13 to 16):** Read the following passage carefully and answer the questions that follow.

The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.

Many human phenomena and characteristics – such as behaviors, beliefs, economies, genes, incomes, life expectancies, and other things – are influenced both by geographic factors and by non-geographic factors. Geographic factors means physical and biological factors tied to geographic location, including climate, the distributions of wild plant and animal species, soils, and topography. Non-geographic factors include those

factors subsumed under the term culture, other factors subsumed under the term history, and decisions by individual people. . . .

[T]he differences between the current economies of North and South Korea . . . cannot be attributed to the modest environmental differences between [them] . . . They are instead due entirely to the different [government] policies . . . At the opposite extreme, the Inuit and other traditional peoples living at North of the Arctic Circle developed warm fur clothes but no agriculture, while equatorial lowland peoples around the world never developed warm fur clothes but often did develop agriculture. The explanation is straightforwardly geographic, rather than a cultural or historical quirk unrelated to geography. . . . Aboriginal Australia remained the sole continent occupied only by hunter/gatherers and with no indigenous farming or herding . . . [Here the] explanation is biogeographic: the Australian continent has no domesticable native animal species and few domesticable native plant species. Instead, the crops and domestic animals that now make Australia a food and wool exporter are all nonnative (mainly Eurasian) species such as sheep, wheat, and grapes, brought to Australia by overseas colonists.

Today, no scholar would be silly enough to deny that culture, history, and individual choices play a big role in many human phenomena. Scholars don't react to cultural, historical, and individual-agent explanations by denouncing "cultural determinism," "historical determinism," or "individual determinism," and then thinking no further. But many scholars do react to any explanation invoking some geographic role, by denouncing "geographic determinism" . . .

Several reasons may underlie this widespread but nonsensical view. One reason is that some geographic explanations advanced a century ago were racist, thereby causing all geographic explanations to become tainted by racist associations in the minds of many scholars other than geographers. But many genetic, historical, psychological, and anthropological explanations advanced a century ago were also racist, yet the validity of newer non-racist genetic etc., explanations is widely accepted today. Another reason for reflex rejection of geographic explanations is that historians have a tradition, in their discipline, of stressing the role of contingency (a favorite word among historians) based on individual decisions and chance. Often that view is warranted . . . But often, too, that view is unwarranted. The development of warm fur clothes among the Inuit living North of the Arctic Circle was not because one influential Inuit leader persuaded other Inuit in 1783 to adopt warm fur clothes, for no good environmental reason.

A third reason is that geographic explanations usually depend on detailed technical facts of geography and other fields of scholarship . . . Most historians and economists don't acquire that detailed knowledge as part of the professional training.

**Q. 13.** The author criticises scholars who are not geographers for all of the following reasons EXCEPT:

1. their labelling of geographic explanations as deterministic.
2. their rejection of the role of biogeographic factors in social and cultural phenomena.
3. their outdated interpretations of past cultural and historical phenomena.
4. the importance they place on the role of individual decisions when studying human phenomena.

**Q. 14.** The examples of the Inuit and Aboriginal Australians are offered in the passage to show:

1. that despite geographical isolation, traditional societies were self-sufficient and adaptive.
2. how environmental factors leads to comparatively divergent paths in livelihoods and development.
3. how physical circumstances can dictate human behaviour and cultures.

4. human resourcefulness across cultures in adapting to their surroundings.

**Q. 15.** All of the following can be inferred from the passage EXCEPT:

1. while most human phenomena result from culture and individual choice, some have bio-geographic origins.
2. agricultural practices changed drastically in the Australian continent after it was colonised.
3. several academic studies of human phenomena in the past involved racist interpretations.
4. individual dictat and contingency were not the causal factors for the use of fur clothing in some very cold climates.

**Q. 16.** All of the following are advanced by the author as reasons why non-geographers disregard geographic influences on human phenomena EXCEPT their:

1. disciplinary training which typically does not include technical knowledge of geography.

2. dismissal of explanations that involve geographical causes for human behaviour.
3. lingering impressions of past geographic analyses that were politically offensive.
4. belief in the central role of humans, unrelated to physical surroundings, in influencing phenomena.

**Q. 17.** There is a sentence that is missing in the paragraph below. Look at the paragraph and decide where (option 1, 2, 3, or 4) the following sentence would best fit.

Sentence: The discovery helps to explain archeological similarities between the Paleolithic peoples of China, Japan, and the Americas.

Paragraph: The researchers also uncovered an unexpected genetic link between Native Americans and Japanese people. \_\_\_(1)\_\_. During the deglaciation period, another group branched out from Northern coastal China and travelled to Japan. \_\_\_(2)\_\_. "We were surprised to find that this ancestral source also contributed to the Japanese gene pool, especially the indigenous Ainus," says Li. \_\_\_(3)\_\_. They shared similarities in how they crafted stemmed projectile points for arrowheads and spears. \_\_\_(4)\_\_. "This suggests that the Pleistocene connection among America, China, and Japan was not confined to culture but also to genetics," says senior author Qing-Peng Kong, an evolutionary geneticist at the Chinese Academy of Sciences.

1. Option 2
2. Option 4
3. Option 3
4. Option 1

**Q. 18.** There is a sentence that is missing in the paragraph below. Look at the paragraph and decide where (option 1, 2, 3, or 4) the following sentence would best fit.

Sentence: This philosophical cut at one's core beliefs, values, and way of life is difficult enough.

Paragraph: The experience of reading philosophy is often disquieting. When reading philosophy, the values around which one has heretofore organised one's life may come to look provincial, flatly wrong, or even evil. \_\_\_(1)\_\_. When beliefs previously held as truths are rendered implausible, new beliefs, values, and ways of living may be required. \_\_\_(2)\_\_. What's worse, philosophers admonish each other to remain unsutured until such time as a defensible new

answer is revealed or constructed. Sometimes philosophical writing is even strictly critical in that, it does not even attempt to provide an alternative after tearing down a cultural or conceptual citadel. \_\_\_(3)\_\_. The reader of philosophy must be prepared for the possibility of this experience. While reading philosophy can help one clarify one's values, and even make one self-conscious for the first time of the fact that there are good reasons for believing what one believes, it can also generate unremediated doubt that is difficult to live with. \_\_\_(4)\_\_.

1. Option 4
2. Option 2
3. Option 1
4. Option 3

**Q. 19.** Five jumbled up sentences (labelled 1, 2, 3, 4 and 5), related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd sentence and key in the number of that sentence as your answer.

1. Having an appreciation for the workings of another person's mind is considered a prerequisite for natural language acquisition, strategic social interaction, reflexive thought, and moral judgment.
2. It is a 'theory of mind' though some scholars prefer to call it 'mentalising' or 'mindreading', which is important for the development of one's cognitive abilities.
3. Though we must speculate about its evolutionary origin, we do have indications that the capacity evolved sometime in the last few million years.
4. This capacity develops from early beginnings in the first year of life to the adult's fast and often effortless understanding of others' thoughts, feelings, and intentions.
5. One of the most fascinating human capacities is the ability to perceive and interpret other people's behaviour in terms of their mental states.

**Q. 20.** Five jumbled up sentences (labelled 1, 2, 3, 4 and 5), related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd sentence and key in the number of that sentence as your answer.

1. In English, there is no systematic rule for the naming of numbers; after ten, we have "eleven" and "twelve" and then the teens: "thirteen", "fourteen", "fifteen" and so on.

2. Even more confusingly, some English words invert the numbers they refer to: the word “fourteen” puts the four first, even though it appears last.
3. It can take children a while to learn all these words, and understand that “fourteen” is different from “forty”.
4. For multiples of 10, English speakers switch to a different pattern: “twenty”, “thirty”, “forty” and so on.
5. If you did not know the word for “eleven”, you would be unable to just guess it – you might come up with something like “one-teen”.

**Q. 21.** The four sentences (labelled 1, 2, 3 and 4) given 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. What precisely are the “unusual elements” that make a particular case so attractive to a certain kind of audience?
2. It might be a particularly savage or unfathomable level of depravity, very often it has something to do with the precise amount of mystery involved.
3. Unsolved, and perhaps unsolvable cases offer something that “ordinary” murder does not.
4. Why are some crimes destined for perpetual re-examination and others locked into permanent obscurity?

**Q. 22.** The four sentences (labelled 1, 2, 3 and 4) given 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. Algorithms hosted on the internet are accessed by many, so biases in AI models have resulted in much larger impact, adversely affecting far larger groups of people.
2. Though “algorithmic bias” is the popular term, the foundation of such bias is not in algorithms, but in the data; algorithms are not biased, data is, as algorithms merely reflect persistent patterns that are present in the training data.
3. Despite their widespread impact, it is relatively easier to fix AI biases than humangenerated biases, as it is simpler

to identify the former than to try to make people unlearn behaviors learnt over generations.

4. The impact of biased decisions made by humans is localised and geographically confined, but with the advent of AI, the impact of such decisions is spread over a much wider scale.

**Q. 23.** The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Colonialism is not a modern phenomenon. World history is full of examples of one society gradually expanding by incorporating adjacent territory and settling its people on newly conquered territory. In the sixteenth century, colonialism changed decisively because of technological developments in navigation that began to connect more remote parts of the world. The modern European colonial project emerged when it became possible to move large numbers of people across the ocean and to maintain political control in spite of geographical dispersion. The term colonialism is used to describe the process of European settlement, violent dispossession and political domination over the rest of the world, including the Americas, Australia, and parts of Africa and Asia.

1. As a result of developments in navigation technology, European colonialism, led to the displacement of indigenous populations and global political changes in the 16<sup>th</sup> century.
2. Colonialism, conceptualized in the 16<sup>th</sup> century, allowed colonizers to expand their territories, establish settlements, and exercise political power.
3. Technological advancements in navigation in the 16<sup>th</sup> century, transformed colonialism, enabling Europeans to establish settlements and exert political dominance over distant regions.
4. Colonialism surged in the 16<sup>th</sup> century due to advancements in navigation, enabling British settlements abroad and global dominance.

**Q. 24.** The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Manipulating information was a feature of history long before modern journalism established rules of integrity. A record dates back to ancient Rome, when Antony met Cleopatra and his political enemy Octavian

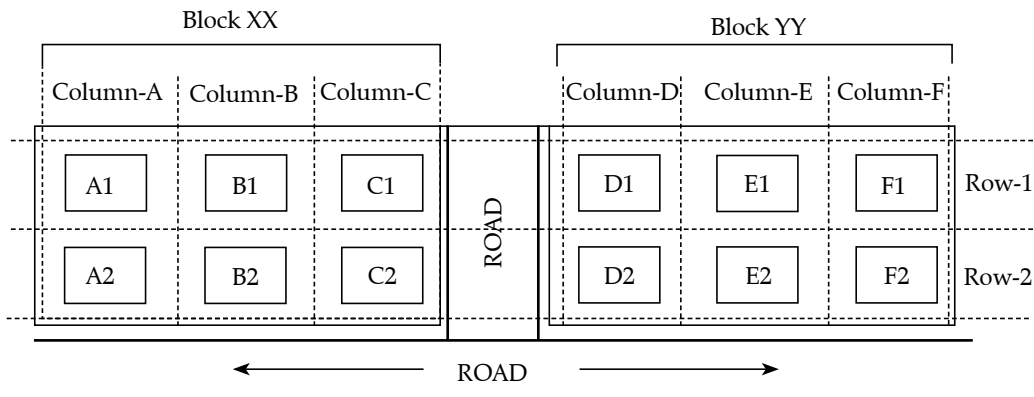
launched a smear campaign against him with “short, sharp slogans written upon coins.” The perpetrator became the first Roman Emperor and “fake news had allowed Octavian to hack the republican system once and for all”. But the 21<sup>st</sup> century has seen the weaponisation of information on an unprecedented scale. Powerful new technology makes the fabrication of content simple, and social networks amplify falsehoods peddled by States, populist politicians, and dishonest corporate entities. The platforms have become fertile ground for computational propaganda, ‘trolling’ and ‘troll armies’.

1. Disinformation, which is mediated by technology today, is not new and has existed since ancient times.
2. People need to become critical of what they read, since historically, weaponization of information has led to corruption.
3. Use of misinformation for attaining power, a practice that is as old as the Octavian era, is currently fueled by technology.
4. Octavian used fake news to manipulate people and attain power and influence, just as people do today.

## Data Interpretation and Logical Reasoning (DILR)

**Directions (Q. 1 to 5):** Read the instructions given and answer the questions that follow:

The schematic diagram below shows 12 rectangular houses in a housing complex. House numbers are mentioned in the rectangles representing the houses. The houses are located in six columns – Column-A through Column-F, and two rows – Row-1 and Row-2. The houses are divided into two blocks - Block XX and Block YY. The diagram also shows two roads, one passing in front of the houses in Row-2 and another between the two blocks.



Some of the houses are occupied. The remaining ones are vacant and are the only ones available for sale. The road adjacency value of a house is the number of its sides adjacent to a road. For example, the road adjacency values of C2, F2, and B1 are 2, 1, and 0, respectively. The neighbour count of a house is the number of sides of that house adjacent to occupied houses in the same block. For example, E1 and C1 can have the maximum possible neighbour counts of 3 and 2, respectively.

The base price of a vacant house is ₹ 10 lakhs if the house does not have a parking space, and ₹ 12 lakhs if it does. The quoted price (in lakhs of ₹) of a vacant house is calculated as (base price) + 5 × (road adjacency value) + 3 × (neighbour count).

The following information is also known.

1. The maximum quoted price of a house in Block XX is ₹ 24 lakhs. The minimum quoted price of a house in block YY is ₹ 15 lakhs, and one such house is in Column-E.
2. Row-1 has two occupied houses, one in each block.
3. Both houses in Column-E are vacant. Each of Column-D and Column-F has at least one occupied house.
4. There is only one house with parking space in Block YY.

**Q. 1.** How many houses are vacant in Block XX?

**Q. 2.** Which of the following houses is definitely occupied?

1. A1      2. B1      3. D2      4. F2

**Q. 3.** Which of the following options best describes the number of vacant houses in Row-2?

1. Exactly 3      2. Either 3 or 4  
3. Either 2 or 3      4. Exactly 2



- Q. 4.** What is the maximum possible quoted price (in lakhs of ₹) for a vacant house in Column-E? **Q. 5.** Which house in Block YY has parking space?  
1. F1      2. E1      3. E2      4. F2

**Directions (Q. 6 to 10):** Answer the questions on the basis of the information given below.

Faculty members in a management school can belong to one of four departments – Finance and Accounting (F&A), Marketing and Strategy (M&S), Operations and Quants (O&Q) and Behaviour and Human Resources (B&H). The numbers of faculty members in F&A, M&S, O&Q and B&H departments are 9, 7, 5 and 3 respectively.

Prof. Pakrasi, Prof. Qureshi, Prof. Ramaswamy and Prof. Samuel are four members of the school's faculty who were candidates for the post of the Dean of the school. Only one of the candidates was from O&Q.

Every faculty member, including the four candidates, voted for the post. In each department, all the faculty members who were not candidates voted for the same candidate. The rules for the election are listed below.

1. There cannot be more than two candidates from a single department.
2. A candidate cannot vote for himself/herself.
3. Faculty members cannot vote for a candidate from their own department.

After the election, it was observed that Prof. Pakrasi received 3 votes, Prof. Qureshi received 14 votes, Prof. Ramaswamy received 6 votes and Prof. Samuel received 1 vote. Prof. Pakrasi voted for Prof. Ramaswamy, Prof. Qureshi for Prof. Samuel, Prof. Ramaswamy for Prof. Qureshi and Prof. Samuel for Prof. Pakrasi.

- Q. 6.** Which two candidates can belong to the same department?  
1. Prof. Pakrasi and Prof. Samuel  
2. Prof. Pakrasi and Prof. Qureshi  
3. Prof. Qureshi and Prof. Ramaswamy  
4. Prof. Ramaswamy and Prof. Samuel
- Q. 7.** Which of the following can be the number of votes that Prof. Qureshi received from a single department?  
1. 7      2. 8      3. 6      4. 9
- Q. 8.** If Prof. Samuel belongs to B&H, which of the following statements is/are true?  
Statement A: Prof. Pakrasi belongs to M&S.  
Statement B: Prof. Ramaswamy belongs to O&Q.  
1. Neither statement A nor statement B  
2. Both statements A and B  
3. Only statement B  
4. Only statement A
- Q. 9.** What best can be concluded about the candidate from O&Q?  
1. It was either Prof. Pakrasi or Prof. Qureshi.  
2. It was Prof. Ramaswamy.  
3. It was either Prof. Ramaswamy or Prof. Samuel.  
4. It was Prof. Samuel.
- Q. 10.** Which of the following statements is/are true?  
Statement A: Non-candidates from M&S voted for Prof. Qureshi.  
Statement B: Non-candidates from F&A voted for Prof. Qureshi.  
1. Only statement B  
2. Only statement A  
3. Both statements A and B  
4. Neither statement A nor statement B

**Directions (Q. 11 to 15):** Answer the questions based on the following information.

Five restaurants, coded R1, R2, R3, R4 and R5 gave integer ratings to five gig workers – Ullas, Vasu, Waman, Xavier and Yusuf, on a scale of 1 to 5.

The means of the ratings given by R1, R2, R3, R4 and R5 were 3.4, 2.2, 3.8, 2.8 and 3.4 respectively.

The summary statistics of these ratings for the five workers is given below.

	Ullas	Vasu	Waman	Xavier	Yusuf
Mean rating	2.2	3.8	3.4	3.6	2.6
Median rating	2	4	4	4	3
Modal rating	2	4	5	5	1 and 4
Range of rating*	3	3	5	4	4

\* Range of ratings is defined as the difference between the maximum and minimum ratings awarded to a worker. The following is partial information about ratings of 1 and 5 awarded by the restaurants to the workers.

- (a) R1 awarded a rating of 5 to Waman, as did R2 to Xavier, R3 to Waman and Xavier, and R5 to Vasu.
- (b) R1 awarded a rating of 1 to Ullas, as did R2 to Waman and Yusuf, and R3 to Yusuf.

- Q. 11. How many individual ratings cannot be determined from the above information?
- Q. 12. To how many workers did R2 give a rating of 4?
- Q. 13. What rating did R1 give to Xavier?
- Q. 14. What is the median of the ratings given by R3 to the five workers?
- Q. 15. Which among the following restaurants gave its median rating to exactly one of the workers?
1. R2      2. R3      3. R4      4. R5

**Directions (Q. 16 to 20):** Answer the questions based on the following information.

A visa processing office (VPO) accepts visa applications in four categories – US, UK, Schengen, and Others. The applications are scheduled for processing in twenty 15-minute slots starting at 9:00 am and ending at 2:00 pm. Ten applications are scheduled in each slot.

There are ten counters in the office, four dedicated to US applications, and two each for UK applications, Schengen applications and Others applications. Applicants are called in for processing sequentially on a first-come-first-served basis whenever a counter gets freed for their category. The processing time for an application is the same within each category. But it may vary across the categories. Each US and UK application requires 10 minutes of processing time. Depending on the number of applications in a category and time required to process an application for that category, it is possible that an applicant for a slot may be processed later.

On a particular day, Ira, Vijay and Nandini were scheduled for Schengen visa processing in that order. They had a 9:15 am slot but entered the VPO at 9:20 am. When they entered the office, exactly six out of the ten counters were either processing applications, or had finished processing one and ready to start processing the next.

Mahira and Osman were scheduled in the 9:30 am slot on that day for visa processing in the Others category. The following additional information is known about that day.

