Actual CAT 2023 Slot - I

SECTION: VERBAL ABILITY AND READING COMPREHENSION

DIRECTIONS *for the questions 1 to 4:* *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 mean 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 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 non-native (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.

1. All of the following can be inferred from the passage EXCEPT:

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

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

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 their outdated interpretations of past cultural and historical phenomena.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

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

1. belief in the central role of humans, unrelated to physical surroundings, in influencing phenomena.
2. disciplinary training which typically does not include technical knowledge of geography.
3. dismissal of explanations that involve geographical causes for human behaviour.
4. lingering impressions of past geographic analyses that were politically offensive.

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

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

DIRECTIONS *for the questions 5 to 8:* *The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.*

RESIDENTS of Lozère, 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 Lozère, 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 19th 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 Lozère, 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 Lozère, for example, farming and a once-flourishing mining industry supported a population of over 140,000 residents in the mid-19th 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 20th century over 2m hunters regularly spent winter weekends tramping in woodland, seeking boars, birds and other prey. Today the Fédération 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 of 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.

5. Which one of the following has NOT contributed to the growing wolf population in Lozère?

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

6. The inhabitants of Lozère have to grapple with all of the following problems, EXCEPT:

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

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

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

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

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

DIRECTIONS *for the questions 9 to 12:* *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 it does 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.

9. 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

1. the depiction of Africa in most Indian Ocean novels is driven by a postcolonial nostalgia for an idyllic past.
2. the depiction of Africa in most Indian Ocean novels is driven by an Orientalist imagination of its cultural crudeness.
3. most mainstream English-language novels have historically privileged the Christian, white, male experience of travel and adventure.
4. very few mainstream English-language novels have historically been set in American and European metropolitan centres.

10. All of the following claims contribute to the "remapping" discussed by the passage,

1. Indian Ocean novels have gone beyond the specifics of national concerns to explore rich regional pasts.
2. the global south, as opposed to the global north, was the first centre of globalisation.
3. the world of early international trade and commerce was not the sole domain of white Europeans.
4. cosmopolitanism originated in the West and travelled to the East through globalization

11. Which one of the following statements is not true about migration in the Indian Ocean world?

1. Geographical location rather than geographical proximity determined the choice of destination for migrants.
2. The Indian Ocean world's migration networks were shaped by religious and commercial histories of the region.
3. Migration in the Indian Ocean world was an ambivalent experience.
4. The Indian Ocean world's migration networks connected the global north with the global south.

12. On the basis of the nature of the relationship between the items in each pair below, choose the odd pair out:

1. Indian Ocean world : Slavery
2. Indian Ocean novels : Outward-looking
3. Postcolonial novels : Border-crossing
4. Postcolonial novels : Anti-colonial nationalism

DIRECTIONS ***for the questions 13 to 16:*** *The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.*

[Fift] 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 maximize, 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 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 thematize 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.

13. 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-hunter- gatherer 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.

14. 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. how two vastly different ways of living and working were able to coexist in proximity for centuries.
4. that forager communities' lifestyles derived not from ignorance about alternatives, but from their own choice.

15. The author of the passage criticises Sahlins's essay for its:

1. failure to supplement its thesis with robust empirical data.
2. outdated values regarding present-day foragers versus ancient foraging communities.
3. cursory treatment of the effects of racism and colonialism on societies.
4. critique of anthropologists who disparage the choices of foragers in today's society.

16. We can infer that Sahlins's main goal in writing his essay was to:

1. put forth the view that, despite egalitarian origins, economic progress brings greater inequality and social hierarchies.
2. hold a mirror to an acquisitive society, with examples of other communities that have chosen successfully to be non-materialistic.
3. counter Galbraith's pessimistic view of the inevitability of a capitalist trajectory for economic growth.
4. highlight the fact that while we started off as a fairly contented egalitarian people, we have progressively degenerated into materialism.

DIRECTIONS *for the questions 17 to 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.*

17. **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. ___(A)___. When beliefs previously held as truths are rendered implausible, new beliefs, values, and ways of living may be required. ___(B)___. 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. ___(C)___. 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. ___(D)___.

1. A 2. B 3. C 4. D

18. **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. ___(A)___. During the deglaciation period, another group branched out from northern coastal China and travelled to Japan. ___(B)___. "We were surprised to find that this ancestral source also contributed to the Japanese gene pool, especially the indigenous Ainus," says Li. ___(C)___. They shared similarities in how they crafted stemmed projectile points for arrowheads and spears. ___(D)___. "This suggests that the Pleistocene connection among the Americas, 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. A 2. B 3. C 4. D

DIRECTIONS *for the questions 19 to 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.*

19. 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 didn't know the word for "eleven", you would be unable to just guess it – you might come up with something like "one-teen".

20. 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 'mentalizing' 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.

DIRECTIONS *for the questions 21 to 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.

21. 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 doesn't.
4. Why are some crimes destined for perpetual re-examination and others locked into permanent obscurity?

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 human- generated 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.

DIRECTIONS *for the questions 23 to 24:* *The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.*

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

24. 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 21st century has seen the weaponization 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. Use of misinformation for attaining power, a practice that is as old as the Octavian era, is currently fueled by technology.
2. People need to become critical of what they read, since historically, weaponization of information has led to corruption.
3. Disinformation, which is mediated by technology today, is not new and has existed since ancient times.
4. Octavian used fake news to manipulate people and attain power and influence, just as people do today.

SECTION: DI & REASONING

DIRECTIONS *for the questions 25 to 29:* *Read the information given below and answer the question that follows.*

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.