1. All slots were full.
  2. The number of US applications was the same in all the slots. The same was true for the other three categories.
  3. 50% of the applications were US applications.
  4. All applicants except Ira, Vijay and Nandini arrived on time.
  5. Vijay was called to a counter at 9:25 am.
- Q. 16. How many UK applications were scheduled on that day?
- Q. 17. What is the maximum possible value of the total time (in minutes, nearest to its integer value) required to process all applications in the Others category on that day?
- Q. 18. Which of the following is the closest to the time when Nandini's application process got over?
1. 9:37 am    2. 9:45 am    3. 9:50 am    4. 9:35 am
- Q. 19. Which of the following statements is false?
1. The application process of Mahira was completed before Nandini's.
  2. The application process of Osman was completed before Vijay's.
  3. The application process of Mahira started after Nandini's.
  4. The application process of Osman was completed before 9:45 am.
- Q. 20. When did the application processing for all US applicants get over on that day?
1. 2:00 pm    2. 3:40 pm    3. 2:05 pm    4. 2:25 pm

## Quantitative Aptitude (QA)

- Q. 1. If  $x$  and  $y$  are real numbers such that  $x^2 + (x - 2y - 1)^2 = -4y(x + y)$ , then the value  $x - 2y$  is
1. 1      2. 2      3. -1      4. 0
- Q. 2. Let  $n$  be the least positive integer such that 168 is a factor of  $1134^n$ . If  $m$  is the least positive integer such that  $1134^n$  is a factor of  $168^m$ , then  $m + n$  equals
1. 24      2. 12      3. 9      4. 15
- Q. 3. If  $\sqrt{5x+9} + \sqrt{5x-9} = 3(2 + \sqrt{2})$ , then  $\sqrt{10x+9}$
1.  $3\sqrt{31}$     2.  $2\sqrt{7}$     3.  $3\sqrt{7}$     4.  $4\sqrt{5}$
- Q. 4. If  $x$  and  $y$  are positive real numbers such that  $\log_x(x^2 + 12) = 4$  and  $3 \log_y x = 1$ , then  $x + y$  equals
1. 10      2. 68      3. 20      4. 11

- Q. 5. The number of integer solutions of equation  $2|x|(x^2 + 1) = 5x^2$  is
- Q. 6. The equation  $x^3 + (2r + 1)x^2 + (4r - 1)x + 2 = 0$  has  $-2$  as one of the roots. If the other two roots are real, then the minimum possible non-negative integer value of  $r$  is
- Q. 7. Let  $\alpha$  and  $\beta$  be the two distinct roots of the equation  $2x^2 - 6x + k = 0$ , such that  $(\alpha + \beta)$  and  $\alpha\beta$  are the distinct roots of the equation  $x^2 + px + p = 0$ . Then the value of  $8(k - p)$  is
- Q. 8. In an examination, the average marks of 4 girls and 6 boys is 24. Each of the girls has the same marks while each of the boys has the same marks. If the marks of any girl is at most double the marks of any boy, but not less than the marks of any boy, then the number of possible distinct integer values of the total marks of 2 girls and 6 boys is  
1. 21      2. 19      3. 20      4. 22
- Q. 9. The salaries of three friends Sita, Gita and Mita are initially in the ratio 5 : 6 : 7, respectively. In the first year, they get salary hikes of 20%, 25% and 20%, respectively. In the second year, Sita and Mita get salary hikes of 40% and 25%, respectively, and the salary of Gita becomes equal to the mean salary of the three friends. The salary hike of Gita in the second year is  
1. 26%      2. 30%      3. 28%      4. 25%
- Q. 10. The minor angle between the hour hand and minute hand of a clock was observed at 8:48 am. The minimum duration, in minutes, after 8:48 am when this angle increase by 50% is  
1.  $\frac{24}{11}$       2.  $\frac{36}{11}$       3. 4      4. 2
- Q. 11. Brishti went on an 8-hour trip in a car. Before the trip, the car had travelled a total of  $x$  km till then, where  $x$  is a whole number and is palindromic, i.e.,  $x$  remains unchanged when its digits are reversed. At the end of the trip, the car had travelled a total of 26862 km till then, this number again being palindromic. If Brishti never drove at more than 110 km/h, then the greatest possible average speed at which she drove during the trip, in km/h, was  
1. 90      2. 80      3. 100      4. 110
- Q. 12. Gita sells two objects A and B at the same price such that she makes a profit of 20% on object A and a loss of 10% on object B. If she increases the selling price such that objects A and B are still sold at an equal price and a profit of 10% is made on object B, then the profit made on object A will be nearest to  
1. 42%      2. 49%      3. 45%      4. 47%
- Q. 13. A mixture P is formed by removing a certain amount of coffee from a coffee jar and replacing the same amount with cocoa powder. The same amount is again removed from mixture P and replaced with same amount of cocoa powder to form a new mixture Q. If the ratio of coffee and cocoa in the mixture Q is 16 : 9, then the ratio of cocoa in mixture P to that in mixture Q is  
1. 4 : 9      2. 1 : 3      3. 5 : 9      4. 1 : 2
- Q. 14. Anil invests ₹ 22000 for 6 years in a certain scheme with 4% interest per annum, compounded half-yearly. Sunil invests in the same scheme for 5 years, and then reinvests the entire amount received at the end of 5 years for one year at 10% simple interest. If the amounts received by both at the end of 6 years are same, then the initial investment made by Sunil, in rupees, is
- Q. 15. The amount of job that Amal, Sunil and Kamal can individually do in a day, are in harmonic progression. Kamal takes twice as much time as Amal to do the same amount of job. If Amal and Sunil work for 4 days and 9 days, respectively, Kamal needs to work for 16 days to finish the remaining job. Then the number of days Sunil will take to finish the job working alone, is
- Q. 16. Arvind travels from town A to town B, and Surbhi from town B to town A, both starting at the same time along the same route. After meeting each other, Arvind takes 6 hours to reach town B while Surbhi takes 24 hours to reach town A. If Arvind travelled at a speed of 54 km/h, then the distance, in km, between town A and town B is
- Q. 17. A quadrilateral ABCD is inscribed in a circle such that  $AB : CD = 2 : 1$  and  $BC : AD = 5 : 4$ . If AC and BD intersect at the point E, then  $AE : CE$  equals  
1. 2 : 1      2. 1 : 2      3. 8 : 5      4. 5 : 8
- Q. 18. Let C be the circle  $x^2 + y^2 + 4x - 6y - 3 = 0$  and L be the locus of the point of intersection of a pair of tangents to C with the angle between the two tangents equal to  $60^\circ$ . Then, the point at which L touches the line  $x = 6$  is  
1. (6, 6)      2. (6, 4)      3. (6, 8)      4. (6, 3)

- Q. 19.** In a right-angled triangle  $\triangle ABC$ , the altitude AB is 5 cm, and the base BC is 12 cm. P and Q are two points on BC such that the areas of  $\triangle ABP$ ,  $\triangle ABQ$  and  $\triangle ABC$  are in arithmetic progression. If the area of  $\triangle ABC$  is 1.5 times the area of  $\triangle ABP$ , the length of PQ, in cm, is
- Q. 20.** For some positive and distinct real numbers  $x$ ,  $y$  and  $z$ , if  $\frac{1}{\sqrt{y} + \sqrt{z}}$  is the arithmetic mean of  $\frac{1}{\sqrt{x} + \sqrt{z}}$  and  $\frac{1}{\sqrt{x} + \sqrt{y}}$ , then the relationship which will always hold true, is
- $x, y$  and  $z$  are in arithmetic progression
  - $\sqrt{x}, \sqrt{y}$  and  $\sqrt{z}$  are in arithmetic progression
  - $y, x$  and  $z$  are in arithmetic progression
  - $\sqrt{x}, \sqrt{z}$  and  $\sqrt{y}$  are in arithmetic progression
- Q. 21.** The number of all natural numbers up to 1000 with non-repeating digits is
- 738
  - 648
  - 504
  - 585
- Q. 22.** A lab experiment measures the number of organisms at 8 am every day. Starting with 2 organisms on the first day, the number of organisms on any day is equal to 3 more than twice the number on the previous day. If the number of organisms on the  $n^{\text{th}}$  day exceeds one million, then the lowest possible value of  $n$  is

## Answer Key

### Verbal Ability and Reading Comprehension (VARC)

1. (2)	2. (1)	3. (4)	4. (3)	5. (4)	6. (3)	7. (2)	8. (2)	9. (4)	10. (1)
11. (4)	12. (4)	13. (3)	14. (3)	15. (1)	16. (2)	17. (3)	18. (2)	19. 2	20. 3
21. 4123	22. 4123	23. (3)	24. (3)						

### Data Interpretation and Logical Reasoning (DILR)

1. 3	2. (2)	3. (3)	4. 21	5. (2)	6. (2)	7. (4)	8. (2)	9. (3)	10. (1)
11. 0	12. 0	13. 3	14. 4	15. (3)	16. 0	17. 200	18. (2)	19. (3)	20. (3)

### Quantitative Aptitude (QA)

1. (1)	2. (4)	3. (3)	4. (1)	5. 3	6. 2	7. 6	8. (1)	9. (1)	10. (1)
11. (3)	12. (4)	13. (3)	14. 20808	15. 27	16. 972	17. (3)	18. (4)	19. 2	20. (3)
21. (1)	22. 19								

## Answers and Explanations

## Verbal Ability and Reading Comprehension (VARC)

1. **Option (2) is correct.**

The passage suggests the opposite. It emphasises that the novels by Ghosh, Gurnah, Collen, and Conrad reference a different set of histories and geographies compared to the commonly found ones centered in Europe or the US. These novels contribute to a remapping that challenges the Western-centric perspective.

Option 1 aligns with the passage. The novels discussed in the passage move beyond the limitations of national concerns and explore the Indian Ocean world, providing a rich regional perspective.

The passage mentions that historical and archaeological evidence suggests that what we now call globalisation first appeared in the Indian Ocean. This supports option (3), that the global south, represented by the Indian Ocean world, was the first center of globalisation.

As per the author, 'commonly found ones' are mostly centred in Europe or the US, assume a background of Christianity and whiteness'. Whereas, his novels highlight a largely Islamic space, feature characters of colour, and centralise ports such as Malindi, Mombasa, Aden, Java, and Bombay. This challenges the idea that early international trade and commerce were solely dominated by white Europeans.

In summary, statements 1, 3, and 4 contribute to the "remapping" discussed in the passage, while statement 2 does not align with the passage's perspective on the origin of cosmopolitanism.

2. **Option (1) is correct.****Postcolonial novels: Border-crossing**

This pair is the odd one out. The passage doesn't explicitly mention postcolonial novels being associated with border-crossing. Instead, it mentions that postcolonial novels were concerned with national questions and sometimes served as allegories for a specific nation. In fact, they were land-focused and

inward-looking, instead of border-crossing. The focus is more on the nation rather than border-crossing.

Option 2 is a consistent pair. The passage emphasises that Indian Ocean novels, as discussed in the book "Writing Ocean Worlds," present an outward-looking perspective. The novels focus on movement, border-crossing, and interconnection.

Option 3 is also a consistent pair. The passage mentions that slavery is a part of the portrayal in the novels set in the Indian Ocean world. While not the central theme, the mention of slavery is in line with the broader historical and thematic context.

Option 4 is also a consistent pair. The passage notes that early postcolonial novels were often concerned with national questions and supported anti-colonial nationalism.

3. **Option (4) is correct.**

The passage discusses how the novels in "Writing Ocean Worlds" by authors like Ghosh, Gurnah, Collen, and Conrad offer a different perspective compared to mainstream English-language novels. It mentions that mainstream novels often center on Europe or the US, assume a background of Christianity and whiteness, and mention places like Paris and New York. Statement 4 aligns with the passage's claim by stating that mainstream English-language novels historically privileged the Christian, white, male experience of travel and adventure. This supports rather than weakens the passage's argument.

4. **Option (3) is correct.**

The passage emphasises that the novels in "Writing Ocean Worlds" highlight a largely Islamic space, featuring characters of colour and centralising ports like Malindi, Mombasa, Aden, Java, and Bombay. The focus is on the interconnected global south, not the global north. This is reflected through the author's book- sensory image of a southern cosmopolitan culture.

Options 1, 2 and 4 are incorrect because the passage mentions that migration is often portrayed as abandonment rather than adventure. Thus, confirming that the migration was an ambivalent experience. It also indicates that for much of history, travel by sea in the Indian Ocean was easier than by land, and port cities far apart were often more easily connected to each other than much closer inland cities. The passage also mentions that the Indian Ocean world's migration networks were shaped by the religious and commercial histories of the region.

5. **Option (4) is correct.**

The passage indicates that Sahlins's essay, "The Original Affluent Society" brings a critical perspective to bear on the contemporary world, particularly on the issues of prosperity and inequality. By referencing Galbraith's "The Affluent Society," the passage suggests that Sahlins's views complement Galbraith's criticism of consumerism and inequality in modern society. The comparison is made to demonstrate that foraging societies, in contrast to the capitalist pursuit of wealth through material production, follow a "Zen road to affluence" by wanting less and prioritising values such as leisure, mobility, and freedom. Therefore, option 4 accurately captures the relationship between Sahlins's views and Galbraith's criticism of contemporary society.

6. **Option (3) is correct.**

The author mentions Tanzania's Hadza community in the context of Marshall Sahlins's argument that forager communities, like the Hadza, had alternatives to settled agriculture but consciously chose their own way of life. The passage states that the Hadza, despite being surrounded by farmers, knew they had alternatives and rejected them. This illustrates the author's point that forager communities' lifestyles are not a result of ignorance about alternatives but a demonstration of real choices. Therefore, option 3 accurately captures the purpose of mentioning Tanzania's Hadza community in the passage.

7. **Option (2) is correct.**

The passage mentions that when viewed in today's context, not every aspect of Sahlins's essay has aged well. One of the criticisms highlighted is that the essay does not thematise the effects of racism, colonialism, and dispossession as heavily as one might expect today. The author points out that, while acknowledging these issues, the essay does not

give them enough emphasis. Therefore, option 2 accurately reflects the author's criticism regarding the essay's treatment of the effects of racism and colonialism.

8. **Option (2) is correct.**

The passage suggests that Sahlins's main goal in writing his essay, "The Original Affluent Society," was to bring a critical perspective to contemporary society. Sahlins used examples from foraging societies to challenge the acquisitive nature of modern society. By showcasing these foraging societies as successful in choosing non-materialistic ways of life, he aimed to provide an alternative perspective on prosperity and challenge the prevailing views on economic progress and wealth accumulation. Therefore, option 2 aligns with the inferred goal of Sahlins in writing his essay.

9. **Option (4) is correct.**

The passage mentions that in the ninth century, the royal office of the Luparii (wolf-catchers) was created in France to tackle wolf predators. This office, along with other hunters, completed their job in the 1930s when the last wolf disappeared from the mainland. The shutting down of the royal office of the Luparii contributed to the eradication of wolves in France at that time. Therefore, the shutting down of this office did not contribute to the growing wolf population in Lozère.

10. **Option (1) is correct.**

The passage suggests that the return of wolves in Lozère has led to conflicts between farmers, who are concerned about the impact of wolves on their livestock and livelihoods, and environmentalists, who see the presence of wolves as a sign of wider ecological health. However, the author hints at a possible economic solution by mentioning tourist venues, such as parks where wolves are kept and discussions about the animals' spread. These venues generate income and jobs in rural areas, indicating a potential economic solution that takes into account the divergent interests of farmers and environmentalists.

Therefore, option 1, "farmers and environmentalists," best captures the divergent and competing interests mentioned in the passage in the context of a possible economic solution.

11. **Option (4) is correct.**

The passage mentions several issues faced by the inhabitants of Lozère, including a lack of local schools, jobs, phone and internet

connections, and concerns about livestock losses due to the return of wolves. However, there is no mention of a decline in the number of hunting licenses as a specific problem faced by the residents of Lozère. Therefore, option 4 is the correct answer.

**12. Option (4) is correct.**

The author's claims revolve around the challenges faced by residents in Lozère, including concerns about the return of wolves and the conflicts between farmers and environmentalists. He considers the issue from a dual economic perspective- a loss for farmers on one hand but an economic gain for the country. Thus, with the onset of Wolf attacks on tourists in Lozere, it will question both the economic standpoints. Therefore, Option 4, stating that wolf attacks on tourists are on the rise, weakens the author's claims. The passage focuses on the impact of wolves on livestock, the livelihoods of farmers, and the conflicts between different interest groups, rather than attacks on tourists.

**13. Option (3) is correct.**

The passage does not criticise scholars for their outdated interpretations of past cultural and historical phenomena. Instead, it discusses scholars' reactions to geographic explanations, particularly their reflex rejection of geographic explanations and the reasons behind it. The criticisms are focused on scholars' labelling of geographic explanations as deterministic, their rejection of the role of biogeographic factors, and their emphasis on individual decisions in studying human phenomena. Therefore, option 3 is not explicitly mentioned as a reason for criticism in the pass

**14. Option (3) is correct.**

The examples of the Inuit and Aboriginal Australians in the passage illustrate how physical circumstances, specifically biogeographic and environmental factors, can influence human behaviour and cultures. The Inuit developed warm fur clothes in response to the cold climate of the Arctic Circle, while Aboriginal Australians remained hunter/gatherers due to the absence of domestic able native animal and plant species on the Australian continent. These examples highlight the role of geography and environment in shaping the lifestyles and cultural practices of these societies, supporting the idea that physical circumstances can dictate human

behaviour and culture .Therefore, option (3) is correct.

**15. Option (1) is correct.**

The passage explicitly states that many human phenomena and characteristics are influenced by both geographic factors and non-geographic factors. It does not imply that most human phenomena result solely from culture and individual choice. Instead, it emphasises the interplay of both geographic and non-geographic factors in shaping various aspects of human behaviour, beliefs, economies, etc. Therefore, option 1 is not a correct inference from the passage.

**16. Option (2) is correct.**

The author presents several reasons why non-geographers often reject or disregard geographic influences on human phenomena. These include the tainted legacy of past racist geographic explanations, a tradition among historians to emphasise contingency and individual decisions, and the technical nature of geographic explanations that many scholars, especially historians and economists, may not acquire in their professional training. The author does not suggest that non-geographers dismiss explanations involving geographical causes for human behaviour. Instead, the passage emphasises the reflex rejection of geographic explanations, attributing it to historical reasons and the perceived lack of relevance in the eyes of scholars from other disciplines. Therefore, option 2 is not presented as a reason in the passage.

**17. Option (3) is correct.**

The missing sentence, "The discovery helps to explain archaeological similarities between the Paleolithic peoples of China, Japan, and America," would best fit in option 3. This is because option 3 discusses the unexpected genetic link between Native Americans and Japanese people, emphasising the contribution of an ancestral source to the Japanese gene pool, particularly among the indigenous Ainu. The sentence about archaeological similarities logically follows this discussion as it provides additional context and explanation for the observed genetic link. It suggests that the genetic connection is not only supported by DNA analysis but also helps explain similarities in the archaeological record among the Paleolithic peoples of China, Japan, and the Americas.

**18. Option (2) is correct.**

The missing sentence, "This philosophical cut at one's core beliefs, values, and way of life is difficult enough," would best fit in option 2. This is because after this the paragraph discusses the disquieting experience of reading philosophy, where previously held beliefs are challenged, rendering them implausible. The sentence about the philosophical cut at one's core beliefs fits logically in this context as it further emphasises the difficulty of the experience. Placing it in option 2 helps maintain the coherence of the paragraph by introducing the challenging nature of the philosophical exploration before discussing the need for new beliefs, values, and ways of living. Furthermore, it plausibly connects the next statement starting with 'what's worse' because the missing statement says that the philosophical cut is difficult enough. It enhances the overall flow of the passage by providing a clearer transition between the disquieting experience and the subsequent need for new perspectives.

**19. Correct answer is [2].**

The odd sentence is 2 because it introduces a different term, "mentalizing" or "mindreading," without establishing its connection to the broader context. The coherent sequence begins with 5, highlighting the human capacity to interpret others' behaviour in terms of mental states. Sentence 1 follows, emphasising the importance of understanding others' minds in various aspects of human development. Sentence 4 logically extends this by discussing the development of this capacity from infancy to adulthood. Finally, sentence 3 adds a temporal perspective, discussing the speculative evolutionary origin of this cognitive ability. Together, they form a cohesive paragraph on the human capacity for understanding others' mental states.

**20. Correct answer is [3].**

The odd sentence is 3 as it introduces a different topic regarding the challenges children face in learning number words. The coherent sequence begins with 1, discussing the lack of a systematic rule for naming numbers in English, followed by 5, which highlights the potential confusion in forming words like "eleven." Sentence 2 adds complexity by mentioning the inversion of numbers in certain words. Finally, sentence 4 extends the discussion to multiples of 10, forming a cohesive paragraph about the

intricacies and irregularities in English number naming conventions. The odd sentence disrupts the flow by introducing a specific difficulty faced by children.

**21. Correct answer is [4123].**

The sequence 4-1-2-3 creates a coherent paragraph that explores the factors making certain crimes perennially intriguing. It begins by questioning the unique elements that captivate a specific audience, followed by a consideration of factors such as extreme brutality or a mysterious aura that contribute to a case's appeal. The third sentence emphasises how unsolved cases provide something distinct from "ordinary" murders. The final sentence builds on this by questioning why some crimes endure constant re-examination while others remain perpetually obscure, inviting readers to ponder on the enduring fascination with certain criminal cases.

**22. Correct answer is [4123].**

The proper sequence is 4-1-2-3. Sentence 4 introduces the subject of the passage- the advent of AI and that the impact of biased decisions is spread over a much wider scale. Sentence (1) logically aligns with it, by stressing on the manner how biases in AI models have resulted in much larger impact. Statement (2) contradicts the preceding statements by asserting that the foundation of such bias is not in algorithms but in data. Statement (3) serves as the appropriate conclusion to the passage- it is relatively easier to fix AI biases than human-generated biases.

**23. Option (3) is correct.**

Option 3 best captures the essence of the passage. It highlights the crucial role of technological advancements in navigation during the 16<sup>th</sup> century in transforming colonialism, allowing Europeans to establish settlements and exert political dominance over distant regions. Option (1) is the only close option, but it fails to highlight the influence of European colonialism, political domination over the rest of the world.

**24. Option (3) is correct.**

Option 3 best captures the essence of the passage. It highlights the historical use of misinformation for gaining power, referencing the Octavian era in ancient Rome, and draws a parallel to the contemporary situation where technology fuels the weaponisation of information by states, politicians, and corporations.



### Data Interpretation and Logical Reasoning (DILR)

**Solution for Questions 1 to 5:**

Block XX		
Column A	Column B	Column C
A1	B1	C1
A2	B2	C2

Block YY			
Column D	Column E	Column F	
D1	E1	F1	Row 1
D2	E2	F2	Row 2

Quoted price (in lakhs of ₹) of a vacant house = Base price +  $5 \times$  (road adjacency value) +  $3 \times$  (neighbour count).

Given: Maximum Quoted Price of a house in Block XX is 24 lakhs.

Now, we will try to find that house which is having the maximum cost.

A1	Without Parking	Road Adjacent Value- 0 Neighbour Count Possibilities are 0, 1, 2. Quoted Price when Neighbour Count is 0, $= 10 + 5 \times 0 + 0 \times 3 = 10$ lakhs. Quoted Price when Neighbour Count is 1, $= 10 + 5 \times 0 + 1 \times 3 = 13$ lakhs. Quoted Price when Neighbour Count is 2, $= 10 + 5 \times 0 + 2 \times 3 = 16$ lakhs.
	With Parking	Road Adjacent Value- 0 Neighbour Count Possibilities are 0, 1, 2. Quoted Price when Neighbour Count is 0, $= 12 + 5 \times 0 + 0 \times 3 = 12$ lakhs. Quoted Price when Neighbour Count is 1, $= 12 + 5 \times 0 + 1 \times 3 = 15$ lakhs. Quoted Price when Neighbour Count is 2, $= 12 + 5 \times 0 + 2 \times 3 = 18$ lakhs.
B1	Without Parking	Road Adjacent Value- 0 Neighbour Count Possibilities are 0, 1, 2. Quoted Price when Neighbour Count is 0, $= 10 + 5 \times 0 + 0 \times 3 = 10$ lakhs. Quoted Price when Neighbour Count is 1, $= 10 + 5 \times 0 + 1 \times 3 = 13$ lakhs. Quoted Price when Neighbour Count is 2, $= 10 + 5 \times 0 + 2 \times 3 = 16$ lakhs.
	With Parking	Road Adjacent Value- 0 Neighbour Count Possibilities are 0, 1, 2. Quoted Price when Neighbour Count is 0, $= 12 + 5 \times 0 + 0 \times 3 = 12$ lakhs. Quoted Price when Neighbour Count is 1, $= 12 + 5 \times 0 + 1 \times 3 = 15$ lakhs. Quoted Price when Neighbour Count is 2, $= 12 + 5 \times 0 + 2 \times 3 = 18$ lakhs.
C1	Without Parking	Road Adjacent Value- 1 Neighbour Count Possibilities are 0, 1, 2. Quoted Price when Neighbour Count is 0, $= 10 + 5 \times 1 + 0 \times 3 = 15$ . Quoted Price when Neighbour Count is 1, $= 10 + 5 \times 1 + 1 \times 3 = 18$ . Quoted Price when Neighbour Count is 2, $= 10 + 5 \times 1 + 2 \times 3 = 21$ lakhs

	With Parking	Road Adjacent Value- 1 Neighbour Count Possibilities are 0, 1, 2. Quoted Price when Neighbour Count is 0, $= 12 + 5 \times 1 + 0 \times 3 = 17$ lakhs. Quoted Price when Neighbour Count is 1, $= 12 + 5 \times 1 + 1 \times 3 = 20$ lakhs. Quoted Price when Neighbour Count is 2, $= 12 + 5 \times 1 + 2 \times 3 = 23$ lakhs.
A2	Without Parking	Road Adjacent Value- 1 Neighbour Count Possibilities are 0, 1, 2. Quoted Price when Neighbour Count is 0, $= 10 + 5 \times 1 + 0 \times 3 = 15$ lakhs. Quoted Price when Neighbour Count is 1, $= 10 + 5 \times 1 + 1 \times 3 = 18$ lakhs. Quoted Price when Neighbour Count is 2, $= 10 + 5 \times 1 + 2 \times 3 = 21$ lakhs.
	With Parking	Road Adjacent Value-1 Neighbour Count Possibilities are 0, 1, 2. Quoted Price when Neighbour Count is 0, $= 12 + 5 \times 1 + 0 \times 3 = 17$ lakhs. Quoted Price when Neighbour Count is 1, $= 12 + 5 \times 1 + 1 \times 3 = 20$ lakhs. Quoted Price when Neighbour Count is 2, $= 12 + 5 \times 1 + 2 \times 3 = 23$ lakhs.
B2	Without Parking	Road Adjacent Value- 1 Neighbour Count Possibilities are 0, 1, 2, 3. Quoted Price when Neighbour Count is 0, $= 10 + 5 \times 1 + 0 \times 3 = 15$ lakhs. Quoted Price when Neighbour Count is 1, $= 10 + 5 \times 1 + 1 \times 3 = 18$ lakhs. Quoted Price when Neighbour Count is 2, $= 10 + 5 \times 1 + 2 \times 3 = 21$ lakhs. Quoted Price when Neighbour Count is 3, $= 10 + 5 \times 1 + 3 \times 3 = 24$ lakhs.
	With Parking	Road Adjacent Value- 1 Neighbour Count Possibilities are 0, 1, 2, 3. Quoted Price when Neighbour Count is 0, $= 12 + 5 \times 1 + 0 \times 3 = 17$ lakhs. Quoted Price when Neighbour Count is 1, $= 12 + 5 \times 1 + 1 \times 3 = 20$ lakhs. Quoted Price when Neighbour Count is 2, $= 12 + 5 \times 1 + 2 \times 3 = 23$ lakhs. Quoted Price when Neighbour Count is 3, $= 12 + 5 \times 1 + 2 \times 3 = 26$ lakhs. (This Number is not Possible due to Maximum Sealing of 24 lakhs).
C2	Without Parking	Road Adjacent Value- 2 Neighbour Count Possibilities are 0, 1. Quoted Price when Neighbour Count is 0, $= 10 + 5 \times 2 + 0 \times 3 = 20$ lakhs. Quoted Price when Neighbour Count is 1, $= 10 + 5 \times 2 + 1 \times 3 = 23$ lakhs.

	With Parking	Road Adjacent Value- 2 Neighbour Count Possibilities are 0. Quoted Price when Neighbour Count is 0, $= 12 + 5 \times 2 + 0 \times 3 = 22$ lakhs.
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Out of all the possible value of the Vacant Flats 24 lacs is possible only in B2. In this scenario the count of neighbours was 3 and it was a price of non-parking house.

So, from here we can conclude that all three neighbours of B2 are occupied flats.

Block XX			Block YY			
Column A	Column B	Column C	Column D	Column E	Column F	
A1	B1 (Occupied)	C1	D1	E1	F1	Row 1
A2 (Occupied)	B2 (Vacant + Max Cost+ Non Parking)	C2 (Occupied)	D2	E2	F2	Row 2

**Given:** Minimum Quoted Price of a house in Block YY is 15 lakhs and one of such houses is in E column.

Now, we will try to find that house which is having the minimum cost.

E1	Non-Parking	Road Adjacent Value- 0, Neighbour Count Possibility- 1. (Since one of the flats from D1 or F1 must be occupied and E2 is unoccupied) Quoted Price= $10 + 5 \times 0 + 3 \times 1 = 13$ lakhs
	Parking	Road Adjacent Value- 0, Neighbour Count Possibility- 1. (Since one of the flats from D1 or F1 must be occupied and E2 is unoccupied) Quoted Price= $12 + 5 \times 0 + 3 \times 1 = 15$ lakhs

Here the Quoted value of E1 arrived at 15 lakhs when we are considering parking.

Block XX			Block YY			
Column A	Column B	Column C	Column D	Column E	Column F	
A1	B1 (Occupied)	C1	D1	E1 (Parking + Min Cost + Vacant)	F1	Row 1
A2 (Occupied)	B2 (Vacant + Max Cost+ non-Parking)	C2 (Occupied)	D2	E2 (Vacant)	F2	Row 2

**Statement 2:** Row-1 has two occupied houses, one in each block.

In Block XX, 1 Occupied house is B1. So, rest in the same block and row must be vacant.

**Statement 3:** Both houses in Column-E are vacant. Each of Column-D and Column-F has at least one occupied house.

**Case I**

Block XX			Block YY			
Column A	Column B	Column C	Column D	Column E	Column F	
A1 (Vacant)	B1 (Occupied)	C1 (Vacant)	D1 (Occupied)	E1 (Parking + Min Cost + Vacant)	F1 (Vacant)	Row 1
A2 (Occupied)	B2 (Vacant + Max Cost+ non-Parking)	C2 (Occupied)	D2 (Vacant/ Occupied)	E2 (Vacant)	F2 (Occupied)	Row 2

## Case II:

Block XX		
Column A	Column B	Column C
A1 (Vacant)	B1 (Occupied)	C1 (Vacant)
A2 (Occupied)	B2 (Vacant + Max Cost + non-Parking)	C2 (Occupied)

Block YY			
Column D	Column E	Column F	
D1 (Vacant)	E1 (Parking + Min Cost + Vacant)	F1 (Occupied)	Row 1
D2 (Occupied)	E2 (Vacant)	F2 (Vacant/ Occupied)	Row 2

## 1. Correct answer is [3].

From the above tables in both the cases the number of vacant houses in Block XX are A1, C1 and B2

Number of vacant houses = 3

## 2. Option (2) is correct.

Out of the given options B1 will always remain occupied.

## 3. Option (3) is correct.

Number of vacant houses in Row 2 = Either B2, E2 or B2, E2 & F2

So, the number of vacant houses will be = 2 or 3.

## 4. Correct answer is [21].

Minimum Quoted Price was of E1. So, Maximum Quoted Price of house in Column E will be E2.

Consider Non-parking house since it given that there is only one parking house in Block YY.

Maximum Quoted Price of E2,

Road Adjacent Value = 1, Neighbour Count = 2

Quoted Price =  $10 + 5 \times 1 + 2 \times 3 = 21$

## 5. Option (2) is correct.

House E1 in the Block YY has the parking.

## Solution for Questions 6 to 10:

The direct information given can be tabled as below:

Department	Total Faculty Members	No. of Candidate for Dean	No. of Non-Candidate Faculty
F & A	9		
M & S	7		
O & Q	5	1	4
B & H	3		

Candidates for Dean	Total Votes	Voters	
		Candidate	Faculty Members
Pakrasi	3	Samuel (1)	2
Qureshi	14	Ramaswamy (1)	13
Ramaswamy	6	Pakrasi (1)	5
Samuel	1	Qureshi (1)	0

**Given:** In each department, all the faculty members who were not candidates voted for the same candidate.

1. There cannot be more than two candidates from a single department.

2. A candidate cannot vote for himself/herself.

3. Faculty members cannot vote for a candidate from their own department.

**For Prakasi,**

**Case I:** If we consider the maximum limit of 2 from every department for the dean candidate then the departments will left with 7, 5, 3 and 1 faculty members respectively and Pakrasi got 2 votes from faculty members which is not possible from any of the department.

**Case II:** If we consider 1 from every department for the dean candidate then the departments will left with, 8, 6, 4 and 2 faculty members respectively and Pakrasi got 2 votes from faculty members which can be possible only when there is 1 Candidate for Dean from B&H department and remaining 2 must have voted him.

Department	Total Faculty Members	No. of Candidate for Dean	No. of Non-Candidate Faculty
F & A	9		
M & S	7		
O & Q	5	1	4
B & H	3	1	2

Candidates for Dean	Total Votes	Voters	
		Candidate	Faculty Members
Pakrasi	3	Samuel (1)	2 (B&H)
Qureshi	14	Ramaswamy (1)	13
Ramaswamy	6	Pakrasi (1)	5
Samuel	1	Qureshi (1)	0

Now, we know that there are only 2 candidates left and there are 3 possibilities of distribution of these 2 candidates,

**Case 1:** Both of the remaining 2 are from F & A.

Department	Total Faculty Members	No. of Candidate for Dean	No. of Non-Candidate Faculty
F & A	9	2	7
M & S	7	0	7
O & Q	5	1	4
B & H	3	1	2

If we consider this situation as true, then the votes distribution of Non-Candidate Faculty is not satisfying the given numbers because Ramaswamy has got 5 of Non-Faculty and no department has the same no. of Non-Candidate Faculties.

Hence, Case I is eliminated.

**Case 2:** 1 each from O&Q and B&H.

Department	Total Faculty Members	No. of Candidate for Dean	No. of Non-Candidate Faculty
F & A	9	1	8
M & S	7	1	6
O & Q	5	1	4
B & H	3	1	2

If we consider this situation as true, then the votes distribution of Non-Candidate Faculty is not satisfying the given numbers because Ramaswamy has got 5 of Non-Faculty and no department has the same no. of Non-Candidate Faculties.

Hence, Case 2 is eliminated.

**Case 3:** Both of the remaining 2 are from M&S.

Department	Total Faculty Members	No. of Candidate for Dean	No. of Non-Candidate Faculty
F & A	9	0	9
M & S	7	2	5
O & Q	5	1	4
B & H	3	1	2

This case satisfying the given condition. Now Ramaswamy can get his 5 Non-Candidate faculty votes from M&S department.

Out of above 3 cases, the only possibility is Case-3.

After considering Case 3 True, the tables will look like;

Department	Total Faculty Members	No. of Candidate for Dean	No. of Non-Candidate Faculty
F & A	9	0	9
M & S	7	2	5
O & Q	5	1	4
B & H	3	1	2

Candidates for Dean	Total Votes	Voters	
		Candidate	Faculty Members
Pakrasi	3	Samuel (1)	2 (B&H)
Qureshi	14	Ramaswamy (1)	13 (F&A + O&Q)
Ramaswamy	6	Pakrasi (1)	5 (M&S)
Samuel	1	Qureshi (1)	0

From the above concluded tables, one more table can be formed for a clarity which will tell about the department of the candidates for Dean.

	F&A	M & S	O & Q	B & H
Pakrasi				
Qureshi				
Ramaswamy				
Samuel				

From the concluded tables, there is no one from F&A for Dean.

	F&A	M & S	O & Q	B & H
Pakrasi	×			
Qureshi	×			
Ramaswamy	×			
Samuel	×			

B&H have voted for Pakrasi and it is given that no non-candidate faculty can vote for his department candidate. Hence, Pakrasi cannot be from B&H.

	F&A	M & S	O & Q	B & H
Pakrasi	×			×
Qureshi	×			
Ramaswamy	×			
Samuel	×			

With the same analogy Qureshi can't, be from O&Q and Ramaswamy cannot be from M&S.

	F&A	M & S	O & Q	B & H
Pakrasi	×			×
Qureshi	×		×	
Ramaswamy	×	×		
Samuel	×			

In M&S there are 2 Candidates, considering above table the 3 possibilities are:

**Case I:** Pakrasi & Qureshi

**Case I:** Qureshi & Samuel

Since Qureshi has voted for Samuel so they can't be from same department. Hence, this case is eliminated.

**Case III:** Pakrasi & Samuel.

Since Samuel has voted for Pakrasi. So, they can't be from the same department. Hence, this case is eliminated. So, the 2 candidates of M&S are from **Case I: Pakrasi & Qureshi**.

The table will look like;

	F&A	M & S	O & Q	B & H
Pakrasi	×	✓	×	×
Qureshi	×	✓	×	×
Ramaswamy	×	×		
Samuel	×	×		

Hence, the final arrangement of the given information will look like;

Department	Total Faculty Members	No. of Candidate for Dean	No. of Non-Candidate Faculty
F & A	9	0	9
M & S	7	2	5
O & Q	5	1	4
B & H	3	1	2

Candidates for Dean	Total Votes	Voters	
		Candidate	Faculty Members
Pakrasi	3	Samuel (1)	2 (B&H)
Qureshi	14	Ramaswamy (1)	13 (F&A + O&Q)
Ramaswamy	6	Pakrasi (1)	5 (M&S)
Samuel	1	Qureshi (1)	0

	F&A	M & S	O & Q	B & H
Pakrasi	×	✓	×	×
Qureshi	×	✓	×	×
Ramaswamy	×	×		
Samuel	×	×		

6. **Option (2) is correct.**

From the above table, M&S is the department which have 2 candidates and those are Qureshi and Pakrasi.

7. **Option (4) is correct.**

Prof. Qureshi received total 13 votes; 9 from F&A and 4 from O&Q. So, out of the given options 9 will be correct.

8. **Option (2) is correct.**

If Prof. Samuel belongs to B&H than the departmental table will look like;

	F&A	M&S	O&Q	B&H
Pakrasi	×	✓	×	×
Qureshi	×	✓	×	×
Ramaswamy	×	×	✓	×
Samuel	×	×	×	✓

**Statement A:** Prof. Pakrasi belongs to M&S. (True) **Statement B:** Prof. Ramaswamy belongs to O&Q. (True)

Hence, both the statements are correct.

9. **Option (3) is correct.**

From the concluded departmental table, there are no concrete information about department O&Q but there are only 2 options available for that either Prof. Ramaswamy or Prof. Samuel.

10. **Option (1) is correct.**

**Statement A:** Non-candidates from M&S voted for Prof. Qureshi. (False)

Non-Candidate from M&S has voted for Ramaswamy not Qureshi. Hence Statement A is False.

**Statement B:** Non-candidates from F&A voted for Prof. Qureshi. (True)

**Solution for Questions 11 to 15:**

Statements (a) and (b) can be filled directly in the table as;

	Ullas	Vasu	Waman	Xavier	Yusuf	Mean Rating By Restaurant
R1	1		5			3.4
R2			1	5	1	2.2
R3			5	5	1	3.8
R4						2.8
R5		5				3.4
Mean Rating	2.2	3.8	3.4	3.6	2.6	
Median Rating	2	4	4	4	3	
Mode Rating	2	4	5	5	1 and 4	
Range of Rating	3	3	4	4	3	

For Reference,

Median = It is the middle number of a group of numbers that have been arranged in order by size.

Mean = Sum of Terms/ Number of Terms.

From here,

Sum = Mean × Number of Terms.

Mode = It is the value that occurs the most often in a data set.

We can convert the given means into Sum for better understanding and the table will look like;

	Ullas	Vasu	Waman	Xavier	Yusuf	Sum of Rating By Restaurant
R1	1		5			17
R2			1	5	1	11
R3			5	5	1	19
R4						14
R5		5				17
Sum of Rating	11	19	17	18	13	
Median Rating	2	4	4	4	3	
Mode Rating	2	4	5	5	1 and 4	
Range of Rating	3	3	4	4	3	

Now we can reduce possible value of ratings for every gig worker using Sum, Median, Mode and Range.

**For Xavier,**

Range is 4, which and Range is the difference between highest and lowest rating. So, one of the ratings should be 1.

Median also remains the part of data and Xavier's Median is 4 which means another value must be 4.

The 3<sup>rd</sup> possible rating =  $18 - (5 + 5 + 1 + 4) \Rightarrow 3$

So, the other ratings that Xavier got are 1, 4, and 3.

	Ullas	Vasu	Waman	Xavier	Yusuf	Sum of Rating By Restaurant
Possible Ratings				1, 4, 3		
R1	1		5			17
R2			1	5	1	11
R3			5	5	1	19
R4						14
R5		5				17
Sum of Rating	11	19	17	18	13	
Median Rating	2	4	4	4	3	
Mode Rating	2	4	5	5	1 and 4	
Range of Rating	3	3	4	4	3	



**For Waman,**

The Median is 4 which means one of the ratings must be 4.

Then the other number =  $17 - (5 + 1 + 5 + 4) = 2$

So, the other ratings that Waman got are 4, and 2.

	Ullas	Vasu	Waman	Xavier	Yusuf	Sum of Rating By Restaurant
Possible Ratings			4, 2	1, 4, 3		
R1	1		5			17
R2			1	5	1	11
R3			5	5	1	19
R4						14
R5		5				17
Sum of Rating	11	19	17	18	13	
Median Rating	2	4	4	4	3	
Mode Rating	2	4	5	5	1 and 4	
Range of Rating	3	3	4	4	3	

**For Vasu,**

The Range is 3 and one of the ratings is 5, which means that another number should be 2.

Median is 4, which means one of the numbers should be 4.

Since, the Mode is 4, which means that 4 rating is there at least twice because than only it will qualify for being mode.

Remaining Possible Number =  $19 - (5 + 4 + 4 + 2) = 4$

So, the other ratings that Vasu got are 4, 4, 4, 2.

	Ullas	Vasu	Waman	Xavier	Yusuf	Sum of Rating By Restaurant
Possible Ratings		4,4,4,2	4, 2	1, 4, 3		
R1	1		5			17
R2			1	5	1	11
R3			5	5	1	19
R4						14
R5		5				17
Sum of Rating	11	19	17	18	13	
Median Rating	2	4	4	4	3	
Mode Rating	2	4	5	5	1 and 4	
Range of Rating	3	3	4	4	3	

**For Yusuf,**

The Mode is both 1 and 4, which means 4 must be there 2 times in his rating to satisfy this.

Remaining Rating =  $13 - (1 + 1 + 4 + 4) \Rightarrow 3$

So, the other ratings of Yusuf are 4, 4, 3.