25. Which two candidates can belong to the same department?

1. Prof. Pakrasi and Prof. Samuel
2. Prof. Qureshi and Prof. Ramaswamy
3. Prof. Pakrasi and Prof. Qureshi
4. Prof. Ramaswamy and Prof. Samuel

26. Which of the following can be the number of votes that Prof. Qureshi received from a single department?

1. 7 2. 9 3. 6 4. 8

27. 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. Only statement A
2. Only statement B
3. Neither statement A nor statement B
4. Both statements A and B

28. What best can be concluded about the candidate from O&Q?

1. It was Prof. Ramaswamy.
2. It was Prof. Samuel.
3. It was either Prof. Pakrasi or Prof. Qureshi.
4. It was either Prof. Ramaswamy or Prof. Samuel.

29. 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. Both statements A and B
2. Only statement B
3. Neither statement A nor statement B
4. Only statement A

DIRECTIONS *for the questions 30 to 34:* *Read the information given below and answer the question that follows.*

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	4	4	3

* 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.

30. How many individual ratings cannot be determined from the above information?

31. To how many workers did R2 give a rating of 4?

32. What rating did R1 give to Xavier?

33. What is the median of the ratings given by R3 to the five workers?

34. Which among the following restaurants gave its median rating to exactly one of the workers?

1. R2 2. R5 3. R3 4. R4

DIRECTIONS ***for the questions 35 to 39:*** *Read the information given below and answer the question that follows.*

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.

35. How many UK applications were scheduled on that day?

36. 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?

37. Which of the following is the closest to the time when Nandini's application process got over?

1. 9:45 am
2. 9:37 am
3. 9:50 am
4. 9:35 am

38. Which of the following statements is false?

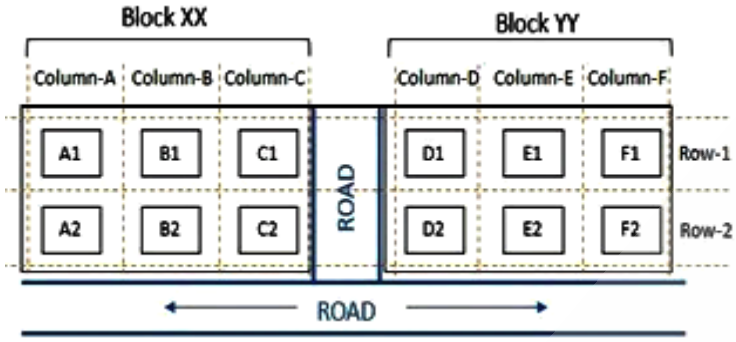
1. The application process of Mahira was completed before Nandini's.
2. The application process of Mahira started after Nandini's.
3. The application process of Osman was completed before 9:45 am.
4. The application process of Osman was completed before Vijay's.

39. When did the application processing for all US applicants get over on that day?

1. 3:40 pm
2. 2:05 pm
3. 2:00 pm
4. 2:25 pm

DIRECTIONS ***for the questions 40 to 44:*** *Read the information given below and answer the question that follows.*

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 Rs. 10 lakhs if the house does not have a parking space, and Rs. 12 lakhs if it does. The quoted price (in lakhs of Rs.) 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 Rs. 24 lakhs. The minimum quoted price of a house in block YY is Rs. 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.

40. How many houses are vacant in Block XX?

41. Which of the following houses is definitely occupied?

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

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

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

43. What is the maximum possible quoted price (in lakhs of Rs.) for a vacant house in Column-E?

44. Which house in Block YY has parking space?

1. F1 2. E2 3. E1 4. F2

SECTION: QUANTITATIVE ABILITY

DIRECTIONS *for the questions 45-66:* *Solve the following question and mark the best possible option.*

45. 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. 11 2. 20 3. 68 4. 10

46. 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. 9 2. 24 3. 15 4. 12

47. 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. 2 2. 0 3. 1 4. – 1

48. If $\sqrt{5x+9} + \sqrt{5x-9} = 3(2+\sqrt{2})$, then $\sqrt{10x+9}$ is equal to

1. $3\sqrt{31}$ 2. $3\sqrt{7}$ 3. $2\sqrt{7}$ 4. $4\sqrt{5}$

49. The number of integer solutions of equation $2|x|(x^2 + 1) = 5x^2$ is

50. Let α and β be the two distinct roots of the equation $2x^2 - 6x + k = 0$, such that (α + β) and αβ are the distinct roots of the equation $x^2 + px + p = 0$. Then, the value of 8 (k – p) is

51. 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

52. The minor angle between the hours hand and minutes hand of a clock was observed at 8:48 am. The minimum duration, in minutes, after 8.48 am when this angle increases by 50% is

1. $\frac{24}{11}$ 2. 2 3.4 4. $\frac{36}{11}$

53. 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. 5 : 9 2. 4 : 9 3. 1 : 3 4. 1 : 2

54. 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. 19 2. 21 3. 22 4. 20

55. 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 traveled a total of 26862 km till then, this number again being palindromic. If Brishti never drove at more than 110 km/hr, then the greatest possible average speed at which she drove during the trip, in km/hr, was

1. 80 2. 90 3. 110 4. 100

56. 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. 47% 4. 45%

57. 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. 25% 3. 28% 4. 30%

58. 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

59. Anil invests Rs. 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

60. 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

61. 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. 5 : 8 2. 8 : 5 3. 1 : 2 4. 2 : 1

62. 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°. Then, the point at which L touches the line x = 6 is