	Ullas	Vasu	Waman	Xavier	Yusuf	Sum of Rating By Restaurant
Possible Ratings		4, 4, 4, 2	4, 2	1, 4, 3	4, 4, 3	
R1	1		5			17
R2			1	5	1	11
R3			5	5	1	19
R4						14
R5		5				17

Sum of Rating	11	19	17	18	13	
Median Rating	2	4	4	4	3	
Mode Rating	2	4	5	5	1 and 4	
Range of Rating	3	3	4	4	3	

**For Ullas,**

Range is 3 and one of the ratings is 1 which means that the maximum rating he got is of 4.

Mode is 2 which means 2 must be there at least 2 times.

The remaining rating =  $11 - (1 + 4 + 2 + 2) \Rightarrow 2$

So, the other ratings of Ullas are 4, 2, 2, 2.

	Ullas	Vasu	Waman	Xavier	Yusuf	Sum of Rating By Restaurant
Possible Ratings	4, 2, 2, 2	4, 4, 4, 2	4, 2	1, 4, 3	4, 4, 3	
R1	1		5			17
R2			1	5	1	11
R3			5	5	1	19
R4						14
R5		5				17
Sum of Rating	11	19	17	18	13	
Median Rating	2	4	4	4	3	
Mode Rating	2	4	5	5	1 and 4	
Range of Rating	3	3	4	4	3	

Now, we will focus on the ratings given by the restaurants.

**For R2,**

The sum of ratings is 11 out of which 7 has already given. It is left with 4 only. The only possible combination of making this 4 is 2 to Ullas and 2 to Vasu.

	Ullas	Vasu	Waman	Xavier	Yusuf	Sum of Rating By Restaurant
Possible Ratings	4, 2, 2	4, 4, 4	4, 2	1, 4, 3	4, 4, 3	
R1	1		5			17
R2	2	2	1	5	1	11
R3			5	5	1	19
R4						14
R5		5				17
Sum of Rating	11	19	17	18	13	
Median Rating	2	4	4	4	3	
Mode Rating	2	4	5	5	1 and 4	
Range of Rating	3	3	4	4	3	

**For R3,**

The sum of ratings is 19 out of which 11 has already given. It is left with 8. The only possible combination of making this is 4 to Ullas and 4 to Vasu.

	Ullas	Vasu	Waman	Xavier	Yusuf	Sum of Rating By Restaurant
Possible Ratings	2, 2	4, 4	4, 2	1, 4, 3	4, 4, 3	
R1	1		5			17
R2	2	2	1	5	1	11
R3	4	4	5	5	1	19

R4						14
R5		5				17
Sum of Rating	11	19	17	18	13	
Median Rating	2	4	4	4	3	
Mode Rating	2	4	5	5	1 and 4	
Range of Rating	3	3	4	4	3	

Vasu and Ullas are left with 2 identical number each and with 2 places left so these can be filled directly.

	Ullas	Vasu	Waman	Xavier	Yusuf	Sum of Rating By Restaurant
Possible Ratings			4, 2	1, 4, 3	4, 4, 3	
R1	1	4	5			17
R2	2	2	1	5	1	11
R3	4	4	5	5	1	19
R4	2	4				14
R5	2	5				17
Sum of Rating	11	19	17	18	13	
Median Rating	2	4	4	4	3	
Mode Rating	2	4	5	5	1 and 4	
Range of Rating	3	3	4	4	3	

**For R5,**

The sum of ratings is 17 out of which 7 has already given. It is left with 10. The only possible combination of making this is 2 to Waman, 4 to Xavier and 4 to Yusuf.

	Ullas	Vasu	Waman	Xavier	Yusuf	Sum of Rating By Restaurant
Possible Ratings			4	1, 3	4, 3	
R1	1	4	5			17
R2	2	2	1	5	1	11
R3	4	4	5	5	1	19
R4	2	4				14
R5	2	5	2	4	4	17
Sum of Rating	11	19	17	18	13	
Median Rating	2	4	4	4	3	
Mode Rating	2	4	5	5	1 and 4	
Range of Rating	3	3	4	4	3	

**For R1,**

The sum of ratings is 17 out of which 10 has already given. It is left with 7. The only possible combination of making this is 3 to Xavier, 4 to Yusuf.

After these only 1 place with one value will be left which can be filled directly.

	Ullas	Vasu	Waman	Xavier	Yusuf	Sum of Rating by Restaurant
Possible Ratings						
R1	1	4	5	3	4	17
R2	2	2	1	5	1	11
R3	4	4	5	5	1	19
R4	2	4	4	1	3	14

R5	2	5	2	4	4	17
Sum of Rating	11	19	17	18	13	
Median Rating	2	4	4	4	3	
Mode Rating	2	4	5	5	1 and 4	
Range of Rating	3	3	4	4	3	

11. Correct answer is [0].

In the final table we have determined everything concretely hence the answer for this question will be 0.

12. Correct answer is [0].

Referring Above Table,  
R2 gave 4 rating to none of the worker.  
Hence, 0 will be the correct answer.

13. Correct answer is [3].

From the above table,  
R1 gave rating of 3 to Xavier.

14. Correct answer is [4].

Ratings by R3 to the workers = 4, 4, 5, 5, 1  
When arranged in ascending order = 1, 4, 4, 5, 5  
Since, Median is Middle number after ascending, in the above numbers 4 will be the median.

R1	1	4	5	3	4
R2	2	2	1	5	1
R3	4	4	5	5	1
R4	2	4	4	1	3
R5	2	5	2	4	4

15. Option (3) is correct.

Ratings by R1 = 1, 4, 5, 3, 4  
Ratings in Ascending Order = 1, 3, 4, 4, 5  
Median of R1 = 4

Ratings by R2 = 2, 2, 1, 5, 1  
Ratings in Ascending Order = 1, 1, 2, 2, 5  
Median of R2 = 2

Ratings by R3 = 4, 4, 5, 5, 1  
Rating in Ascending Order = 1, 4, 4, 5, 5  
Median of R3 = 4

Ratings by R4 = 2, 4, 4, 1, 3  
Ratings in Ascending Order = 1, 2, 3, 4, 4  
Median of R4 = 3

Rating by R5 = 2, 5, 2, 4, 4  
Ratings in Ascending Order = 2, 2, 4, 4, 5  
Median of R5 = 4

From the above data, it is clear that only R4 is there, which gave its median rating to only one worker, rest all have given this to more than 1 worker.  
Hence, R4 will be the correct answer.

**Solution for Questions 16 to 20:**

As per data given in the paragraph, the number of slots is 20 and the total duration of the slots is  $20 \times 15 = 300$  minutes (9:00 am to 2:00 pm).

The number of counters is 10 and also given US -4, UK -2, Schengen -2, Others-2.

Ten applications are scheduled in each slot and 50% of the applications are from US applications. Therefore, the number of applications of US per slot is 5. UK, Schengen and Others are 5 applications per slot as per given in the data.

The US and UK per application duration is 10 Minutes. In addition, each visa processing office the number of US applications was the same in all the slots. The same was true for the other three categories.

The data can be filled in the table as follows:

Slot Number	Slot Timing (am to pm)	US				UK		Schengen		Others	
		Coun-ter-1	Coun-ter-2	Coun-ter-3	Coun-ter-4	Coun-ter-1	Coun-ter-2	Coun-ter-1	Coun-ter-2	Coun-ter-1	Coun-ter-2
1	9:00 – 9:15	2	1	1	1	0	0	1	2	1	1
2	9:15 – 9:30	1	2	1	1	0	0	2	1	1	1
3	9:30 – 9:45	1	1	2	1	0	0	1	2	1	1
4	9:45 – 10:00	1	1	1	2	0	0	2	1	1	1
5	10:00 – 10:15	2	1	1	1	0	0	1	2	1	1
6	10:15 – 10:30	1	2	1	1	0	0	2	1	1	1
7	10:30 – 10:45	1	1	2	1	0	0	1	2	1	1
8	10:45 – 11:00	1	1	1	2	0	0	2	1	1	1
9	11:00 – 11:15	2	1	1	1	0	0	1	2	1	1

10	11:15 – 11:30	1	2	1	1	0	0	2	1	1	1
11	11:30 – 11:45	1	1	2	1	0	0	1	2	1	1
12	11:45 – 12:00	1	1	1	2	0	0	2	1	1	1
13	12:00 – 12:15	2	1	1	1	0	0	1	2	1	1
14	12:15 – 12:30	1	2	1	1	0	0	2	1	1	1
15	12:30 – 12:45	1	1	2	1	0	0	1	2	1	1
16	12:45 – 1:00	1	1	1	2	0	0	2	1	1	1
17	1:00 – 1:15	2	1	1	1	0	0	1	2	1	1
18	1:15 – 1:30	1	2	1	1	0	0	2	1	1	1
19	1:30 – 1:45	1	1	2	1	0	0	1	2	1	1
20	1:45 – 2:00	1	1	1	2	0	0	2	1	1	1

16. Correct answer is [0].

From the data table, there is no application process at UK counters.

17. Correct answer is [200].

The maximum possible value of the total time at others counters is  $10 \times 20$  minutes or 200 minutes.

18. Option (2) is correct.

At Schengen counter, Vijay was called to a counter at 9:25 am. So, the application process as follows:

Schengen		
Slot Duration	Counter-1	Counter-2
Slot 9:00 – 9:15	One Application - 9:00 – 9:10	One Application - 9:00 – 9:10 & Second Application - 9:10 – 9:20
Slot 9:15 – 9:30	One Application - 9:15 – 9:25 & Second Application 9:25 – 9:35 (Vijay)	One Application - 9:20 – 9:30 (Ira)
Slot 9:30 – 9:45	One Application - 9:35 – 9:45 (Nandini)	One Application - 9:30 – 9:40 & Second Application 9:40 – 9:55

The only option can be possible is (2) as per above table.

19. Option (3) is correct.

As per options, the only possible false statement is (3).

20. Option (3) is correct.

The last two slots of US, the application process as follows:

U.S.				
Slot 19 & 20	Counter-1	Counter-2	Counter-3	Counter-4
1:30 – 1:45	One Application - 1:30 – 1:40	One Application 1:35 – 1:45	One Application 1:30 – 1:40 & Second Application 1:40 to 1:50	One Application - 1:30 – 1:40
1:45 – 2:00	One Application- 1:45 – 1:55	One Application 1:45 – 1:55	One Application 1:50 – 2:00	One Application - 1:45 – 1:55 & Second Application 1:55 – 2:05

### Quantitative Aptitude (QA)

1. Option (1) is correct.

Given that:  $x^2 + (x - 2y - 1)^2 = -4y(x + y)$   
 $\Rightarrow x^2 + 4xy + 4y^2 + (x - 2y - 1)^2 = 0$   
 $\Rightarrow (x + 2y)^2 + (x - 2y - 1)^2 = 0$   
 $\Rightarrow x + 2y = 0$  or  $x - 2y - 1 = 0$   
 $\Rightarrow x - 2y = 1$

2. Option (4) is correct.

$168 = 2^3 \times 3^1 \times 7^1$   
 $1134 = 2^1 \times 3^4 \times 7^1$   
 Since, 168 is a factor of  $1134^n$ .  
 $\therefore$  least value of  $n$  is 3.  
 Now,  $1134^n = 1134^3 = 2^3 \times 3^{12} \times 7^3$   
 $168^m = (2^3 \times 3^1 \times 7^1)^m$

Since,  $1134^n$  is a factor of  $168^m$

$\therefore$  least value of  $m$  is 12

Now,  $m + n = 12 + 3 = 15$ .

**3. Option (3) is correct.**

Given that:

$$\sqrt{(5x+9)} + \sqrt{(5x-9)} = 3(2 + \sqrt{2})$$

$$\sqrt{5x+9} + \sqrt{5x-9} = 6 + 3\sqrt{2} = \sqrt{36} + \sqrt{18}$$

So,  $5x + 9 = 36$  and  $5x - 9 = 18$

$$\Rightarrow 5x = 36 - 9 = 27$$

$$\text{Now, } \sqrt{10x+9} = \sqrt{54+9} = \sqrt{63} = 3\sqrt{7}.$$

**4. Option (1) is correct.**

$$\log_x(x^2 + 12) = 4$$

$$\Rightarrow x^4 = x^2 + 12$$

$$\Rightarrow x^4 - x^2 + 12 = 0$$

$$\Rightarrow (x^2 - 4)(x^2 + 3) = 0$$

$$\because x^2 + 3 \neq 0$$

$$\Rightarrow x^2 - 4 = 0$$

$$\Rightarrow x = +2 \text{ But } x \neq -2$$

$$\therefore x = 2$$

$$\text{Now, } 3 \log_y x = 1$$

$$\Rightarrow \log_y x^3 = 1$$

$$\Rightarrow x^3 = y$$

$$\Rightarrow y = 2^3 = 8$$

$$\text{Now, } x + y = 2 + 8 = 10$$

**5. Correct answer is [3].**

**Case 1:**  $x \geq 0$

$$2x(x^2 + 1) = 5x^2$$

$$\Rightarrow 2x(x^2 + 1) - 5x^2 = 0$$

$$\Rightarrow x[2x^2 - 5x + 2] = 0$$

$$\Rightarrow x[x - 2](2x - 1) = 0$$

$$\Rightarrow x = 0, 2, \frac{1}{2}$$

Integer solutions = 0, 2

**Case 2:**  $x < 0$

$$2x(x^2 + 1) = -5x^2$$

$$\Rightarrow 2x(x^2 + 1) + 5x^2 = 0$$

$$\Rightarrow x[2x^2 + 5x + 2] = 0$$

$$\Rightarrow x(x + 2)(2x + 1) = 0$$

$$\Rightarrow x = -2, -\frac{1}{2}$$

[Integer solution = -2]

Number of integer solutions is 3.

**6. Correct answer is [2].**

Since one roots is -2

Let  $\alpha$  and  $\beta$  are two roots given equations.

$$\text{Product of roots} = (-2) \alpha \beta = \frac{-d}{a} = \frac{-2}{1}$$

$$\Rightarrow \alpha \beta = 1 \Rightarrow \beta = \frac{1}{\alpha}$$

$$\text{Sum of roots} = \alpha + \frac{1}{\alpha} - 2 = \frac{-b}{a} = 0 \Rightarrow -(2r + 1)$$

$$\Rightarrow \alpha + \frac{1}{\alpha} = -2r + 1$$

$$\text{We have, } -2 \geq \alpha + \frac{1}{\alpha} \geq 2$$

$$\Rightarrow -2 \geq -2r + 1 \geq 2$$

$$\Rightarrow -3 \geq -2r \geq 1$$

$$\frac{3}{2} \leq r \leq -\frac{1}{2}$$

$\therefore$  Minimum possible non-negative integer value of  $r$  is 2.

**7. Correct answer is [6].**

$\because \alpha$  and  $\beta$  are two roots of  $2x^2 - 6x + k = 0$ .

$$\therefore \alpha + \beta = -\frac{(-6)}{2} = 3 \text{ and } \alpha\beta = \frac{k}{2}$$

$\because \alpha + \beta$  and  $\alpha\beta$  are two roots of  $x^2 + px + p = 0$

$$\therefore \alpha + \beta + \alpha\beta = -p \Rightarrow 3 + \frac{k}{2} = -p \quad \dots(i)$$

$$\text{and } (\alpha + \beta) \alpha\beta = p \Rightarrow \frac{3k}{2} = p \quad \dots(ii)$$

On solving equation (i) and (ii), we get

$$k = -\frac{3}{2} \text{ and } p = -\frac{9}{4}$$

$$\text{Now, } 8(k - p) = 8\left(-\frac{3}{2} + \frac{9}{4}\right) = 6$$

**8. Option (1) is correct.**

A.T.Q.

$$4G + 6B = 240$$

$$B \leq G \leq 2B \Rightarrow B \leq \frac{120 - 3B}{2} \leq 2B$$

$$\Rightarrow 17.14 \leq B \leq 24$$

Maximum value of  $G = 2B$

$$\therefore 2G + 6B = 10B = 10 \times 17.14 = 171.4$$

Minimum value of  $G = B$

$$\therefore 2G + 6B = 8B = 8 \times 24 = 192$$

$\therefore$  Number of possible distinct integer value is 21.

**9. Option (1) is correct.**

Let salaries of three friends Sita, Gita and Mita are  $5x$ ,  $6x$  and  $7x$  respectively.

Increased salary of Sita in 2 years

$$= 5x \left(1 + \frac{20}{100}\right) \left(1 + \frac{40}{100}\right) = 8.4x$$

Increased salary of Mita in 2 years

$$= 7x \left(1 + \frac{20}{100}\right) \left(1 + \frac{25}{100}\right) = 10.5x$$

Let salary of Gita in second year is  $y$ :

A.T.Q,

$$\frac{8.4x + y + 10.5x}{3} = y$$

$$18.9x = 2y$$

$$\Rightarrow y = 9.45x$$

$$\text{Salary of Gita in first year} = 6x \left(1 + \frac{25}{100}\right) = 7.5x$$

$$\text{Percent Increase in 2}^{\text{nd}} \text{ year salary of Gita}$$

$$= \frac{9.45x - 7.5x}{7.5x} \times 100 = 26\%$$

10. **Option (1) is correct.**

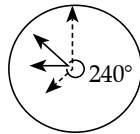
$$\therefore \text{In one min angle} = \left(\frac{11}{2}\right)^\circ$$

$$\therefore 48 \text{ min angle} = \frac{11}{2} \times 48 = 264^\circ$$

$$\therefore \text{Minor angle} = 264^\circ - 240^\circ = 24^\circ$$

$$50\% \text{ of Minor angle} = 12^\circ$$

$$\therefore \left(\frac{11}{2}\right)^\circ \text{ angle make in 1 min.}$$



$$\therefore 1^\circ \text{ angle make in } \frac{2}{11} \text{ min.}$$

$$\therefore 12^\circ \text{ angle make in } \frac{2}{11} \times 12 = \frac{24}{11} \text{ min.}$$

11. **Option (3) is correct.**

Given that total distance = 26862 km

By option checking:

Option (4) : Distance in 8 hour

$$= 8 \times 110 = 880 \text{ km}$$

$$\therefore x = 26862 - 880 = 25982$$

But it is not Palindrom.

Option (3) : Distance in 8 hour

$$= 8 \times 100 = 800 \text{ km}$$

$$\therefore x = 26862 - 800 = 26062$$

It is Palindrom.

12. **Option (4) is correct.**

Let S.P. of both A and B be ₹ x.

$$\therefore \text{C.P. of A} = \frac{x \times 100}{120} = \frac{10x}{12}$$

$$\text{C.P. of B} = \frac{x \times 100}{90} = \frac{10x}{9}$$

After increase on selling price,

$$\frac{10x}{9} \left(1 + \frac{10}{100}\right) = \frac{10x}{12} \left(1 + \frac{y}{100}\right)$$

$$\Rightarrow \frac{12}{9} \times \frac{11}{10} = 1 + \frac{y}{100}$$

$$= \frac{44}{30} - 1 = \frac{y}{100} \Rightarrow \frac{140}{3} = y$$

$$y = 46.6 = 47\%$$

13. **Option (3) is correct.**

We have,

$$\text{Final ratio} = \frac{16}{9}$$

$$\text{Initial ratio} = \left(1 - \frac{\text{Replaced value}}{\text{Total value}}\right)^{\text{no. of times}}$$

$$\frac{16}{25} = \frac{1}{1} \left(1 - \frac{R}{\text{Total}}\right)^2 \Rightarrow \frac{R}{\text{Total}} = \frac{1}{5}$$

$$\therefore \text{Fraction of cocoa in P} = \frac{1}{5}$$

$$\text{Fraction of cocoa in Q} = 9/25$$

$$\therefore \text{Ratio} = 5 : 9$$

14. **Correct answer is [20808].**

A.T.Q.,

$$A = 22000 \left(1 + \frac{2}{100}\right)^{12} = x \left(1 + \frac{2}{100}\right)^{10} \left(1 + \frac{10}{100}\right)$$

where x is investment by Sunil.

$$22000 \times \frac{51}{50} \times \frac{51}{50} = x \times \frac{11}{10}$$

$$\therefore x = 20808$$

15. **Correct answer is [27].**

Given that work done are in H.P.

$\therefore$  Time taken are in A.P.