1. (6, 8) 2. (6, 4) 3. (6, 6) 4. (6, 3)

63. In a right-angled triangle ΔABC, 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 ΔABP, ΔABQ and ΔABC are in arithmetic progression. If the area of ΔABC is 1.5 times the area of ΔABP, the length of PQ, in cm, is

64. For some positive and distinct real numbers x, y and z, if $\frac{1}{\sqrt{y}+\sqrt{z}}$ is the arithmetic mean of $\frac{1}{\sqrt{y}+\sqrt{z}}$ and $\frac{1}{\sqrt{x}+\sqrt{y}}$, then the relationship which will always hold true, is

1. y, x and z are in arithmetic progression
2. x, y and z are in arithmetic progression
3. $\sqrt{x}, \sqrt{z}$ and $\sqrt{y}$ are in arithmetic progression
4. $\sqrt{x}, \sqrt{z}$ and $\sqrt{z}$ are in arithmetic progression

65. The number of all natural numbers up to 1000 with non-repeating digits is

1. 738
2. 648
3. 504
4. 585

66. 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 nth day exceeds one million, then the lowest possible value of n is

hitbullseye

Answer Key Actual CAT Slot - I

Q. No	Key	Q. No	Key	Q. No	Key
1.	3	25.	3	45.	4
2.	2	26.	2	46.	3
3.	3	27.	4	47.	3
4.	1	28.	4	48.	2
5.	1	29.	2	49.	3
6.	4	30.	0	50.	6
7.	4	31.	0	51.	2
8.	4	32.	3	52.	1
9.	3	33.	4	53.	1
10.	4	34.	5	54.	2
11.	4	35.	0	55.	4
12.	3	36.	200	56.	3
13.	4	37.	1	57.	1
14.	4	38.	2	58.	972
15.	3	39.	2	59.	20808
16.	2	40.	3	60.	27
17.	1	41.	1	61.	2
18.	3	42.	3	62.	4
19.	3	43.	21	63.	2
20.	2	44.	3	64.	1
21.	4123			65.	1
22.	4123			66.	19
23.	4				
24.	1				

Explanation Actual CAT Slot - I

Q. No	Explanation
1.	It is not possible to derive Option C directly from the passage. Although the passage does mention the impact of both geographical factors, such as biogeography, and non-geographical factors like culture and history on human phenomena, the use of words like 'most' and 'some' cannot be justified based on the information provided in the passage. Therefore, Option C is the appropriate choice. Option 1- This statement is directly supported by the passage. The passage mentions that some geographic explanations advanced a century ago were racist, causing all geographic explanations to become tainted by racist associations in the minds of many scholars other than geographers. Option 2- There is a discussion that the crops and domestic animals that make Australia a food and wool exporter are non-native species brought by overseas colonists. Option 4- The passage mentions that the development of warm fur clothes among the Inuit living north of the Arctic Circle was not because one influential Inuit leader persuaded others in 1783 to adopt warm fur clothes for no good environmental reason. Instead, it attributes the development to straightforward geographic factors.
2.	The passage does not directly condemn non-geographer scholars for possessing outdated interpretations of historical and cultural events. The primary critiques focus on their overemphasis on individual choices, labelling of geographic explanations as deterministic, and refusal to acknowledge the impact of geographic factors, including biogeographic factors, on social and cultural phenomena.
3.	The passage does not imply that individuals who are not geographers reject explanations that attribute human behavior to geographical factors. Instead, it suggests that those who are not geographers often respond to such explanations by denouncing the concept of "geographic determinism." The reasons for this reaction include a belief in the central role of humans, a lack of technical knowledge of geography due to disciplinary training, and negative impressions of past geographic analyses that were considered politically offensive.
4.	Option 1 accurately reflects the idea presented in the passage. The passage discusses the development of warm fur clothes among the Inuit and the absence of indigenous farming in Aboriginal Australia as outcomes influenced by physical circumstances, such as geographic and biogeographic factors. While option 2 is partially correct so eliminated. Yet a very close choice. For option 3 the passage does not explicitly convey the idea that traditional societies, specifically the Inuit and Aboriginal Australians, were self-sufficient and adaptive despite geographical isolation.
5.	The passage does not mention the shutting down of the royal office of the Luparii as a contributing factor to the growing wolf population. Instead, it emphasizes factors such as the protected status of wolves in Europe, the decline of hunting as a sport, the efforts of NGOs to track and count the animals, and the increase in woodlands and forest cover in Lozère. Rest all options are mentioned in the context so can be eliminated.
6.	The passage discusses the decline in the number of hunting licenses and the quieter forests due to a decrease in hunting as a sport. However, it does not specifically state that the inhabitants of Lozère are grappling with this as a problem. On the other hand, the passage mentions issues such as a lack of local schools, jobs, phone and internet connections, and livestock losses due to the return of wolves. That helps us to conclude that 4 is the right choice.

7.	The passage does not explicitly mention the divergent and competing interests of specific groups, but it does provide information that implies conflicts between different stakeholders. Based on the information provided, the option that best aligns with the potential conflicts discussed in the passage is the 4th one. The passage describes how farmers in Lozère are concerned about the return of wolves, as they claim the wolves cause livestock losses. On the other hand, environmentalists may celebrate the return of predators like wolves, considering it a sign of wider ecological health. This suggests a potential conflict of interests between farmers, who are concerned about their livelihoods and livestock, and environmentalists, who may prioritize the ecological balance.
8.	The author's claims in the passage seem to revolve around the conflict between farmers and environmentalists regarding the return of wolves, with farmers expressing concerns about livestock losses. If there were reports of wolf attacks on tourists on the rise, it might suggest a different perspective on the impact of wolves in the area, potentially indicating a more immediate threat to human safety rather than just concerns about livestock. Only option 4 could weaken the emphasis on the environmental benefits mentioned in the passage. Option 1- This statement is not directly relevant to the author's claims about the conflict between farmers and environmentalists regarding the return of wolves. It doesn't necessarily weaken or strengthen the main arguments in the passage. Option 2- This statement aligns with the information presented in the passage and supports the author's claims about the return of wolves, which is a central theme in the discussion of conflicts between farmers and environmentalists. Option 3- This statement is mentioned briefly in the passage, but it doesn't directly relate to the author's claims about the conflict between farmers and environmentalists regarding the return of wolves. While unemployment concerns are mentioned, the primary focus is on the impact of the return of wolves on farmers.
9.	The passage emphasizes that mainstream English-language fiction has historically privileged certain perspectives and settings. And the exception is statement 3. It supports the passage's claim by reinforcing the idea that mainstream English-language fiction has a specific focus on the experiences of a particular group rather than weakening it. For option 1- This statement weakens the passage's claim because it suggests that Indian Ocean novels may also have elements of nostalgia, similar to mainstream English-language fiction. For option, 2-This statement weakens the passage's claim as it implies that Indian Ocean novels may also fall into the trap of using Orientalist stereotypes, similar to mainstream English-language fiction. For option 4- This statement weakens the passage's claim because it suggests that there is a diversity in settings even within mainstream English-language novels. The exception is statement 3. It supports the passage's claim rather than weakening it.
10.	The passage discusses the "remapping" achieved by Indian Ocean novels. Let's evaluate each claim: Option 1- This claim contributes to the remapping by suggesting that the novels explore regional pasts rather than being confined to national concerns. Option 2- This claim contributes to the remapping by challenging the traditional focus on the global north and highlighting the global south as the first center of globalization. Option 3- This claim contributes to the remapping by challenging the Eurocentric view of early international trade and commerce. Option 4- This claim does not contribute to the remapping; in fact, it reinforces a Western-centric view by suggesting that cosmopolitanism originated in the West and traveled eastward.

	Therefore, the correct answer is 4.
11.	The passage discusses migration in the Indian Ocean world. Out of all options, 4 is the right one. As this statement is not true according to the passage. The passage emphasizes that the Indian Ocean world's migration networks are distinct from the commonly found narratives centered in Europe or the US. Instead, the novels highlight a largely Islamic space and feature characters of color, suggesting a different orientation from the global north. For option 1- This statement is consistent with the passage, which mentions that port cities far apart were often more easily connected to each other than too much closer inland cities due to the ease of travel by sea. For Option 2- This statement is consistent with the passage, which highlights that migration in the Indian Ocean world was shaped by the religious and commercial histories of the region. For option 3- This statement is consistent with the passage, which mentions that migration is often a matter of force, and travel is portrayed as abandonment rather than adventure.
12.	The options 1 and 4 are not the right choice. As in option A the pair suggests a historical and thematic connection, as the Indian Ocean world is associated with historical aspects such as slavery. This pair does not seem to be odd. In option 4, this pair also represents a thematic connection, suggesting that postcolonial novels often explore anti-colonial nationalism. This aligns with the passage's discussion of the early postcolonial literature's concern with national questions. The lone instance of border crossing in the third one—which we can classify as peculiar—occurs in the Indian Ocean novel world rather than the Postcolonial novel world.
13.	In the passage, the author mentions Galbraith's "The Affluent Society" in the context of Marshall Sahlins's essay, "The Original Affluent Society." The purpose is to highlight how Sahlins's views complement Galbraith's criticism of consumerism and inequality in contemporary society. So, option 4 is the right choice. The passage notes that Sahlins's essay challenges contemporary economic life and bourgeois individualism. By referencing Galbraith's work, the author emphasizes that Sahlins's perspective aligns with the critical stance towards postwar prosperity and inequality presented by Galbraith. Sahlins's essay, with its title nodding toward Galbraith's work, brings a critical perspective to the contemporary world, showing that alternative ways of living exist. It contrasts the capitalist pursuit of wealth through material production with the idea that foraging societies achieve affluence not by acquiring more but by desiring less. In summary, the mention of Galbraith's "The Affluent Society" serves to illustrate how Sahlins's views resonate with and complement Galbraith's critique of consumerism and inequality in the modern world. While, Option 1 is incorrect. The passage does not suggest that Galbraith's theories refute Sahlins's thesis. Instead, it emphasizes how their views complement each other in criticizing contemporary society. Option 2 is incorrect. The passage does not suggest that Galbraith's views directly influenced Sahlins's analysis of prehistoric societies. The mention is about how their perspectives align in critiquing contemporary society. Option 3 is also incorrect. While the passage discusses the contrast between contemporary growth paths and foragers' ways of living, it does not specifically highlight a pacifist content in foragers' lives.
14.	The passage mentions the contemporary Hadza of Tanzania to demonstrate that forager communities, like the Hadza, were aware of alternatives (such as those of surrounding farmers)