Given that: Kamal takes twice as much time as Amal.

$$\therefore \text{Ratio of time taken of Amal, Sunil and kamal} = 1 : 1.5 : 2 = 2 : 3 : 4$$

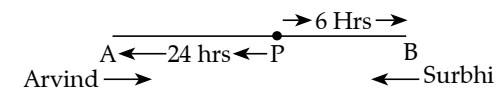
$$\text{So, ratio of work done} = \frac{1}{2} : \frac{1}{3} : \frac{1}{4} = 6 : 4 : 3$$

$$\text{Total work} = 4 \times 6 + 5 \times 4 + 16 \times 3$$

$$= 24 + 36 + 48 = 108$$

$$\text{Number of days taken by sunil} = \frac{108}{4} = 27 \text{ days.}$$

16. **Correct answer is [972].**



$$\text{We have } \frac{S_1}{S_2} = \sqrt{\frac{T_2}{T_1}} \Rightarrow \frac{54}{S_2} = \sqrt{\frac{24}{6}} = 2$$

$$S_2 = 27 \text{ km/h.}$$

$$\text{Distance AB} = 27 \times 24 + 6 \times 54 = 972 \text{ km.}$$

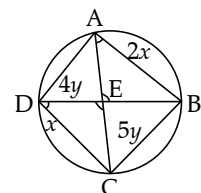
17. **Option (3) is correct.**

$$\angle CAB = \angle CDB$$

$$\angle AEB = \angle CED$$

$$\therefore \Delta AEB \sim \Delta DEC$$

$$\frac{AE}{DE} = \frac{EB}{EC} = \frac{AB}{CD} = \frac{2}{1}$$



Similarly,

$$\triangle AED \sim \triangle BEC$$

$$\frac{AE}{BE} = \frac{ED}{EC} = \frac{AD}{BC} = \frac{4}{5}$$

$$\frac{AE}{DE} = \frac{2}{1} = \frac{8}{4}$$

$$\frac{ED}{EC} = \frac{4}{5}$$

$$\therefore AE : ED : EC = 8 : 4 : 5$$

$$\frac{AE}{CE} = \frac{8}{5} = 8 : 5$$

18. Option (4) is correct.

$$\text{Equation of circle is } x^2 + y^2 + 4x - 6y - 3 = 0$$

$$\text{centre} = (-2, 3)$$

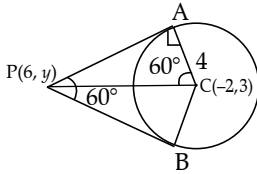
$$\text{radius} = \sqrt{4+9+3} = 4$$

$$\cos 60^\circ = \frac{4}{CP} \Rightarrow CP = 8$$

$$(6+2)^2 + (y-3)^2 = 8^2$$

$$(y-3)^2 = 0 \Rightarrow y = 3$$

$$\therefore \text{Point } (6, 3)$$



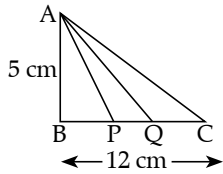
19. Correct answer is [2].

$$\text{Area of } \triangle ABC = \frac{1}{2} \times 5 \times 12 = 30 \text{ cm}^2$$

$$\text{Area } \triangle ABC = 1.5 \text{ area } \triangle ABP$$

$$30 = \frac{15}{10} \text{ area } \triangle ABP$$

$$\triangle ABP = \frac{30 \times 10}{15} = 20 \text{ cm}^2$$



$$\frac{1}{2} \times 5 \times BP = 20 \Rightarrow BP = \frac{20 \times 2}{5} = 8 \text{ cm}$$

$\therefore$  area  $\triangle ABP$ , area  $\triangle ABQ$  and area  $\triangle ABC$  are in A.P.

$\therefore 20, x$  and  $30$  are in A.P.

$$2x = 20 + 30 = 50$$

$$x = 25 \text{ cm}^2$$

$$\therefore \text{Area of } \triangle ABQ = \frac{1}{2} \times 5 \times BQ = 25$$

$$BQ = \frac{25 \times 2}{5} = 10 \text{ cm}$$

$$\therefore PQ = BQ - BP = 10 - 8 = 2 \text{ cm}$$

20. Option (3) is correct.

Let  $y, x$  and  $z$  are in A.P.

$$\Rightarrow x - z = d, x - y = -d \text{ and } y - z = 2d$$

Now,

$$\frac{1}{\sqrt{x} + \sqrt{z}} + \frac{1}{\sqrt{x} + \sqrt{y}} = \frac{2}{\sqrt{y} + \sqrt{z}}$$

$$\frac{\sqrt{x} - \sqrt{z}}{x - z} + \frac{\sqrt{x} - \sqrt{y}}{x - y} = \frac{2(\sqrt{y} - \sqrt{z})}{y - z}$$

$$\frac{\sqrt{x} - \sqrt{z}}{d} + \frac{\sqrt{x} - \sqrt{y}}{-d} = \frac{2(\sqrt{y} - \sqrt{z})}{2d}$$

$$(\sqrt{x} - \sqrt{z}) - (\sqrt{x} - \sqrt{y}) = \sqrt{y} - \sqrt{z}$$

$$\therefore \sqrt{y} - \sqrt{z} = \sqrt{y} - \sqrt{z}$$

21. Option (1) is correct.

$$\text{Number of one digit number} = 1 \text{ to } 9 = 9$$

$$\text{Number of two digit number} = 9 \times 9 = 81$$

$$\text{Number of three digit number} = 9 \times 9 \times 8 = 648$$

$$\text{Total number} = 9 + 81 + 648 = 738$$

22. Correct answer is [19].

$$1^{\text{st}} \text{ day} = 2$$

$$2^{\text{nd}} \text{ day} = 2 \times 2 + 3 = 7$$

$$3^{\text{rd}} \text{ day} = 2 \times 7 + 3 = 17$$

$$4^{\text{th}} \text{ day} = 2 \times 17 + 3 = 37$$

$$\text{Let } S = 2 + 7 + 17 + 37 + \dots + a_n$$

$$\begin{array}{r} S = \quad \underline{2} + \underline{7} + \underline{17} + \underline{37} + \dots + \underline{a_{n-1}} + \underline{a_n} \\ 0 = 2 + 5 + 10 + 20 + \dots + n \text{ term} - a_n \end{array}$$

$$a_n = 2 + \frac{5(2^{n-1} - 1)}{2 - 1} = 2 + 5(2^{n-1} - 1) > 10,00,000$$

$$5(2^{n-1} - 1) > 999998$$

$$\Rightarrow 2^{n-1} - 1 > 199999.6$$

$$\Rightarrow 2^{n-1} > 200,000.6$$

$$\Rightarrow n - 1 \geq 18 = n \geq 19$$

$$\therefore n = 19$$



CAT 2023

Shift-2

QUESTION  
PAPER

Time: 120 Mins

Maximum Marks: 198

**Important Instructions**

- (i) Total Number of Questions: 66
- (ii) Number of Questions in Verbal Ability and Reading Comprehension (VARC): 24
- (iii) Number of Questions in Data Interpretation and Logical Reasoning (DILR): 20
- (iv) Number of Questions in Quantitative Ability (QA): 22
- (v) 40 minutes are allotted to attempt each section.
- (vi) 4 answer options for each MCQ type question.
- (vii) Answers are typed in the given space on the computer screen for Non-MCQ.
- (viii) For each correct answer: + 3 marks
- (ix) Negative marking (Applicable for wrong answers in MCQs): - 1 mark

**Verbal Ability and Reading Comprehension (VARC)**

**Passage 1**

**Directions (Q. 1 to 4):** Read the following passage carefully and answer the questions that follow.

The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.

The positivists, anxious to stake out their claim for history as a science, contributed the weight of their influence to the cult of facts. First ascertain the facts, said the positivists, then draw your conclusions from them. . . . This is what may [be] called the common-sense view of history. History consists of a corpus of ascertained facts. The facts are available to the historian in documents, inscriptions, and so on . . . [Sir George Clark] contrasted the "hard core of facts" in history with the surrounding pulp of disputable interpretation forgetting perhaps that the pulpy part of the fruit is more rewarding than the hard core. . . . It recalls the favourite dictum of the great liberal journalist C. P. Scott: "Facts are sacred, opinion is free." . . .

What is a historical fact? . . . According to the common-sense view, there are certain basic facts which are the same for all historians and which form, so to speak, the backbone of history—the fact, for example, that the Battle of Hastings was fought in 1066. But this view calls for two observations. In the first place, it is not with facts like these that the historian is primarily concerned. It is no doubt important to know that the great battle was fought in 1066 and not in 1065 or 1067, and that it was fought at Hastings and not at Eastbourne or Brighton. The historian must not get these things wrong. But [to] praise a historian for his accuracy is like praising an architect for using well-seasoned timber or properly mixed concrete in his building. It is a necessary condition of his work, but not his essential function. It is precisely for matters of this kind that the historian is entitled to rely on what have been called the "auxiliary sciences" of history—archaeology, epigraphy, numismatics, chronology, and so forth. . . .

The second observation is that the necessity to establish these basic facts rests not on any quality in the facts themselves, but on an a priori decision of the historian. In spite of C. P. Scott's motto, every journalist knows today that the most effective way to influence opinion is by the selection and arrangement of the appropriate facts. It used to be said that facts speak for themselves. This is, of course, untrue. The facts speak only when the historian calls on them: it is he who decides to which facts to give the floor, and in what order or context. . . . The only reason why we are interested to know that the battle was fought at Hastings in 1066 is that historians regard it as a major historical event. . . . Professor Talcott Parsons once called [science] "a selective system of cognitive orientations to reality." It might perhaps have been put more simply. But history is, among other things, that. The historian is necessarily selective. The belief in a hard core of historical facts existing objectively and independently of the interpretation of the historian is a preposterous fallacy, but one which it is very hard to eradicate.

- Q. 1.** If the author of the passage were to write a book on the Battle of Hastings along the lines of his/her own reasoning, the focus of the historical account would be on:
1. providing a nuanced interpretation by relying on the auxiliary sciences.
  2. exploring the socio-political and economic factors that led to the Battle.
  3. producing a detailed timeline of the various events that led to the Battle.
  4. deriving historical facts from the relevant documents and inscriptions.
- Q. 2.** According to this passage, which one of the following statements best describes the significance of archaeology for historians?
1. Archaeology helps historians to locate the oldest civilisations in history.
  2. Archaeology helps historians to ascertain factual accuracy.
  3. Archaeology helps historians to interpret historical facts.
  4. Archaeology helps historians to carry out their primary duty.
- Q. 3.** All of the following, if true, can weaken the passage's claim that facts do not speak for themselves, EXCEPT:
1. a fact, by its very nature, is objective and universal, irrespective of the context in which it is placed.
  2. facts, like truth, can be relative: what is fact for person X may not be so for person Y.
  3. the order in which a series of facts is presented does not have any bearing on the production of meaning.
  4. the truth value of a fact is independent of the historian who expresses it.
- Q. 4.** All of the following describe the "common-sense view" of history, EXCEPT:
1. only the positivist methods can lead to credible historical knowledge.
  2. history can be objective like the sciences if it is derived from historical facts.
  3. real history can be found in ancient engravings and archival documents.
  4. history is like science: a selective system of cognitive orientations to reality.

## Passage 2

**Directions (Q. 5 to 8):** Read the following passage carefully and answer the questions that follow.

The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.

Umberto Eco, an Italian writer, was right when he said the language of Europe is translation. Netflix and other deep-pocketed global firms speak it well. Just as the EU employs a small army of translators and interpreters to turn intricate laws or impassioned speeches of Romanian MEPs into the EU's 24 official languages, so do the likes of Netflix. It now offers dubbing in 34 languages and subtitling in a few more. . . .

The economics of European productions are more appealing, too. American audiences are more willing than before to give dubbed or subtitled viewing a chance. This means shows such as "Lupin", a French crime caper on Netflix, can become global hits. . . . In 2015, about 75% of Netflix's original content was American; now the figure is half, according to Ampere, a media-analysis company. Netflix has about 100 productions under way in Europe, which is more than big public broadcasters in France or Germany. . . .

Not everything works across borders. Comedy sometimes struggles. Whodunits and bloodthirsty maelstroms between arch Romans and uppity tribesmen have a more universal appeal. Some do it better than others. Barbarians aside, German television is not always built for export, says one executive, being polite. A bigger problem is that national broadcasters still dominate. Streaming services, such as Netflix or Disney+, account for about a third of all viewing hours, even in markets where they are well-established. Europe is an ageing continent. The generation of teens staring at phones is outnumbered by their elders who prefer to gawp at the box.

In Brussels and national capitals, the prospect of Netflix as a cultural hegemon is seen as a threat. "Cultural sovereignty" is the watchword of European executives worried that the Americans will eat their lunch. To be fair, Netflix content sometimes seems stuck in an uncanny valley somewhere in the mid-Atlantic, with local quirks stripped out. Netflix originals tend to have fewer specific cultural references than shows produced by domestic rivals, according to Enders, a market analyst. The company used to have an imperial model of commissioning, with executives in Los Angeles cooking up ideas French people might like. Now Netflix has offices across Europe. But ultimately the big decisions rest with American executives. This makes European politicians nervous.

They should not be. An irony of European integration is that it is often American companies that facilitate it. Google Translate makes European newspapers comprehensible, even if a little clunky, for the continent's non-polyglots. American social-media companies make it easier for Europeans to talk politics across borders. (That they do not always like to hear what they say about each other is another matter.) Now Netflix and friends pump the same content into homes across a continent, making culture a cross-border endeavour, too. If Europeans are to share a currency, bail each other out in times of financial need and share vaccines in a pandemic, then they need to have something in common—even if it is just bingeing on the same series. Watching fictitious northern and southern Europeans tear each other apart 2,000 years ago beats doing so in reality.

- Q. 5.** Based only on information provided in the passage, which one of the following hypothetical Netflix shows would be most successful with audiences across the EU?
1. A trans-Atlantic romantic drama set in Europe and America.
  2. An Italian comedy show hosted by an international star.
  3. An original German TV science fiction production.
  4. A murder mystery drama set in North Africa and France.
- Q. 6.** The author sees the rise of Netflix in Europe as:
1. an economic threat.
  2. a looming cultural threat.
  3. filling an entertainment gap.
  4. a unifying force.
- Q. 7.** Based on information provided in the passage, all of the following are true, EXCEPT:
1. national broadcasters dominate in the EU in terms of total television viewing hours.
  2. Netflix has been able to transform itself into a truly European entity.
  3. only half of Netflix's original programming in the EU is now produced in America.
  4. European television productions have the potential to become global hits.
- Q. 8.** Which one of the following research findings would weaken the author's conclusion in the final paragraph?
1. Research shows there is a wide variance in the popularity and viewing of Netflix shows across different EU countries.
  2. Research shows that older women across the EU enjoy watching romantic comedies on Netflix, whereas younger women prefer historical fiction dramas.
  3. Research shows that Netflix hits produced in France are very popular with North American audiences.
  4. Research shows that Netflix has been gradually losing market share to other streaming television service providers.

### Passage 3

**Directions (Q. 9 to 12):** Read the following passage carefully and answer the questions that follow.

The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.

Over the past four centuries liberalism has been so successful that it has driven all its opponents off the battlefield. Now it is disintegrating, destroyed by a mix of hubris and internal contradictions, according to Patrick Deneen, a professor of politics at the University of Notre Dame. . . . Equality of opportunity has produced a new meritocratic aristocracy that has all the aloofness of the old aristocracy with none of its sense of noblesse oblige. Democracy has degenerated into a theatre of the absurd. And technological advances are reducing ever more areas of work into meaningless drudgery. "The gap between liberalism's claims about itself and the lived reality of the citizenry" is now so wide that "the lie can no longer be accepted," Mr Deneen writes. What better proof of this than the vision of 1,000 private planes whisking their occupants to Davos to discuss the question of "creating a shared future in a fragmented world"? . . .

Deneen does an impressive job of capturing the current mood of disillusionment, echoing left-wing complaints about rampant commercialism, right-wing complaints about narcissistic and bullying students, and general worries about atomisation and selfishness. But when he concludes that all this adds up to a failure of liberalism, is his argument convincing? . . . He argues that the essence of liberalism lies in freeing individuals from constraints. In fact, liberalism contains a wide range of intellectual traditions which provide different answers to the question of how to trade off the relative claims of rights and responsibilities, individual expression and social ties. . . . liberals experimented with a range of ideas from devolving power from the centre to creating national education systems.

Mr. Deneen's fixation on the essence of liberalism leads to the second big problem of his book: his failure to recognise liberalism's ability to reform itself and address its internal problems. The late 19<sup>th</sup> century saw America suffering from many of the problems that are reappearing today, including the creation of a business aristocracy, the rise of vast companies, the corruption of politics and the sense that society was dividing into winners and losers. But a wide variety of reformers, working within the liberal tradition, tackled these problems head on. Theodore Roosevelt took on the trusts. Progressives cleaned up government corruption. University reformers modernised academic syllabuses and built ladders of opportunity. Rather than dying, liberalism reformed itself.

Mr. Deneen is right to point out that the record of liberalism in recent years has been dismal. He is also right to assert that the world has much to learn from the premodern notions of liberty as self-mastery and self-denial. The biggest enemy of liberalism is not so much atomisation but old-fashioned greed, as members of the Davos elite pile their plates ever higher with perks and share options. But he is wrong to argue that the only way for people to liberate themselves from the contradictions of liberalism is "liberation from liberalism itself". The best way to read "Why Liberalism Failed" is not as a funeral oration but as a call to action: up your game, or else.

**Q. 9.** The author of the passage is likely to disagree with all of the following statements, EXCEPT:

1. if we accept that liberalism is a dying ideal, we must work to find a viable substitute.
2. the essence of liberalism lies in greater individual self-expression and freedoms.
3. claims about liberalism's disintegration are exaggerated and misunderstand its core features.
4. liberalism was the dominant ideal in the past century, but it had to reform itself to remain so.

**Q. 10.** All of the following statements are evidence of the decline of liberalism today, EXCEPT:

1. "And technological advances are reducing ever more areas of work into meaningless drudgery."
2. "... the creation of a business aristocracy, the rise of vast companies ..."
3. "Democracy has degenerated into a theatre of the absurd."
4. "'The gap between liberalism's claims about itself and the lived reality of the citizenry is now so wide that 'the lie can no longer be accepted, ...'"

**Q. 11.** The author of the passage refers to "the Davos elite" to illustrate his views on:

1. the unlikelihood of a return to the liberalism of the past as long as the rich continue to benefit from the decline in liberal values.
2. the fact that the rise in liberalism had led to a greater interest in shared futures from unlikely social classes.
3. the hypocrisy of the liberal rich, who profess to subscribe to liberal values while cornering most of the wealth.
4. the way the debate around liberalism has been captured by the rich who have managed to insulate themselves from economic hardships.

**Q. 12.** The author of the passage faults Deneen's conclusions for all of the following reasons, EXCEPT:

1. its extreme pessimism about the future of liberalism today and predictions of an ultimate decline.
2. its repeated harking back to premodern notions of liberty.
3. its very narrow definition of liberalism limited to individual freedoms.
4. its failure to note historical instances in which the process of declining liberalism has managed to reverse itself.

#### Passage 4

**Directions (Q. 13 to 16):** Read the following passage carefully and answer the questions that follow.

The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.

The Second Hand September campaign, led by Oxfam . . . seeks to encourage shopping at local organisations and charities as alternatives to fast fashion brands such as Primark and Boohoo in the name of saving our planet. As innocent as mindless scrolling through online shops may seem, such consumers are unintentionally—or perhaps even knowingly—contributing to an industry that uses more energy than aviation. . . .

Brits buy more garments than any other country in Europe, so it comes as no shock that many of those clothes end up in UK landfills each year: 3,00,000 tonnes of them, to be exact. This waste of clothing is destructive

to our planet, releasing greenhouse gasses as clothes are burnt as well as bleeding toxins and dyes into the surrounding soil and water. As ecologist Chelsea Rochman bluntly put it, “The mismanagement of our waste has even come back to haunt us on our dinner plate.”

It’s not surprising, then, that people are scrambling for a solution, the most common of which is second-hand shopping. Retailers selling consigned clothing are currently expanding at a rapid rate . . . If everyone bought just one used item in a year, it would save 449 million lbs of waste, equivalent to the weight of 1 million Polar bears. “Thriftling” has increasingly become a trendy practice. London is home to many second-hand, or more commonly coined ‘vintage’, shops across the city from Bayswater to Brixton.

So you’re cool and you care about the planet; you’ve killed two birds with one stone. But do people simply purchase a second-hand item, flash it on Instagram with #vintage and call it a day without considering whether what they are doing is actually effective?

According to a study commissioned by Patagonia, for instance, older clothes shed more microfibres. These can end up in our rivers and seas after just one wash due to the worn material, thus contributing to microfibre pollution. To break it down, the amount of microfibres released by laundering 1,00,000 fleece jackets is equivalent to as many as 11,900 plastic grocery bags, and up to 40 per cent of that ends up in our oceans. . . . So where does this leave second-hand consumers? [They would be well advised to buy] high-quality items that shed less and last longer [as this] combats both microfibre pollution and excess garment sending up in landfills. . . .

Luxury brands would rather not circulate their latest season stock around the globe to be sold at a cheaper price, which is why companies like ThredUP, a US fashion resale marketplace, have not yet caught on in the UK. There will always be a market for consignment but there is also a whole generation of people who have been taught that only buying new products is the norm; second-hand luxury goods are not in their psyche. Ben Whitaker, director at Liquidation Firm B-Stock, told Prospect that unless recycling becomes cost-effective and filters into mass production, with the right technology to partner it, “high-end retailers would rather put brand before sustainability.”

**Q. 13.** Based on the passage, we can infer that the opposite of fast fashion, ‘slow fashion’, would most likely refer to clothes that:

1. do not shed microfibres.
2. are sold by genuine vintage stores.
3. are of high quality and long lasting.
4. do not bleed toxins and dyes.

**Q. 14.** According to the author, companies like ThredUP have not caught on in the UK for all of the following reasons EXCEPT that:

1. the British don’t buy second-hand clothing.
2. luxury brands do not like their product to be devalued.
3. luxury brands want to maintain their brand image.
4. recycling is currently not financially attractive for luxury brands.