	but actively chose to reject them. This serves as an illustration that foragers make real choices about their ways of living, emphasizing the principle of collective self-determination in societies. So it makes 4th right one.
15.	The passage mentions that, when viewed in today's context, not every aspect of Sahlins's essay has aged well. One of the criticisms is that the essay does not thematize the effects of racism, colonialism, and dispossession as heavily as might be expected today. Therefore, the critique is about the essay's treatment of these important issues, suggesting it is cursory or insufficient. This makes the 3rd as the right choice. For Option 1,it is not a criticism mentioned in the passage. The passage acknowledges that the point of the essay is not so much the empirical validity of the data but its conceptual challenge to contemporary economic life and bourgeois individualism. Option 2 is not explicitly mentioned as a criticism in the passage. The passage acknowledges that not every aspect of the essay has aged well but does not specifically criticize it for having outdated values. Option 4 also is not mentioned as a criticism in the passage. The passage does mention Sahlins rebuking evolutionary anthropologists for treating present-day foragers as "left behind" by progress, but it does not frame this as a criticism of Sahlins.
16.	The passage suggests that Sahlins's essay, "The Original Affluent Society," aimed to challenge contemporary economic life and bourgeois individualism. It held a critical perspective on the capitalist world's pursuit of wealth through material production and presented foraging societies as examples of an alternative path. The essay contrasts the desire for more material goods in the capitalist world with the foraging societies' pursuit of affluence through wanting less. This aligns with the idea of holding a mirror to an acquisitive society and presenting alternative ways of living.
17.	The sentence "This philosophical cut at one's core beliefs, values, and way of life is difficult enough." would best fit at Option 2 because it logically follows the statement in Option 1. Option 1 discusses how reading philosophy can make the values one has organized their life around appear provincial, wrong, or even evil. Following this, the sentence in Option 2, "This philosophical cut at one's core beliefs, values, and way of life is difficult enough," provides an explanation and emphasizes the challenging nature of the experience described in Option 1. It helps to convey the emotional and intellectual difficulty that arises when one's fundamental beliefs are scrutinized by philosophical inquiry.
18.	The paragraph discusses the genetic link between Native Americans and Japanese people, the migration during the deglaciation period from northern coastal China to Japan, and the surprise that this ancestral source also contributed to the Japanese gene pool. After presenting these findings, the sentence "The discovery helps to explain archaeological similarities between the Paleolithic peoples of China, Japan, and the Americas" logically connects the genetic information to archaeological similarities. Option 3, which discusses the shared similarities in crafting projectile points, provides a context for introducing the archaeological aspect. Placing the sentence about archaeological similarities after this context makes more sense as it elaborates on the shared cultural aspects mentioned in Option 3.
19.	The theme of the provided sentences except the 3rd one revolves around the irregularities and complexities in the naming of numbers in the English language. It discusses the lack of a systematic rule, the specific patterns for teens and multiples of ten, and highlights the potential confusion that can arise, particularly for learners or those unfamiliar with the language's numerical conventions. The sentences collectively address the intricacies and variations in how

	numbers are named in English. While Sentence 3 shifts the focus to the learning process of children and their understanding of the differences between numbers like "fourteen" and "forty."
20.	The theme of the provided sentences revolves around the concept of "theory of mind" or "mentalizing," which is the ability to understand and interpret the thoughts, feelings, and intentions of others. The sentences discuss the significance of this cognitive ability for various aspects of human development, including natural language acquisition, social interaction, reflexive thought, moral judgment, and cognitive abilities. The progression of this capacity from early beginnings to adulthood is also highlighted, and there is speculation about its evolutionary origin. Overall, the theme centers on the importance and development of the ability to understand the minds of others in human cognition and behavior. Here Sentence 2 differs from the rest because it provides alternative terms for the concept discussed in the other sentences. While the other sentences consistently use the term "theory of mind," Sentence 2 introduces synonyms such as 'mentalizing' or 'mindreading' to describe the same cognitive ability. This sentence essentially offers different labels for the concept without introducing new information or aspects of the theme discussed in the surrounding sentences.
21.	Sentence 4 serves as a general introduction, raising the question about the enduring interest in certain crimes. Then 1 follows logically from the introductory question, delving into the specifics of what makes a case attractive to a particular audience. Then the 2nd sentence provides reasons or factors that contribute to the attractiveness of certain cases, linking back to the question raised in Sentence 1.3rd further explores the nature of the cases in question, emphasizing the appeal of unsolved or mysterious cases.
22.	4123 is the sequence that forms a coherent flow, where each sentence logically follows the previous one, building a comprehensive discussion on the impact and sources of bias in AI. Sentence 4 sets the stage by highlighting the contrast between the localized impact of human-made biased decisions and the broader impact introduced by AI. Then sentence 1 builds upon the idea introduced in Sentence 4, emphasizing how algorithms, especially those hosted on the internet, can have a widespread impact affecting larger groups of people. Sentence 2 delves into the distinction between "algorithmic bias" and the actual source of bias, emphasizing that biases are rooted in the data rather than the algorithms themselves. Sentence 3 concludes by addressing the relative ease of fixing AI biases compared to human-generated biases, emphasizing the practical aspect of addressing biases in AI.
23.	The passage discusses colonialism as a historical phenomenon, highlighting its evolution and the factors that led to its transformation in the sixteenth century. It emphasizes the role of technological developments in navigation during that period, which enabled the connection of more remote parts of the world. The emergence of the modern European colonial project is attributed to the newfound ability to move large numbers of people across oceans and maintain political control despite geographical dispersion. The term colonialism is defined in the passage as encompassing European settlement, violent dispossession, and political domination over various regions globally, including the Americas, Australia, and parts of Africa and Asia. Overall, the passage provides a historical context for colonialism, underlining its earlier forms and the significant changes that occurred during the sixteenth century due to advancements in navigation technology. So option 4^{th} is the correct one.
24.	The passage discusses the historical aspect of manipulating information, emphasizing that this practice predates the establishment of modern journalism and rules of integrity. It provides an example from ancient Rome, where political enemies used a smear campaign against Antony with slogans written on coins, illustrating the early use of fake news for political purposes.