**Q. 15.** The act of “thriftling”, as described in the passage, can be considered ironic because it:

1. offers luxury clothing at cut-rate prices.
2. has created environmental problems.
3. is an anti-consumerist attitude.
4. is not cost-effective for retailers.

**Q. 16.** The central idea of the passage would be undermined if:

1. customers bought all their clothes online.
2. second-hand stores sold only high-quality clothes.

3. Primark and Boohoo recycled their clothes for vintage stores.

4. clothes were not thrown and burnt in landfills.

**Q. 17.** There is a sentence that is missing in the paragraph below. Look at the paragraph and decide where (option 1, 2, 3, or 4) the following sentence would best fit.

**Sentence:** And probably much earlier, moving the documentation for kissing back 1,000 years compared to what was acknowledged in the scientific community.

**Paragraph:** Research has hypothesised that the earliest evidence of human lip kissing originated in a very specific geographical location in South Asia 3,500 years ago.\_\_(1)\_\_. From there it may have spread to other regions, simultaneously accelerating the spread of the herpes simplex virus 1. According to Dr Troels Pank Arboll and Dr Sophie Lund Rasmussen, who in a new article in the journal *Science* draw on a range of written sources from the earliest Mesopotamian societies, kissing was already a well-established practice 4,500 years ago in the Middle East.\_\_(2)\_\_. In ancient Mesopotamia, people wrote in cuneiform script on clay tablets.\_\_(3)\_\_. Many thousands of these clay tablets have survived to this day, and they contain clear examples that kissing

was considered a part of romantic intimacy in ancient times.\_\_(4)\_\_. "Kissing could also have been part of friendships and family members' relations," says Dr Troels Pank Arbøll, an expert on the history of medicine in Mesopotamia.

1. Option 4
2. Option 2
3. Option 3
4. Option 1

**Q. 18.** There is a sentence that is missing in the paragraph below. Look at the paragraph and decide where (option 1, 2, 3, or 4) the following sentence would best fit.

**Sentence:** Dualism was long held as the defining feature of developing countries in contrast to developed countries, where frontier technologies and high productivity were assumed to prevail.

**Paragraph:** \_\_(1)\_\_. At the core of development economics lies the idea of 'productive dualism': that poor countries' economies are split between a narrow 'modern' sector that uses advanced technologies and a larger 'traditional' sector characterised by very low productivity.\_\_(2)\_\_. While this distinction between developing and advanced economies may have made some sense in the 1950s and 1960s, it no longer appears to be very relevant. A combination of forces have produced a widening gap between the winners and those left behind.\_\_(3)\_\_. Convergence between poor and rich parts of the economy was arrested and regional disparities widened.\_\_(4)\_\_. As a result, policymakers in advanced economies are now grappling with the same questions that have long preoccupied developing economies: mainly how to close the gap with the more advanced parts of the economy.

1. Option 1
2. Option 2
3. Option 3
4. Option 4

**Q. 19.** Five jumbled up sentences (labelled 1, 2, 3, 4 and 5), related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd sentence and key in the number of that sentence as your answer.

1. Self-care particularly links to loneliness, behavioural problems and negative academic outcomes.
2. "Latchkey children" refers to children who routinely return home from school to empty homes and take care of themselves for extended periods of time.
3. Although self-care generally points to negative outcomes, it is important to

consider that the bulk of research has yet to track long-term consequences.

4. In research and practice, the phrase "children in self-care" has come to replace latchkey in an effort to more accurately reflect the nature of their circumstances.
5. Although parents might believe that self-care would be beneficial for development, recent research has found quite the opposite.

**Q. 20.** Five jumbled up sentences (labelled 1, 2, 3, 4 and 5), related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd sentence and key in the number of that sentence as your answer.

1. The banning of Northern Lights could be considered a precursor to censoring books for "moral", world view or religious reasons.
2. Attempts to ban books are attempts to silence authors who have summoned immense courage in telling their stories.
3. Now the banning and challenging of books in the US has escalated to an unprecedented level.
4. The widely acclaimed fantasy novel Northern Lights was banned in some parts of the US, and was the second most challenged book in the US.
5. The American Library Association documented an unparalleled number of reported book challenges in 2022, about 2,500 unique titles.

**Q. 21.** The four sentences (labelled 1, 2, 3 and 4) given 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. Like the ants that make up a colony, no single neuron holds complex information like self-awareness, hope or pride.
2. Although the human brain is not yet understood enough to identify the mechanism by which emergence functions, most neurobiologists agree that complex interconnections among the parts give rise to qualities that belong only to the whole.
3. Nonetheless, the sum of all neurons in the nervous system generate complex human emotions like fear and joy, none of which can be attributed to a single neuron.

4. Human consciousness is often called an emergent property of the human brain.

**Q. 22.** The four sentences (labelled 1, 2, 3 and 4) given 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. Contemporary African writing like 'The Bottled Leopard' voices this theme using two children and two backgrounds to juxtapose two varying cultures.
2. Chukwuemeka Ike explores the conflict, and casts the Western tradition as condescending, enveloping and unaccommodating towards local African practice.
3. However, their views contradict the reality, for a rich and sustaining local African cultural ethos exists for all who care, to see and experience.
4. Western Christian concepts tend to deny or feign ignorance about the existence of a genuine and enduring indigenous African tradition.

**Q. 23.** The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Heatwaves are becoming longer, frequent and intense due to climate change. The impacts of extreme heat are unevenly experienced; with older people and young children, those with pre-existing medical conditions and on low incomes significantly more vulnerable. Adaptation to heatwaves is a significant public policy concern. Research conducted among at-risk people in the UK reveals that even vulnerable people do not perceive themselves as at risk of extreme heat; therefore, early warnings of extreme heat events do not perform as intended. This suggests that understanding how extreme heat is narrated is very important. The news media play a central role in this process and can help warn people about the

potential danger, as well as about impacts on infrastructure and society.

1. People are vulnerable to heatwaves caused due to climate change, measures taken are ineffective.
2. News stories help in warning about heatwaves, but they have to become more effective.
3. Heatwaves pose an enormous risk; the media plays a pivotal role in alerting people to this danger.
4. Protection from heat waves is important but current reports and public policies seem ineffective.

**Q. 24.** The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

People spontaneously create counterfactual alternatives to reality when they think "if only" or "what if" and imagine how the past could have been different. The mind computes counterfactuals for many reasons. Counterfactuals explain the past and prepare for the future, they implicate various relations including causal ones, and they affect intentions and decisions. They modulate emotions such as regret and relief, and they support moral judgments such as blame. The ability to create counterfactuals develops throughout childhood and contributes to reasoning about other people's beliefs, including their false beliefs.

1. Counterfactual alternatives to reality are created for a variety of reasons and is part of one's developmental process.
2. People create counterfactual alternatives to reality for various reasons, including reasoning about other people's beliefs.
3. Counterfactuals help people to prepare for the future by understanding intentions and making decisions.
4. Counterfactual thinking helps to reverse past and future actions and reason out false beliefs.

## Data Interpretation and Logical Reasoning (DILR)

**Directions (Q. 1 to 5):** Read the instructions given and answer the questions that follow:

Odsville has five firms – Alfloo, Bzygoo, Czechy, Drjbna and Elavalaki. Each of these firms was founded in some year and also closed down a few years later.

Each firm raised ₹ 1 crore in its first and last year of existence. The amount each firm raised every year increased until it reached a maximum, and then decreased until the firm closed down. No firm raised the same amount of money in two consecutive years. Each annual increase and decrease was either by ₹ 1 crore or by ₹ 2 crores.

The table below provides partial information about the five firms.

Firm	First year of existence	Last year of experience	Total amount raised (₹ crores)
Alfloo	2009	2016	21
Bzygoo	2012	2015	
Czechy	2013		9
Drjbna	2011	2015	10
Elavalaki	2010		13

- Q. 1.** For which firm(s) can the amounts raised by them be concluded with certainty in each year?
1. Only Czechy
  2. Only Bzygoo and Czechy and Drjbna
  3. Only Drjbna
  4. Only Czechy and Drjbna
- Q. 2.** What best can be concluded about the total amount of money raised in 2015?
1. It is either ₹ 7 crores or ₹ 8 crores or ₹ 9 crores.
  2. It is either ₹ 7 crores or ₹ 8 crores.
  3. It is exactly ₹ 8 crores.
  4. It is either ₹ 8 crores or ₹ 9 crores.
- Q. 3.** What is the largest possible total amount of money (in ₹ crores) that could have been raised in 2013?
- Q. 4.** If Elavalaki raised ₹ 3 crores in 2013, then what is the smallest possible total amount of money (in ₹ crores) that could have been raised by all the companies in 2012?
1. 10
  2. 9
  3. 12
  4. 11
- Q. 5.** If the total amount of money raised in 2014 is ₹ 12 crores, then which of the following is not possible?
1. Alfloo raised the same amount of money as Drjbna in 2013.
  2. Bzygoo raised more money than Elavalaki in 2014.
  3. Bzygoo raised the same amount of money as Elavalaki in 2013.
  4. Alfloo raised the same amount of money as Bzygoo in 2014.

**Directions (Q. 6 to 10):** Answer the questions on the basis of the information given below.

Anjali, Bipasha and Chitra visited an entertainment park that has four rides. Each ride lasts one hour and can accommodate one visitor at one point. All rides begin at 9 a.m. and must be completed by 5 p.m. except for Ride-3, for which the last ride has to be completed by 1 p.m. Ride gates open every 30 minutes, for example, 10 a.m., 10:30 a.m., and so on. Whenever a ride gate opens, and there is no visitor inside, the first visitor waiting in the queue buys the ticket just before taking the ride. The ticket prices are ₹ 20, ₹ 50, ₹ 30 and ₹ 40 for Rides 1 to 4, respectively. Each of the three visitors took at least one ride and did not necessarily take all rides. None of them took the same ride more than once. The movement time from one ride to another is negligible, and a visitor leaves the ride immediately after the completion of the ride. No one takes a break inside the park unless mentioned explicitly.

The following information is also known.

1. Chitra never waited in the queue and completed her visit by 11 a.m. after spending ₹ 50 to pay for the ticket(s).
  2. Anjali took Ride-1 at 11 a.m. after waiting for 30 min for Chitra to complete it. It was the only ride where Anjali waited.
  3. Bipasha began her first of three rides at 11:30 a.m. All three visitors incurred the same amount of ticket expense by 12:15 p.m.
  4. The last ride taken by Anjali and Bipasha was the same, where Bipasha waited 30 min for Anjali to complete her ride. Before standing in the queue for that ride, Bipasha took a 1-hour coffee break after completing her previous ride.
- Q. 6.** What was the total amount spent on tickets (in ₹) by Bipasha?
1. 110
  2. 100
  3. 90
  4. 120
- Q. 7.** Which were all the rides that Anjali completed by 2:00 p.m.?
1. Ride-1 and Ride-3
  2. Ride-1, Ride-2 and Ride-4
  3. Ride-1 and Ride-4
  4. Ride-1, Ride-2 and Ride-3
- Q. 8.** Which ride was taken by all three visitors?
1. Ride-1
  2. Ride-3
  3. Ride-2
  4. Ride-4
- Q. 9.** How many rides did Anjali and Chitra take in total?
- Q. 10.** What was the total amount spent on tickets (in ₹) by Anjali?



**Directions (Q. 11 to 15):** Answer the questions based on the following information.

Three participants – Akhil, Bimal and Chatur participate in a random draw competition for five days. Every day, each participant randomly picks up a ball numbered between 1 and 9. The number on the ball determines his score on that day. The total score of a participant is the sum of his scores attained in the five days. The total score of a day is the sum of participants’ scores on that day. The 2-day average on a day, except on Day 1, is the average of the total scores of that day and of the previous day. For example, if the total scores of Day 1 and Day 2 are 25 and 20, then the 2-day average on Day 2 is calculated as 22.5. Table 1 gives the 2-day averages for Days 2 through 5.

**Table 1 : 2-day averages for Days 2 through 5**

Day 2	Day 3	Day 4	Day 5
15	15.5	16	17

Participants are ranked each day, with the person having the maximum score being awarded the minimum rank (1) on that day. If there is a tie, all participants with the tied score are awarded the best available rank. For example, if on a day Akhil, Bimal and Chatur score 8, 7 and 7, respectively, then their ranks will be 1, 2 and 2, respectively on that day. These ranks are given in Table 2.

**Table 2: Ranks of participants on each day**

	Day 1	Day 2	Day 3	Day 4	Day 5
<b>Akhil</b>	1	2	2	3	3
<b>Bimal</b>	2	3	2	1	1
<b>Chatur</b>	3	1	1	2	2

The following information is also known.

- Chatur always scores in multiples of 3. His score on Day 2 is the unique highest score in the competition. His minimum score is observed only on Day 1, and it matches Akhil’s score on Day 4.
- The total score on Day 3 is the same as the total score on Day 4.
- Bimal’s scores are the same on Day 1 and Day 3.

**Q. 11.** What is Akhil’s score on Day 1?

- 7
- 6
- 5
- 8

**Q. 12.** Who attains the maximum total score?

- Bimal
- Chatur
- Cannot be determined
- Akhil

**Q. 13.** What is the minimum possible total score of Bimal?

**Q. 14.** If the total score of Bimal is a multiple of 3, what is the score of Akhil on Day 2?

- Cannot be determined
- 5
- 6
- 4

**Q. 15.** If Akhil attains a total score of 24, then what is the total score of Bimal?

**Directions (Q. 16 to 20):** Answer the questions based on the following information.

There are nine boxes arranged in a  $3 \times 3$  array as shown in Tables 1 and 2. Each box contains three sacks. Each sack has a certain number of coins, between 1 and 9, both inclusive.

The average number of coins per sack in the boxes are all distinct integers. The total number of coins in each row is the same. The total number of coins in each column is also the same.

	1st column	2nd column	3rd column
1st row	<input type="text"/>	9	6
2nd row	2	<input type="text"/>	<input type="text"/>
3rd row	8	<input type="text"/>	<input type="text"/>

Table 1

	1st column	2nd column	3rd column
1st row	1**	2*	2*
2nd row	1**	0*	3*
3rd row	3*	2**	0**

Table 2

Table 1 gives information regarding the median of the numbers of coins in the three sacks in a box for some of the boxes. In Table 2, each box has a number which represents the number of sacks in that box having more than 5 coins. That number is followed by a \* if the sacks in that box satisfy exactly one among the following three conditions, and it is followed by \*\* if two or more of these conditions are satisfied.

- (i) The minimum among the numbers of coins in the three sacks in the box is 1.  
 (ii) The median of the numbers of coins in the three sacks is 1.  
 (iii) The maximum among the numbers of coins in the three sacks in the box is 9.

- Q. 16.** What is the total number of coins in all the boxes in the 3<sup>rd</sup> row?  
 1. 36      2. 30      3. 15      4. 45
- Q. 17.** How many boxes have at least one sack containing 9 coins?  
 1. 3      2. 8      3. 5      4. 4
- Q. 18.** For how many boxes are the average and median of the numbers of coins contained in the three sacks in that box the same?
- Q. 19.** How many sacks have exactly one coin?
- Q. 20.** In how many boxes do all three sacks contain different numbers of coins?

## Quantitative Aptitude (QA)

- Q. 1.** For any natural numbers  $m, n$  and  $k$ , such that  $k$  divides both  $m + 2n$  and  $3m + 4n$ ,  $k$  must be a common divisor of  
 1.  $m$  and  $n$       2.  $m$  and  $2n$   
 3.  $2m$  and  $3n$       4.  $2m$  and  $n$
- Q. 2.** The sum of all possible values of  $x$  satisfying the equation  $2^{4x^2} - 2^{2x^2 + x + 16} + 2^{2x + 30} = 0$ , is  
 1. 3      2.  $\frac{5}{2}$       3.  $\frac{3}{2}$       4.  $\frac{1}{2}$
- Q. 3.** Any non-zero real numbers  $x, y$  such that  $y \neq 3$  and  $\frac{x}{y} < \frac{x+3}{y-3}$ , will satisfy the condition  
 1. If  $y > 10$ , then  $-x > y$   
 2.  $\frac{x}{y} < \frac{y}{x}$   
 3. If  $x < 0$ , then  $-x < y$   
 4. If  $y < 0$ , then  $-x < y$
- Q. 4.** Let  $a, b, m$  and  $n$  be natural numbers such that  $a > 1$  and  $b > 1$ . If  $a^m b^n = 144^{145}$ , then the largest possible value of  $n - m$  is  
 1. 579      2. 580      3. 289      4. 290
- Q. 5.** Let  $k$  be the largest integer such that the equation  $(x - 1)^2 + 2kx + 11 = 0$  has no real roots. If  $y$  is a positive real number, then the least possible value of  $\frac{k}{4y} + 9y$  is
- Q. 6.** The number of positive integers less than 50, having exactly two distinct factors other than 1 and itself, is
- Q. 7.** For some positive real number  $x$ , if  $\log_{\sqrt{3}}(x) + \frac{\log_x(25)}{\log_x(0.008)} = \frac{16}{3}$ , then the value of  $\log_3(3x^2)$  is
- Q. 8.** Pipes A and C are fill pipes while Pipe B is a drain pipe of a tank. Pipe B empties the full tank in one hour less than the time taken by Pipe A to fill the empty tank. When pipes A, B and C are turned on together, the empty tank is filled in two hours. If pipes B and C are turned on together when the tank is empty and Pipe B is turned off after one hour, then Pipe C takes another one hour and 15 minutes to fill the remaining tank. If Pipe A can fill the empty tank in less than five hours, then the time taken, in minutes, by Pipe C to fill the empty tank is  
 1. 60      2. 90      3. 75      4. 120
- Q. 9.** Anil borrows ₹ 2 lakhs at an interest rate of 8% per annum, compounded half-yearly. He repays ₹ 10,320 at the end of the first year and closes the loan by paying the outstanding amount at the end of the third year. Then, the total interest, in rupees, paid over the three years is nearest to  
 1. 40,991      2. 45,311      3. 33,130      4. 51,311
- Q. 10.** Ravi is driving at a speed of 40 km/h on a road. Vijay is 54 metres behind Ravi and driving in the same direction as Ravi. Ashok is driving along the same road from the opposite direction at a speed of 50 km/h and is 225 metres away from Ravi. The speed, in km/h, at which Vijay should drive so that all the three cross each other at the same time, is  
 1. 67.2      2. 58.8      3. 61.6      4. 64.4
- Q. 11.** Minu purchases a pair of sunglasses at ₹ 1,000 and sells to Kanu at 20% profit. Then, Kanu sells it back to Minu at 20% loss. Finally, Minu sells the same pair of sunglasses to Tanu. If the total profit made by Minu from all her transactions is ₹ 500, then the percentage of profit made by Minu when she sold the pair of sunglasses to Tanu is  
 1. 26%      2. 31.25%      3. 52%      4. 35.42%

- Q. 12.** The price of a precious stone is directly proportional to the square of its weight. Sita has a precious stone weighing 18 units. If she breaks it into four pieces with each piece having distinct integer weight, then the difference between the highest and lowest possible values of the total price of the four pieces will be 2,88,000. Then, the price of the original precious stone is
1. 9,72,000                      2. 12,96,000  
3. 19,44,000                      4. 16,20,000
- Q. 13.** In a company, 20% of the employees work in the manufacturing department. If the total salary obtained by all the manufacturing employees is one-sixth of the total salary obtained by all the employees in the company, then the ratio of the average salary obtained by the manufacturing employees to the average salary obtained by the non-manufacturing employees is
1. 4 : 5      2. 6 : 5      3. 5 : 6      4. 5 : 4
- Q. 14.** A container has 40 litres of milk. Then, 4 litres are removed from the container and replaced with 4 litres of water. This process of replacing 4 litres of the liquid in the container with an equal volume of water is continued repeatedly. The smallest number of times of doing this process, after which the volume of milk in the container becomes less than that of water, is
- Q. 15.** If a certain amount of money is divided equally among  $n$  persons, each one receives ₹ 352. However, if two persons receive ₹ 506 each and the remaining amount is divided equally among the other persons, each of them receive less than or equal to ₹ 330. Then, the maximum possible value of  $n$  is
- Q. 16.** Jayant bought a certain number of white shirts at the rate of ₹ 1,000 per piece and a certain number of blue shirts at the rate of ₹ 1,125 per piece. For each shirt, he then set a fixed market price which was 25% higher than the average cost of all the shirts. He sold all the shirts at a discount of 10% and made a total profit of ₹ 51,000. If he bought both colours of shirts, then the maximum possible total number of shirts that he could have bought is
- Q. 17.** A triangle is drawn with its vertices on the circle  $C$  such that one of its sides is a diameter of  $C$  and the other two sides have their lengths in the ratio  $a : b$ . If the radius of the circle is  $r$ , then the area of the triangle is
1.  $\frac{2abr^2}{a^2 + b^2}$                       2.  $\frac{4abr^2}{a^2 + b^2}$   
3.  $\frac{abr^2}{a^2 + b^2}$                       4.  $\frac{abr^2}{2(a^2 + b^2)}$
- Q. 18.** In a rectangle ABCD,  $AB = 9$  cm and  $BC = 6$  cm. P and Q are two points on BC such that the areas of the figures ABP, APQ, and AQCD are in geometric progression. If the area of the figure AQCD is four times the area of triangle ABP, then  $BP : PQ : QC$  is
1. 2 : 4 : 1      2. 1 : 2 : 4      3. 1 : 1 : 2      4. 1 : 2 : 1
- Q. 19.** The area of the quadrilateral bounded by the Y-axis, the line  $x = 5$ , and the lines  $|x - y| - |x - 5| = 2$ , is
- Q. 20.** If  $p^2 + q^2 - 29 = 2pq - 20 = 52 - 2pq$ , then the difference between the maximum and minimum possible value of  $(p^3 - q^3)$  is
1. 243      2. 378      3. 189      4. 486
- Q. 21.** Let both the series  $a_1, a_2, a_3, \dots$  and  $b_1, b_2, b_3, \dots$  be in arithmetic progression such that the common differences of both the series are prime numbers. If  $a_5 = b_9, a_{19} = b_{19}$  and  $b_2 = 0$ , then  $a_{11}$  equals
1. 86      2. 84      3. 79      4. 83
- Q. 22.** Let  $a_n$  and  $b_n$  be two sequences such that  $a_n = 13 + 6(n - 1)$  and  $b_n = 15 + 7(n - 1)$  for all natural numbers  $n$ . Then, the largest three digit integer that is common to both these sequences, is