The passage then transitions to the 21st century, highlighting the unprecedented scale of information weaponization. It points out that powerful new technology simplifies the fabrication of content, and social networks play a significant role in amplifying falsehoods propagated by states, populist politicians, and dishonest corporate entities. The platforms are described as fertile ground for various manipulative practices, including computational propaganda, trolling, and the deployment of troll armies. Overall, the passage addresses the historical roots of information manipulation and its contemporary manifestations with advanced technology and social media platforms. So the correct choice is option 1.

25-28.

After reading the set, we can write following conditions.

1. There can be either 0 or 1 or 2 candidates form any department.
2. A candidate cannot vote for himself or herself.
3. Faculty members can not vote for candidate from their own department.
4. Non-candidates form same department voted for same candidate.
5. There are 9, 7, 5, 3 faculty members in FA, MS, OQ ,and BH.
6. P, Q, R, S received 3, 14, 6 and 1 votes.
7. There is exactly 1 candidate form OQ.

Since the questions are dubious, we can say there would be at least two cases.

Given Only one candidate is from OQ and there are 5 faculties from OQ ⇒ there are 4 non-candidates from OQ.

Also, P voted for R, Q for S, R for Q and S for P. Given that all non-candidates faculty members from same department voted for the same candidate. So, all 4 non-candidates from OQ can vote for candidates either Q or R.

Now P has got only 2 votes from non-candidates. From condition 4, these 2 votes can be from BH only that implies there is one candidate from BH.

R has got 5 votes which can be only from MS because of condition 4 that implies there are 2 candidates from MS.

Further, it can be determined that there is no candidates from FA. Q has got 13 non- candidates' votes. They would be from remaining departments: FA (9) & OQ (4)

Now let us try to find which candidate is from which department.

From condition (3), R cannot be from MS. And Similarly we can determine for other candidates.

	Voted by candidates	Voted by Members
P(3)	S	2 (BH)
Q (14)	R	13 (FA(9)+OQ(4)
R (6)	P	5 (MS)
S (1)	Q	zero

Subject	**No. of members**	**No. of candidates**	**Other (Voted)**	**Candidates in dept.**
FA	9	0	9 (Q)	×
MS	7	2	5 (R)	P/Q/S
OQ	5	1	4 (Q)	P/R/S
BH	3	1	2 (P)	R/Q/S

And Q has voted for S. So, Q and S cannot be in same department. So, P is definitely one of the candidate from MS.

R has voted for Q. So, R and Q cannot be together. S has voted for P. So, P & S cannot be together. So, In MS, the candidates would be P & Q.

Subject	No. of members	No. of candidates	Other (Voted)	Candidates in dept.
FA	9	0	9 (Q)	×
MS	7	2	5 (R)	P, Q
OQ	5	1	4 (Q)	R/S
BH	3	1	2 (P)	S/R

25. P & Q are from same department.

26. Q gets 9 from FA and 4 from OQ. So, answer is 9.

27. Both statements are true.

28. It was either Prof. Ramaswamy or Prof. Samuel.

29. Only statement (B) is true.

30-34. To solve this set, following definitions we need to know:

$$\text{Mean} = \frac{\text{Sum of items}}{\text{no. of items}}$$

Median = middle value after arranging the data in either ascending or descending order.
Mode = the number which is appearing highest number of times
Range = Maximum number – Minimum number
By using Mean formula; we can calculate total of all ratings given by all restaurants to each worker.

For Ullas, $U = 2.2 \times 5 = 11$
$V = 3.8 \times 5 = 19$
$W = 3.4 \times 5 = 17$
$X = 3.6 \times 5 = 18$
$Y = 2.6 \times 5 = 13$

For Ullas, median rating is 2 i.e. middle most rating is 2. So, two lowest ratings are ≤ 2. Also, mode is 2. It means there should be atleast two 2's in ratings. Range = 3. That means Max rating – Min. rating = 3. R_1 awarded rating of 1 to U. Means maximum rating can be 4 only. So far we have deducted 4 ratings of U and they are are 1, 4, 2, 2. Since total is 11. So, all ratings are 1, 2, 2, 2, 4.
For V, total is 19. If we give 5 rating every time we will get total of 20. It means ratings are 2, 4, 4, 4, 5. (Because range is 3.)

For w, Similarly we can say, ratings are 1, 2, 4, 5, 5.
For x, ratings are 1, 3, 4, 5, 5.
For y, there are two modes 1 & 4. It means 1 and 4 will occur atleast twice. So, ratings are 1, 1, 3, 4, 4.

$B_1 < B_2 < B_3 < B_4 < B_5$ where B_i = ratings i

	B_1	B_2	B_3	B_4	B_5	Total
U	1	2	2	2	4	11

V	2	4	4	4	5	19
W	1	2	4	5	5	17
X	1	3	4	5	5	18
Y	1	1	3	4	4	13

Now Let us try to find a link between workers and restaurants.

	R_1	R_2	R_3	R_4	R_5	Ratings	Total
U	1	2	4	2	2	1, 2, 2, 2, 4	11
V	4	2	4	4	5	2, 4, 4, 4, 5	19
W	5	1	5	2/4	4/2	1, 2, 4, 5, 5	17
X	1/3/4	5	5	1/3/4	1/3/4	1, 3, 4, 5, 5	18
Y	3/4/4	1	1	3/4/4	3/4/4	1, 1, 3, 4, 4	13
Total	3.4×5=17	2.2×5=11	3.8×5=19	2.8×5=14	17		

Since total of ratings given by R3 is 19. It is possible only if remaining ratings are 4 & 4. Because all 5's are used.
Let us think, for R4;
Possible ratings are 2, 4, 2/4, 1/3/4 or 3/4/4
Total = 14
So, possible cases are 2, 4, 2, 3, 3 or 2, 4, 4, 1, 3
But by putting 2, 4, 2, 3, 3, the table is not satisfied.
So, now we can make a new table:

	R_1	R_2	R_3	R_4	R_5
U	1	2	4	2	2
V	4	2	4	4	5
W	5	1	5	4	2
X	3	5	5	1	4
Y	4	1	1	3	4

30. Ans is 0

31. Ans is 0

32. Ans is 3

33. Ratings are 1, 4, 4, 5, 5.
So, median is 4.

34. R_1 median = 4 (given twice) (1, 3, 4, 4, 5)
R_2 median = 2 (given twice) (1, 1, 2, 2, 5)
R_3 median = 4 (given twice) (1, 4, 4, 5, 5)
R_4 median = 3 (given once) (1, 2, 3, 4, 4)
R_5 median = 4 (given twice) (2, 2, 4, 4, 5)
So, answer is R_4

35-39. Given slots are twenty 15 minutes slots starting at 9AM and ending at 2PM. Then applicants are scheduled in each slot.
Total number of applicants = 10 × 20 = 200
No. of US applications = 50% of Total
= 50% of 200 = 100
Since the number of US applications was the same in all slots.

	So, US applications in each slot = $\frac{100}{20} = 5$ It is given that I, V and N were scheduled for Schengen visa processing in that order. Their slot was 9:15 AM. It means the number of shengen applicants in each slot is at least 3. Similarly, it is given that M and O were scheduled in the 9:30AM slot in others category. So, the number of applicants in other category in each slot is at least 2. Since the number of applicants in each slots is 10. So, it can be inferred that number of Schengen and others applicants is 3 and 2 respectively. Hence the number of UK applicants is 0 in each slot. Total number of counters = 10 US counters = 4 UK counters = 2 Schengen counters = 2 Others counters = 2 Given that US and UK application requires 10 mins of processing time. Vijay was called at 9:25 A.M. (5^{th} in line). It is possible if processing time for Schengen visa is 12.5 mins. On a particular day, I, V and N were scheduled for Schengen visa processing in given order. They had 9:15 AM slot but entered at 9:20 A.M. when they entered VPO, exactly 6 out of 10 counters were either processing applications or had finished processing ones and ready to start processing the next. Hence at 9:20 A.M. there are exactly 4 free counters. Out of these 4 free counters, 2 would be UK and 2 would be others. So, for US (Processing time is 10 mins) slots counter-wise are, C_1 : 9:10, 9:20, 9:30, 9:40, 9:55, 10:10, 10:20 C_2 : 9:10, 9:25, 9:35, 9:45, 9:55, 10:10 C_3 : 9:10, 9:25, 9:40, 9:50, 10:00, 10:10 C_4 : 9:10, 9:25, 9:40, 9:55, 10:05, 10:15 For Schengen visa (12.5 mins) slots are C1 : 9:12.30, 9:25. 9:37.30 C2 : 9:12.30, 9:32.30, 9:45 For others (5 mins) slots are C1 → 9:05, 9:20, 9:35 C2 → 9:05, 9:20, 9:35
35.	0 is the answer.
36.	For the others, the time taken to process are application is 5 mins. Time taken to process 40 applications is 40 × 5 = 200 mins.
37.	Nandini's application is 6th in Schengen application. So, her process will end at 9:45 AM True
38.	Option 3) the process for O was completed before 9:45 A.M. True Option 2) The application process for Mahira started after Nandini's. For Mahira, starting time is 9:30 A.M. So, for Nandini, starting time is 9:32.30. False. So, option 2 is answer.

39.

From the slots, we can see that the first slot took 20 mins to complete, and after that the remaining 19 slots took 15 mins each to complete the US application process.
So, Total time taken = 20 + 15 × 19 = 305 mins.
Hence end time will be = 9 AM + 305 Mins = 2:05 P.M.

40-44.

Block XX				**Block YY**		
A_1	B_1	C_1	Road	D_1	E_1	F_1
A_2	B_2	C_2		D_2	E_2	F_2

Road

We can determine following by reading the set:
1. Row 1 has two occupied houses one in each block means one out of A_1, B_1, C_1 is occupied. One out of D_1, E_1, F_1 is occupied
Also, it means 4 are vacant.
2. E_1 and E_2 are vacant.
3. The costeliest house (vacant) in block xx is worth 24 lacs.
4. The cheapest house (vacant) in block yy is worth 15 lacs.
5. One out of E_1 or E_2 is of worth 15 lacs.
6. There is only are house with parking space in block yy.

Let a = road adjacency value
Let b = neighbor count.
Where a = 0/1/2
Where b = 0/1/2/3

There can be 2 possibilities for the house worth 24 lacs:

Case 1: - A house has parking space:
Quoted price = 12 + 5a + 3b = 24
⇒ 5a + 3b = 12
The only possible solution is a = 0, b = 4.
But b can't be 4 as maximum no. of neighbors can be 3.