## Answer Key

### Verbal Ability and Reading Comprehension (VARC)

1. (2)	2. (2)	3. (2)	4. (4)	5. (4)	6. (4)	7. (2)	8. (1)	9. (4)	10. (1)
11. (3)	12. (2)	13. (3)	14. (1)	15. (2)	16. (2)	17. (2)	18. (2)	19. 3	20. 2
21. 4132	22. 4321	23. (3)	24. (1)						

### Data Interpretation and Logical Reasoning (DILR)

1. (4)	2. (2)	3. 17	4. (4)	5. (3)	6. (1)	7. (4)	8. (1)	9. 6	10. 140
11. (1)	12. (2)	13. 25	14. (4)	15. 26	16. (4)	17. (3)	18. 4	19. 9	20. 5

### Quantitative Aptitude (QA)

1. (2)	2. (4)	3. (4)	4. (1)	5. 6	6. 15	7. 7	8. (2)	9. (4)	10. (3)
11. (2)	12. (2)	13. (1)	14. 7	15. 16	16. 407	17. (1)	18. (1)	19. 45	20. (2)
21. (3)	22. 967								

**Access the Solutions**

Scan QR Code

**Given at Page xvi**

CAT 2023

Shift-3

QUESTION  
PAPER

Time: 120 Mins

Maximum Marks: 198

**Important Instructions**

- (i) Total Number of Questions: 66
- (ii) Number of Questions in Verbal Ability and Reading Comprehension (VARC): 24
- (iii) Number of Questions in Data Interpretation and Logical Reasoning (DILR): 20
- (iv) Number of Questions in Quantitative Ability (QA): 22
- (v) 40 minutes are allotted to attempt each section.
- (vi) 4 answer options for each MCQ type question.
- (vii) Answers are typed in the given space on the computer screen for Non-MCQ.
- (viii) For each correct answer: + 3 marks
- (ix) Negative marking (Applicable for wrong answers in MCQs): - 1 mark

**Verbal Ability and Reading Comprehension (VARC)**

**Passage 1**

**Directions (Q. 1 to 4):** Read the following passage carefully and answer the questions that follow.

The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.

In 2006, the Met [art museum in the US] agreed to return the Euphronios krater, a masterpiece Greek urn that had been a museum draw since 1972. In 2007, the Getty [art museum in the US] agreed to return 40 objects to Italy, including a marble Aphrodite, in the midst of looting scandals. And in December, Sotheby's and a private owner agreed to return an ancient Khmer statue of a warrior, pulled from auction two years before, to Cambodia.

Cultural property, or patrimony, laws limit the transfer of cultural property outside the source country's territory, including outright export prohibitions and national ownership laws. Most art historians, archaeologists, museum officials and policymakers portray cultural property laws in general as invaluable tools for counteracting the ugly legacy of Western cultural imperialism.

During the late 19<sup>th</sup> and early 20<sup>th</sup> century — an era former Met director Thomas Hoving called “the age of piracy” — American and European art museums acquired antiquities by hook or by crook, from grave robbers or souvenir collectors, bounty from digs and ancient sites in impoverished but art-rich source countries. Patrimony laws were intended to protect future archaeological discoveries against Western imperialist designs. . . .

I surveyed 90 countries with one or more archaeological sites on UNESCO's World Heritage Site list, and my study shows that in most cases the number of discovered sites diminishes sharply after a country passes a cultural property law. There are 222 archaeological sites listed for those 90 countries. When you look into the history of the sites, you see that all but 21 were discovered before the passage of cultural property laws. . . .

Strict cultural patrimony laws are popular in most countries. But the downside may be that they reduce incentives for foreign governments, nongovernmental organisations and educational institutions to invest in overseas exploration because their efforts will not necessarily be rewarded by opportunities to hold, display and study what is uncovered. To the extent that source countries can fund their own archaeological projects, artifacts and sites may still be discovered. . . . The survey has far-reaching implications. It suggests that source countries, particularly in the developing world, should narrow their cultural property laws so that they can reap the benefits of new archaeological discoveries, which typically increase tourism and enhance cultural pride. This does not mean these nations should abolish restrictions on foreign excavation and foreign claims to artifacts.

China provides an interesting alternative approach for source nations eager for foreign archaeological investment. From 1935 to 2003, China had a restrictive cultural property law that prohibited foreign ownership of Chinese cultural artifacts. In those years, China's most significant archaeological discovery occurred by chance, in 1974, when peasant farmers accidentally uncovered ranks of buried terra cotta warriors, which are part of Emperor Qin's spectacular tomb system.

In 2003, the Chinese government switched course, dropping its cultural property law and embracing collaborative international archaeological research. Since then, China has nominated 11 archaeological sites for inclusion in the World Heritage Site list, including eight in 2013, the most ever for China.

- Q. 1.** From the passage we can infer that the author is likely to advise poor, but archaeologically-rich source countries to do all of the following, EXCEPT:
1. allow foreign countries to analyse and exhibit the archaeological finds made in the source country.
  2. adopt China's strategy of dropping its cultural property laws and carrying out archaeological research through international collaboration.
  3. to find ways to motivate other countries to finance archaeological explorations in their country.
  4. fund institutes in other countries to undertake archaeological exploration in the source country reaping the benefits of cutting-edge techniques.
- Q. 2.** It can be inferred from the passage that archaeological sites are considered important by some source countries because they:
1. are subject to strict patrimony laws.
  2. are a symbol of Western imperialism.
  3. generate funds for future discoveries.
  4. give a boost to the tourism sector.
- Q. 3.** Which one of the following statements, if true, would undermine the central idea of the passage?
1. UNESCO finances archaeological research in poor, but archaeologically-rich source countries.
  2. Western countries will have to apologise to countries for looting their cultural property in the past century.
  3. Affluent archaeologically-rich source countries can afford to carry out their own excavations.
  4. Museums established in economically deprived archaeologically-rich source countries can display the antiques discovered there.
- Q. 4.** Which one of the following statements best expresses the paradox of patrimony laws?
1. They were aimed at protecting cultural property, but instead reduced new archaeological discoveries.
  2. They were intended to protect cultural property, but instead resulted in the withholding of national treasure from museums.
  3. They were aimed at protecting cultural property, but instead reduced business for auctioneers like Sotheby's.
  4. They were intended to protect cultural property, but instead resulted in the neglect of historical sites.

## Passage 2

**Directions (Q. 5 to 8):** Read the following passage carefully and answer the questions that follow.

The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.

Steven Pinker's new book, "Rationality: What It Is, Why It Seems Scarce, Why It Matters," offers a pragmatic dose of measured optimism, presenting rationality as a fragile but achievable ideal in personal and civic life. . . . Pinker's ambition to illuminate such a crucial topic offers the welcome prospect of a return to sanity. . . . It's no small achievement to make formal logic, game theory, statistics and Bayesian reasoning delightful topics full of charm and relevance.

It's also plausible to believe that a wider application of the rational tools he analyses would improve the world in important ways. His primer on statistics and scientific uncertainty is particularly timely and should be required reading before consuming any news about the [COVID] pandemic. More broadly, he argues that less media coverage of shocking but vanishingly rare events, from shark attacks to adverse vaccine reactions, would help prevent dangerous overreactions, fatalism and the diversion of finite resources away from solvable but less-dramatic issues, like malnutrition in the developing world.

It's a reasonable critique, and Pinker is not the first to make it. But analysing the political economy of journalism — its funding structures, ownership concentration and increasing reliance on social media shares — would have given a fuller picture of why so much coverage is so misguided and what we might do about it.

Pinker's main focus is the sort of conscious, sequential reasoning that can track the steps in a geometric proof or an argument in formal logic. Skill in this domain maps directly onto the navigation of many real-world problems, and Pinker shows how greater mastery of the tools of rationality can improve decision-making in medical, legal, financial and many other contexts in which we must act on uncertain and shifting information. . . .

Despite the undeniable power of the sort of rationality he describes, many of the deepest insights in the history of science, math, music and art strike their originators in moments of epiphany. From the 19<sup>th</sup>-century chemist Friedrich August Kekule's discovery of the structure of benzene to any of Mozart's symphonies, much extraordinary human achievement is not a product of conscious, sequential reasoning. Even Plato's Socrates — who anticipated many of Pinker's points by nearly 2,500 years, showing the virtue of knowing what you do not know and examining all premises in arguments, not simply trusting speakers' authority or charisma — attributed many of his most profound insights to dreams and visions. Conscious reasoning is helpful in sorting the wheat from the chaff, but it would be interesting to consider the hidden aquifers that make much of the grain grow in the first place.

The role of moral and ethical education in promoting rational behaviour is also underexplored. Pinker recognises that rationality "is not just a cognitive virtue but a moral one." But this profoundly important point, one subtly explored by ancient Greek philosophers like Plato and Aristotle, doesn't really get developed. This is a shame, since possessing the right sort of moral character is arguably a precondition for using rationality in beneficial ways.

- Q. 5.** The author endorses Pinker's views on the importance of logical reasoning as it:
1. equips people with the ability to tackle challenging practical problems.
  2. helps people to gain expertise in statistics and other scientific disciplines.
  3. focuses public attention on real issues like development rather than sensational events.
  4. provides a moral compass for resolving important ethical dilemmas.
- Q. 6.** According to the author, for Pinker as well as the ancient Greek philosophers, rational thinking involves all of the following EXCEPT:
1. the belief that the ability to reason logically encompasses an ethical and moral dimension.
  2. the primacy of conscious sequential reasoning as the basis for seminal human achievements.
  3. arriving at independent conclusions irrespective of who is presenting the argument.
  4. an awareness of underlying assumptions in an argument and gaps in one's own knowledge.
- Q. 7.** The author refers to the ancient Greek philosophers to:
1. show how dreams and visions have for centuries influenced subconscious behaviour and pathbreaking inventions.
  2. indicate the various similarities between their thinking and Pinker's conclusions.
  3. highlight the influence of their thinking on the development of Pinker's arguments.
  4. reveal gaps in Pinker's discussion of the importance of ethical considerations in rational behaviour.
- Q. 8.** The author mentions Kekule's discovery of the structure of benzene and Mozart's symphonies to illustrate the point that:
1. unlike the sciences, human achievements in other fields are a mix of logical reasoning and spontaneous epiphanies.
  2. great innovations across various fields can stem from flashes of intuition and are not always propelled by logical thinking.
  3. it is not just the creative arts, but also scientific fields that have benefitted from flashes of creativity.
  4. Pinker's conclusions on sequential reasoning are belied by European achievements which, in the past, were more rooted in unconscious bursts of genius.

### Passage 3

**Directions (Q. 9 to 12):** Read the following passage carefully and answer the questions that follow.

The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.

The biggest challenge [The Nutmeg's Curse by Ghosh] throws down is to the prevailing understanding of when the climate crisis started. Most of us have accepted . . . that it started with the widespread use of coal at the beginning of the Industrial Age in the 18<sup>th</sup> century and worsened with the mass adoption of oil and natural gas in the 20<sup>th</sup> century.

Ghosh takes this history at least three centuries back, to the start of European colonialism in the 15<sup>th</sup> century. He [starts] the book with a 1621 massacre by Dutch invaders determined to impose a monopoly on nutmeg cultivation and trade in the Banda islands in today's Indonesia. Not only do the Dutch systematically depopulate the islands through genocide, they also try their best to bring nutmeg cultivation into plantation mode. These are the two points to which Ghosh returns through examples from around the world. One, how European colonialists decimated not only indigenous populations but also indigenous understanding of the relationship between humans and Earth. Two, how this was an invasion not only of humans but of the Earth itself, and how this continues to the present day by looking at nature as a 'resource' to exploit. . . .

We know we are facing more frequent and more severe heatwaves, storms, floods, droughts and wildfires due to climate change. We know our expansion through deforestation, dam building, canal cutting – in short, terraforming, the word Ghosh uses – has brought us repeated disasters . . . Are these the responses of an angry Gaia who has finally had enough? By using the word 'curse' in the title, the author makes it clear that he thinks so. I use the pronoun 'who' knowingly, because Ghosh has quoted many non-European sources to enquire into the relationship between humans and the world around them so that he can question the prevalent way of looking at Earth as an inert object to be exploited to the maximum.

As Ghosh's text, notes and bibliography show once more, none of this is new. There have always been challenges to the way European colonialists looked at other civilisations and at Earth. It is just that the invaders and their myriad backers in the fields of economics, politics, anthropology, philosophy, literature, technology, physics, chemistry, biology have dominated global intellectual discourse. . . .

There are other points of view that we can hear today if we listen hard enough. Those observing global climate negotiations know about the Latin American way of looking at Earth as Pachamama (Earth Mother). They also know how such a framing is just provided lip service and is ignored in the substantive portions of the negotiations. In 'The Nutmeg's Curse', Ghosh explains why. He shows the extent of the vested interest in the oil economy – not only for oil-exporting countries, but also for a superpower like the US that controls oil drilling, oil prices and oil movement around the world. Many of us know power utilities are sabotaging decentralised solar power generation today because it hits their revenues and control. And how the other points of view are so often drowned out.

**Q. 9.** All of the following can be inferred from the reviewer's discussion of "The Nutmeg's Curse", EXCEPT

1. academic discourses have always served the function of raising awareness about environmental preservation.
2. the history of climate change is deeply intertwined with the history of colonialism.
3. the contemporary dominant perception of nature and the environment was put in place by processes of colonialism.
4. environmental preservation policy makers can learn a lot from non-European and/or pre-colonial societies.

**Q. 10.** Which one of the following best explains the primary purpose of the discussion of the colonisation of the Banda islands in "The Nutmeg's Curse"?

1. To illustrate the first instance in history when the processes responsible for climate change were initiated.
2. To illustrate how systemic violence against the colonised constituted the cornerstone of colonialism.
3. To illustrate how colonialism represented and perpetuated the mindset that has led to climate change.
4. To illustrate the role played by the cultivation of certain crops in the plantation mode in contributing to climate change.

**Q. 11.** Which one of the following, if true, would make the reviewer's choice of the pronoun "who" for Gaia inappropriate?

1. Ghosh's book has a different title: "The Nutmeg's Revenge".
2. Non-European societies have perceived the Earth as a non-living source of all resources.



3. Modern western science discovers new evidence for the Earth being an inanimate object.
4. There is a direct cause–effect relationship between human activities and global climate change.

**Q. 12.** On the basis of information in the passage, which one of the following is NOT a reason for the failure of policies seeking to address climate change?

1. The marginalised status of non-European ways of looking at nature and the environment.
2. The greed of organisations benefiting from non-renewable energy resources.
3. The decentralised characteristic of renewable energy resources like solar power.
4. The global dominance of oil economies and international politics built around it.

### Passage 4

**Directions (Q. 13 to 16):** Read the following passage carefully and answer the questions that follow.

The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.

Understanding romantic aesthetics is not a simple undertaking for reasons that are internal to the nature of the subject. Distinguished scholars, such as Arthur Lovejoy, Northrop Frye and Isaiah Berlin, have remarked on the notorious challenges facing any attempt to define romanticism. Lovejoy, for example, claimed that romanticism is “the scandal of literary history and criticism” . . . The main difficulty in studying the romantics, according to him, is the lack of any “single real entity, or type of entity” that the concept “romanticism” designates. Lovejoy concluded, “the word ‘romantic’ has come to mean so many things that, by itself, it means nothing” . . .

The more specific task of characterising romantic aesthetics adds to these difficulties an air of paradox. Conventionally, “aesthetics” refers to a theory concerning beauty and art or the branch of philosophy that studies these topics. However, many of the romantics rejected the identification of aesthetics with a circumscribed domain of human life that is separated from the practical and theoretical domains of life. The most characteristic romantic commitment is to the idea that the character of art and beauty and of our engagement with them should shape all aspects of human life. Being fundamental to human existence, beauty and art should be a central ingredient not only in a philosophical or artistic life, but also in the lives of ordinary men and women. Another challenge for any attempt to characterise romantic aesthetics lies in the fact that most of the romantics were poets and artists whose views of art and beauty are, for the most part, to be found not in developed theoretical accounts, but in fragments, aphorisms and poems, which are often more elusive and suggestive than conclusive.

Nevertheless, in spite of these challenges the task of characterising romantic aesthetics is neither impossible nor undesirable, as numerous thinkers responding to Lovejoy’s radical skepticism have noted. While warning against a reductive definition of romanticism, Berlin, for example, still heralded the need for a general characterisation: “[Although] one does have a certain sympathy with Lovejoy’s despair...[he is] in this instance mistaken. There was a romantic movement...and it is important to discover what it is” . . .

Recent attempts to characterise romanticism and to stress its contemporary relevance follow this path. Instead of overlooking the undeniable differences between the variety of romanticisms of different nations that Lovejoy had stressed, such studies attempt to characterise romanticism, not in terms of a single definition, a specific time, or a specific place, but in terms of “particular philosophical questions and concerns” . . .

While the German, British and French romantics are all considered, the central protagonists in the following are the German romantics. Two reasons explain this focus: first, because it has paved the way for the other romanticisms, German romanticism has a pride of place among the different national romanticisms . . . Second, the aesthetic outlook that was developed in Germany roughly between 1796 and 1801–02 — the period that corresponds to the heyday of what is known as “Early Romanticism” . . . — offers the most philosophical expression of romanticism since it is grounded primarily in the epistemological, metaphysical, ethical, and political concerns that the German romantics discerned in the aftermath of Kant’s philosophy.

**Q. 13.** According to the romantics, aesthetics:

1. is primarily the concern of philosophers and artists, rather than of ordinary people.
2. should be confined to a specific domain separate from the practical and theoretical aspects of life.
3. permeates all aspects of human life, philosophical and mundane.

4. is widely considered to be irrelevant to human existence.

**Q. 14.** According to the passage, recent studies on romanticism avoid “a single definition, a specific time, or a specific place” because they:

1. understand that the variety of romanticisms renders a general analysis impossible.

2. prefer to focus on the fundamental concerns of the romantics.
3. prefer to highlight the paradox of romantic aesthetics as a concept.
4. seek to discredit Lovejoy's scepticism regarding romanticism.

**Q. 15.** Which one of the following statements is NOT supported by the passage?

1. Recent studies on romanticism seek to refute the differences between national romanticisms.
2. Characterising romantic aesthetics is both possible and desirable, despite the challenges involved.
3. Many romantics rejected the idea of aesthetics as a domain separate from other aspects of life.
4. Romantic aesthetics are primarily expressed through fragments, aphorisms, and poems.

**Q. 16.** The main difficulty in studying romanticism is the:

1. elusive and suggestive nature of romantic aesthetics.
2. lack of clear conceptual contours of the domain.
3. absence of written accounts by romantic poets and artists.
4. controversial and scandalous history of romantic literature.

**Q. 17.** There is a sentence that is missing in the paragraph below. Look at the paragraph and decide where (option 1, 2, 3, or 4) the following sentence would best fit.

**Sentence:** For theoretical purposes, arguments may be considered as freestanding entities, abstracted from their contexts of use in actual human activities.

**Paragraph :** \_\_\_(1)\_\_. An argument can be defined as a complex symbolic structure where some parts, known as the premises, offer support to another part, the conclusion. Alternatively, an argument can be viewed as a complex speech act consisting of one or more acts of premising (which assert propositions in favour of the conclusion), an act of concluding, and a stated or implicit marker ("hence", "therefore") that indicates that the conclusion follows from the premises. \_\_\_(2)\_\_. The relation of support between premises and conclusion can be cashed out in different ways: the premises may guarantee the truth of the conclusion, or make its truth more probable; the premises may imply

the conclusion; the premises may make the conclusion more acceptable (or assertible). \_\_\_(3)\_\_. But depending on one's explanatory goals, there is also much to be gained from considering arguments as they in fact occur in human communicative practices. \_\_\_(4)\_\_.

1. Option 2
2. Option 1
3. Option 4
4. Option 3

**Q. 18.** There is a sentence that is missing in the paragraph below. Look at the paragraph and decide where (option 1, 2, 3, or 4) the following sentence would best fit.

**Sentence:** Beyond undermining the monopoly of the State on the use of force, armed conflict also creates an environment that can enable organised crime to prosper.

**Paragraph:** \_\_\_(1)\_\_. Linkages between illicit arms, organised crime, and armed conflict can reinforce one another while also escalating and prolonging violence and eroding governance. \_\_\_(2)\_\_. Financial gains from crime can lengthen or intensify armed conflicts by creating revenue streams for non-State armed groups (NSAGs). \_\_\_(3)\_\_. In this context, when hostilities cease and parties to a conflict move towards a peaceful resolution, the widespread availability of surplus arms and ammunition can contribute to a situation of 'criminalised peace' that obstructs sustainable peacebuilding efforts. \_\_\_(4)\_\_.

1. Option 4
2. Option 2
3. Option 1
4. Option 3

**Q. 19.** Five jumbled up sentences (labelled 1, 2, 3, 4 and 5), related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd sentence and key in the number of that sentence as your answer.

1. Although hard skills have traditionally ruled the roost, some companies are moving away from choosing prospective hires based on technical abilities alone.
2. Companies are shaking off the old definition of an ideal candidate and ditching the idea of looking for the singularly perfect candidate altogether.
3. Now, some job descriptions are frequently asking for candidates to demonstrate soft skills, such as leadership or teamwork.
4. That's not to say that practical know-how is no longer required – some jobs still call for highly specific expertise
5. The move towards prioritising soft skills "is a natural response to three years of the pandemic" says a senior recruiter at Cenlar FSB.

**Q. 20.** Five jumbled up sentences (labelled 1, 2, 3, 4 and 5), related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd sentence and key in the number of that sentence as your answer.

1. Boa Senior, who lived through the 2004 tsunami, the Japanese occupation and diseases brought by British settlers, was the last native of the island chain who was fluent in Bo.
2. The indigenous population has been steadily collapsing since the island chain was colonised by British settlers in 1858 and used for most of the following 100 years as a colonial penal colony.
3. Taking its name from a now-extinct tribe, Bo is one of the 10 Great Andamanese languages, which are thought to date back to pre-Neolithic human settlement of south-east Asia.
4. The last speaker of an ancient tribal language has died in the Andaman Islands, breaking a 65,000-year link to one of the world's oldest cultures.
5. Though the language has been closely studied by researchers of linguistic history, Boa Senior spent the last few years of her life unable to converse with anyone in her mother tongue.

**Q. 21.** The four sentences (labelled 1, 2, 3 and 4) given 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. Centuries later formal learning is still mostly based on reading, even with the widespread use of other possible education-affecting technologies such as film, radio, and television.
2. One of the immediate and recognisable impacts of the printing press was on how people learned; in the scribal culture it primarily involved listening, so memorisation was paramount.
3. The transformation of learners from listeners to readers was a complex social and cultural phenomenon, and it was not until the industrial era that the concept of universal literacy took root.
4. The printing press shifted the learning process, as listening and memorisation gradually gave way to reading and learning no longer required the presence of a mentor; it could be done privately.

**Q. 22.** The four sentences (labelled 1, 2, 3 and 4) given 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. Veena Sahajwalla, a materials scientist at the University of New South Wales, believes there is a new way of solving this problem.
2. Her vision is for automated drones and robots to pick out components, put them into a small furnace and smelt them at specific temperatures to extract the metals one by one before they are sent off to manufacturers for reuse.
3. E-waste contains huge quantities of valuable metals, ceramics and plastics that could be salvaged and recycled, although currently not enough of it is.
4. She plans to build microfactories that can tease apart the tangle of materials in mobile phones, computers and other e-waste.

**Q. 23.** The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Gradually, life for the island's birds is improving. Antarctic prions and white-headed petrels, which also nest in burrows, had managed to cling on in some sites while pests were on the island. Their numbers are now increasing. "It's fantastic and so exciting," Shaw says. As birds return to breed, they also poo. This adds nutrients to the soil, which in turn helps the plants to grow back stronger. Tall plants then help burrowing birds hide from predatory skuas. "It's this wonderful feedback loop," Shaw says. Today, the "pretty paddock" that Houghton first experienced has been transformed. "The tussock is over your head, and you're dodging all these penguin tunnels," she says. The orchids and tiny herb that had been protected by fencing have started turning up all over the place.

1. There is a huge positive transformation of the ecosystem of the island when brought under environmental protection.
2. There is an increasing number of predatory birds and plants on the island despite the presence of pests which is a positive development.
3. In the absence of pests, life on the island is now protected, and there has been a revival of a variety of birds and plants.

4. Flowering plants, herbs and birds are now being protected on this wonderful Antarctic island.

**Q. 24.** The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

The weight of society's expectations is hardly a new phenomenon but it has become particularly draining over recent decades, perhaps because expectations themselves are so multifarious and contradictory. The perfectionism of the 1950s was rooted in the norms of mass culture and captured in famous advertising images of the ideal white American family that now seem self-satirising. In that era, perfectionism meant seamlessly conforming to values, behaviour and appearance: chiselled confidence for men, demure graciousness for women. The perfectionist was under pressure to look like everyone else, only more so. The perfectionists

of today, by contrast, feel an obligation to stand out through their idiosyncratic style and wit if they are to gain a foothold in the attention economy.

1. The desire to attract attention is so deep-rooted in individual consciousness that people are willing to go to any lengths to achieve it.
2. The image of perfectionism is reflected in and perpetuated by the media; and people do their best to adhere to these ideals.
3. The pressure to appear perfect has been the cause of tension and conflict because the idea itself has been in a state of flux and hard to define.
4. Though long-standing, the pressure to appear perfect and thereby attract attention, has evolved over time from one of conformism to one of non-conformism.

## Data Interpretation and Logical Reasoning (DILR)

**Directions (Q. 1 to 5):** Read the instructions given and answer the questions that follow:

In a coaching class, some students register online, and some others register offline. No student registers both online and offline; hence the total registration number is the sum of online and offline registrations. The following facts and table pertain to these registration numbers for the five months – January to May of 2023. The table shows the minimum, maximum, median registration numbers of these five months, separately for online, offline and total number of registrations. The following additional facts are known.

1. In every month, both online and offline registration numbers were multiples of 10.
2. In January, the number of offline registrations was twice that of online registrations.
3. In April, the number of online registrations was twice that of offline registrations.
4. The number of online registrations in March was the same as the number of offline registrations in February.
5. The number of online registrations was the largest in May.

	Minimum	Maximum	Median
<b>Online</b>	40	100	80
<b>Offline</b>	30	80	50
<b>Total</b>	110	130	120

- Q. 1.** What was the total number of registrations in April?
- Q. 2.** What was the number of online registrations in January?
- Q. 3.** Which of the following statements can be true?
- I. The number of offline registrations was the smallest in May.
- II. The total number of registrations was the smallest in February.
- Q. 4.** What best can be concluded about the number of offline registrations in February?
- Q. 5.** Which pair of months definitely had the same total number of registrations?

1. Only I                      2. Both I and II  
3. Neither I nor II        4. Only II

1. 30 or 50 or 80        2. 50 or 80  
3. 80                        4. 50

- I. January and April  
II. February and May
1. Only II                    2. Neither I nor II  
3. Both I and II          4. Only I

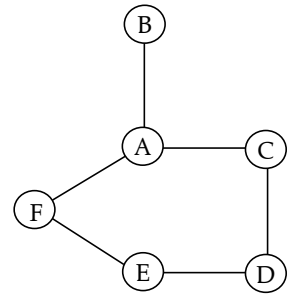
**Directions (Q. 6 to 10):** Answer the questions on the basis of the information given below.

A, B, C, D, E and F are the six police stations in an area, which are connected by streets as shown below. Four teams – Team 1, Team 2, Team 3 and Team 4 – patrol these streets continuously between 09:00 hours and 12:00 hours each day.

The teams need 30 minutes to cross a street connecting one police station to another. All four teams start from Station A at 09:00 hours and must return to Station A by 12:00 hours. They can also pass via Station A at any point on their journeys.

The following facts are known.

- None of the streets has more than one team travelling along it in any direction at any point in time.
- Teams 2 and 3 are the only ones in stations E and D respectively at 10:00 hours.
- Teams 1 and 3 are the only ones in station E at 10:30 hours.
- Teams 1 and 4 are the only ones in stations B and E respectively at 11:30 hours.
- Team 1 and Team 4 are the only teams that patrol the street connecting stations A and E.
- Team 4 never passes through Stations B, D or F.



- Q. 6.** Which one among the following stations is visited the largest number of times?
- Station C
  - Station D
  - Station E
  - Station F
- Q. 7.** How many times do the teams pass through Station B in a day?
- Q. 8.** Which team patrols the street connecting Stations D and E at 10:15 hours?
- Team 3
  - Team 2
  - Team 4
  - Team 1
- Q. 9.** How many times does Team 4 pass through Station E in a day?
- Q. 10.** How many teams pass through Station C in a day?
- 3
  - 2
  - 1
  - 4

**Directions (Q. 11 to 15):** Answer the questions based on the following information.

There are only three female students – Amala, Koli and Rini – and only three male students – Biman, Mathew and Shyamal – in a course. The course has two evaluation components, a project and a test. The aggregate score in the course is a weighted average of the two components, with the weights being positive and adding to 1.

The projects are done in groups of two, with each group consisting of a female and a male student. Both the group members obtain the same score in the project.

The following additional facts are known about the scores in the project and the test.

- The minimum, maximum and the average of both project and test scores were identical – 40, 80 and 60, respectively.
- The test scores of the students were all multiples of 10; four of them were distinct and the remaining two were equal to the average test scores.
- Amala's score in the project was double that of Koli in the same, but Koli scored 20 more than Amala in the test. Yet Amala had the highest aggregate score.
- Shyamal scored the second highest in the test. He scored two more than Koli, but two less than Amala in the aggregate.
- Biman scored the second lowest in the test and the lowest in the aggregate.
- Mathew scored more than Rini in the project, but less than her in the test.

- Q. 11.** What was Rini's score in the project?
- Q. 12.** What was the weight of the test component?
- 0.75
  - 0.50
  - 0.60
  - 0.40
- Q. 13.** What was the maximum aggregate score obtained by the students?
- 68
  - 80
  - 62
  - 66
- Q. 14.** What was Mathew's score in the test?
- Q. 15.** Which of the following pairs of students were part of the same project team?
- Amala and Biman
  - Koli and Mathew
- Both (i) and (ii)
  - Neither (i) nor (ii)
  - Only (i)
  - Only (ii)

**Directions (Q. 16 to 20):** Answer the questions based on the following information.

An air conditioner (AC) company has four dealers – D1, D2, D3 and D4 in a city. It is evaluating sales performances of these dealers. The company sells two variants of ACs – Window and Split. Both these variants can be either Inverter type or Non-inverter type. It is known that of the total number of ACs sold in the city, 25% were of Window variant, while the rest were of Split variant. Among the Inverter ACs sold, 20% were of Window variant.

The following information is also known:

1. Every dealer sold at least two Window ACs.
2. D1 sold 13 Inverter ACs, while D3 sold 5 Non-inverter ACs.
3. A total of six Window Non-inverter ACs and 36 Split Inverter ACs were sold in the city.
4. The number of Split ACs sold by D1 was twice the number of Window ACs sold by it.
5. D3 and D4 sold an equal number of Window ACs and this number was one-third of the number of similar ACs sold by D2.
6. D2 and D3 were the only ones who sold Window Non-inverter ACs. The number of these ACs sold by D2 was twice the number of these ACs sold by D3.
7. D3 and D4 sold an equal number of Split Inverter ACs. This number was half the number of similar ACs sold by D2.

**Q. 16.** How many Split Inverter ACs did D2 sell?

**Q. 17.** What percentage of ACs sold were of Non-inverter type?

1. 75.00%   2. 33.33%   3. 25.00%   4. 20.00%

**Q. 18.** What was the total number of ACs sold by D2 and D4?

**Q. 19.** Which of the following statements is necessarily false?

1. D1 and D3 together sold more ACs as compared to D2 and D4 together.

2. D2 sold the highest number of ACs.

3. D1 and D3 sold an equal number of Split ACs.

4. D4 sold more Split ACs as compared to D3.

**Q. 20.** If D3 and D4 sold an equal number of ACs, then what was the number of Non-inverter ACs sold by D2?

1. 6      2. 5      3. 4      4. 7

## Quantitative Aptitude (QA)

**Q. 1.** For a real number  $x$ , if  $\frac{1}{2}, \frac{\log_3(2^x - 9)}{\log_3 4}$ , and  $\frac{\log_5\left(2^x + \frac{17}{2}\right)}{\log_5 4}$  are in an arithmetic

progression, then the common difference is

1.  $\log_4\left(\frac{3}{2}\right)$       2.  $\log_4\left(\frac{23}{2}\right)$   
3.  $\log_4\left(\frac{7}{2}\right)$       4.  $\log_4 7$

**Q. 2.** Let  $n$  and  $m$  be two positive integers such that there are exactly 41 integers greater than  $8^m$  and less than  $8^n$ , which can be expressed as powers of 2. Then, the smallest possible value of  $n + m$  is

1. 44      2. 14      3. 16      4. 42

**Q. 3.** For some real numbers  $a$  and  $b$ , the system of equations  $x + y = 4$  and  $(a + 5)x = (b^2 - 15)y = 8b$  has infinitely many solutions for  $x$  and  $y$ . Then, the maximum possible value of  $ab$  is

1. 33      2. 55      3. 15      4. 25

**Q. 4.** If  $x$  is a positive real number such that  $x^8 + \left(\frac{1}{x}\right)^8 = 47$ , then the value of  $x^9 + \left(\frac{1}{x}\right)^9$  is

1.  $34\sqrt{5}$       2.  $40\sqrt{5}$       3.  $30\sqrt{5}$       4.  $36\sqrt{5}$

**Q. 5.** A quadratic equation  $x^2 + bx + c = 0$  has two real roots. If the difference between the reciprocals of the roots is  $\frac{1}{3}$ , and the sum of

the reciprocals of the squares of the roots is  $\frac{5}{9}$ , then the largest possible value of  $(b + c)$  is

**Q. 6.** Let  $n$  be any natural number such that  $5^{n-1} < 3^{n+1}$ . Then, the least integer value of  $m$  that satisfies  $3^{n+1} < 2^{n+m}$  for each such  $n$ , is

**Q. 7.** The sum of the first two natural numbers, each having 15 factors (including 1 and the number itself), is

**Q. 8.** A merchant purchases a cloth at a rate of ₹ 100 per metre and receives 5 cm length of cloth free for every 100 cm length of cloth purchased by him. He sells the same cloth at a rate of ₹ 110 per metre but cheats his customers by giving 95 cm length of cloth for every 100 cm length of cloth purchased by the customers. If the merchant provides a 5% discount, the resulting profit earned by him is

1. 9.7%      2. 15.5%      3. 4.2%      4. 16%

**Q. 9.** A boat takes 2 hours to travel downstream a river from part A to part B, and 3 hours to return to part A. Another boat takes a total of 6 hours to travel from part B to part A and return to part B. If the speeds of the boats and the river are constant, then the time, in hours, taken by the slower boat to travel from part A to part B is

1.  $3(3 + \sqrt{5})$       2.  $3(3 - \sqrt{5})$   
3.  $3(\sqrt{5} - 1)$       4.  $12(\sqrt{5} - 2)$

- Q. 10.** There are three persons A, B and C in a room. If a person D joins the room, the average weight of the persons in the room reduces by  $x$  kg. Instead of D, if person E joins the room, the average weight of the persons in the room increases by  $2x$  kg. If the weight of E is 12 kg more than that of D, then the value of  $x$  is  
 1. 2      2. 1      3. 1.5      4. 0.5
- Q. 11.** The population of a town in 2020 was 1,00,000. The population decreased by  $y\%$  from the year 2020 to 2021, and increased by  $x\%$  from the year 2021 to 2022, where  $x$  and  $y$  are two natural numbers. If population in 2022 was greater than the population in 2020 and the difference between  $x$  and  $y$  is 10, then the lowest possible population of the town in 2021 was  
 1. 73,000    2. 75,000    3. 74,000    4. 72,000
- Q. 12.** Anil mixes cocoa with sugar in the ratio 3 : 2 to prepare mixture A, and coffee with sugar in the ratio 7 : 3 to prepare mixture B. He combines mixtures A and B in the ratio 2 : 3 to make a new mixture C. If he mixes C with an equal amount of milk to make a drink, then the percentage of sugar in this drink will be  
 1. 24      2. 16      3. 17      4. 21
- Q. 13.** Rahul, Rakshita and Gurmeet, working together, would have taken more than 7 days to finish a job. On the other hand, Rahul and Gurmeet, working together would have taken less than 15 days to finish the job. However, they all worked together for 6 days, followed by Rakshita, who worked alone for 3 more days to finish the job. If Rakshita had worked alone on the job then the number of days she would have taken to finish the job, cannot be  
 1. 20      2. 21      3. 16      4. 17
- Q. 14.** The number of coins collected per week by two coin-collectors A and B are in the ratio 3 : 4. If the total number of coins collected by A in 5 weeks is a multiple of 7, and the total number of coins collected by B in 3 weeks is a multiple of 24, then the minimum possible number of coins collected by A in one week is \_\_\_\_\_.
- Q. 15.** Gautam and Suhani, working together, can finish a job in 20 days. If Gautam does only 60% of his usual work on a day, Suhani must do 150% of her usual work on that day to exactly make up for it. Then, the number of days required by the faster worker to complete the job working alone is
- Q. 16.** A fruit seller has a stock of mangoes, bananas and apples with at least one fruit of each type. At the beginning of a day, the number of mangoes make up 40% of his stock. That day, he sells half of the mangoes, 96 bananas and 40% of the apples. At the end of the day, he ends up selling 50% of the fruits. The smallest possible total number of fruits in the stock at the beginning of the day is \_\_\_\_\_.
- Q. 17.** Let  $\triangle ABC$  be an isosceles triangle such that AB and AC are of equal length. AD is the altitude from A on BC and BE is the altitude from B on AC. If AD and BE intersect at O such that  $\angle AOB = 105^\circ$ , then  $\frac{AD}{BE}$   
 1.  $2 \cos 15^\circ$     2.  $\sin 15^\circ$     3.  $2 \sin 15^\circ$     4.  $\cos 15^\circ$
- Q. 18.** A rectangle with the largest possible area is drawn inside a semicircle of radius 2 cm. Then, the ratio of the lengths of the largest to the smallest side of this rectangle is  
 1. 1 : 1      2. 2 : 1      3.  $\sqrt{5} : 1$       4.  $\sqrt{2} : 1$
- Q. 19.** In a regular polygon, any interior angle exceeds the exterior angle by 120 degrees. Then, the number of diagonals of this polygon is \_\_\_\_\_.
- Q. 20.** The value of  $1 + \left(1 + \frac{1}{3}\right)\frac{1}{4} + \left(1 + \frac{1}{3} + \frac{1}{9}\right)\frac{1}{16} + \left(1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27}\right)\frac{1}{64} + \dots$ , is  
 1.  $\frac{15}{8}$       2.  $\frac{15}{13}$       3.  $\frac{16}{11}$       4.  $\frac{27}{12}$
- Q. 21.** Let  $a_n = 46 + 8n$  and  $b_n = 98 + 4n$  be two sequences for natural numbers  $n \leq 100$ . Then, the sum of all terms common to both the sequences is  
 1. 14602    2. 14798    3. 15000    4. 14900
- Q. 22.** Suppose  $f(x, y)$  is a real-valued function such that  $f(3x + 2y, 2x - 5y) = 19x$ , for all real numbers  $x$  and  $y$ . The value of  $x$  for which  $f(x, 2x) = 27$ , is \_\_\_\_\_.

## Answer Key

### Verbal Ability and Reading Comprehension (VARC)

1. (4)	2. (4)	3. (1)	4. (1)	5. (1)	6. (2)	7. (4)	8. (2)	9. (1)	10. (3)
11. (2)	12. (3)	13. (3)	14. (2)	15. (1)	16. (2)	17. (4)	18. (4)	19. 2	20. 2
21. 2431	22. 3142	23. (3)	24. (4)						

### Data Interpretation and Logical Reasoning (DILR)

1. 120	2. 40	3. (1)	4. (4)	5. (3)	6. (3)	7. 2	8. (1)	9. 2	10. (2)
11. 60	12. (3)	13. (1)	14. 40	15. (2)	16. 14	17. (3)	18. 33	19. (1)	20. (2)

### Quantitative Aptitude (QA)

1. (3)	2. (3)	3. (1)	4. (1)	5. 9	6. 5	7. 468	8. (2)	9. (2)	10. (2)
11. (1)	12. (3)	13. (2)	14. 42	15. 36	16. 340	17. (1)	18. (2)	19. 54	20. (3)
21. (4)	22. 3								

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