Case 2:- House has not parking space.
Quoted price = 10 + 5a + 3b = 24
⇒ 5a + 3b = 14
⇒ a = 1, b = 3
It means the house has 1 roads adjacent and 3 neighbours i.e. occupied houses.
The only possibility is B_2
So, we can determine B_2 is vacant and worth 24 lacs. Also A_2, B_1 and C_2 are unoccupied.
From condition (1), we can say A_1 & C_1 are unoccupied.

Block XX

×	√	×
A_1	B_1	C_1
A_2	B_2	C_2
√	(24L) ×	√

√ = occupied
× = Unoccupied

For Block YY:

Both E_1 and E_2 are vacant.

By condition 4, either price of E_1 or E_2 is 15 Lacs.

Two cases arise:-

Case 1: If E_1 is of 15 Lacs.

Road adjacency value = 0.

If this house has no parking space then

$10 + 5 \times 0 + 3b = 15$

$\Rightarrow 3b = 5$ Never possible.

If E_1 has parking space,

$12 + 5 \times 0 + 3b = 15$

$\Rightarrow 3b = 3 \Rightarrow b = 1$.

Means E_1 has one occupied neighboring house. E_2 is already vacant. So, It can be either D_1 or F_1. So, there would be 2 possibilities

√	×	×
D_1	E_1	F_1
×	×	√
D_2	E_2	F_2

or

×	×	√
D_1	E_1	F_1
√	×	×
D_2	E_2	F_2

Case 2:

If E_2 is of 15 Lacs.

We already know a = 1.

If E_2 has parking space:

$12+ 5 \times 1 + 3b = 15 \Rightarrow 3b = -2$ (Not possible)

If E_2 has no parking space:

$10 + 5 \times 1 + 3b = 15 \Rightarrow b = 0$

Means D_2, E_1 and F_2 are vacant.

That implies D1 & F_1 are occupied by condition that column D and column F has at least one occupied house. But it is a contradiction to condition 1.

So, this is an invalid case.

40. Answer is 3.

41. B_1 is definitely occupied.

42. Exactly 3.

43. Maximum possible quoted price = $10 + 5 \times 1 + 3 \times 2 = 21$ Lacs.

44. E_1 has parking space.

45. $\text{Log}_x (x^2+12) = 4$

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

$x^4 - (x^2+12) = 0$

$x^4 - x^2 - 12 = 0$

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

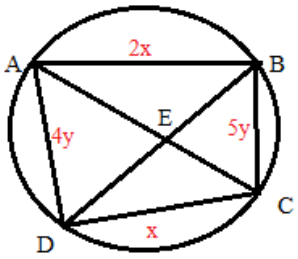
$x^2 = 4$ and $x^2 = -3$

	Here x^2 cannot be negative so rejecting -3. $x^2 = 4$ x = 2 and x = -2. Now again x is in the base here, so it cannot be negative. As such x = -2 rejected. Finally we get, x = 2. Further we are given, $3 \log_y x = 1$ $\log_y x = 1/3$ $x = y^{1/3}$ $2 = y^{1/3}$ Cube on both side, we get 8 = y Finally, x + y = 2 + 8 =10.
46.	Solution: Firstly doing prime factorization $168 = 2^3 \times 3^1 \times 7^1$ $1134 = 2^1 \times 3^4 \times 7^1$ The least positive integer value of n in 1134^n to make it a factor of 168 $1134^n / 168$ We need atleast 2^3 in numerator, so minimum value of n must be 3. $1134^3 = 2^3 \times 3^{12} \times 7^3$ $168 = 2^3 \times 3^1 \times 7^1$ The least positive integer value of m in 168^m to make it a factor of 1134^n We need atleast 3^{12} in numerator, so minimum value of m must be 12. Finally m + n = 12 +3 =15.
47.	$x^2 + (x-2y-1)^2 = -4y(x+y)$ $x^2 + 4y(x+y) + (x-2y-1)^2 = 0$ $x^2 + 4yx + 4y^2 + (x-2y-1)^2 = 0$ $(x+2y)^2 + (x-2y-1)^2 = 0$ As both of these are square, so they none of them could be negative. In order to make the sum as zero, they must be individually zero. As such, $(x - 2y - 1)^2 = 0 \Rightarrow x - 2y - 1 = 0 \Rightarrow x - 2y = 1$. So, answer is 1.
48.	$\sqrt{5x+9} + \sqrt{5x-9} = 3(2+\sqrt{2})$ $\sqrt{5x+9} + \sqrt{5x-9} = 6 + 3\sqrt{2}$ $\sqrt{5x+9} + \sqrt{5x-9} = \sqrt{36} + \sqrt{18}$ Here we can observe difference between $\sqrt{5x+9}$ and $\sqrt{5x-9}$ also $\sqrt{36}$ and $\sqrt{18}$ is same. From here we can equate, $\sqrt{5x+9} = \sqrt{36}$ so, 5x + 9 = 36 10x + 9 = 63 $\sqrt{10x+9} = \sqrt{63}$ $\sqrt{10x+9} = 3\sqrt{7}$.
49.	$2|x|(x^2 + 1) = 5x^2$ Let $y = |x|$

	so $y^2 = x^2$ rewriting the equation $2y(y^2 + 1)= 5 y^2$ we can cancel y from both the sides, means x = 0 we are left with $2(y^2 + 1)= 5 y$ $2y^2 + 2= 5 y$ $2y^2 - 5 y + 2 = 0$ y = ½ and 2. we need integral value, so leaving 1/2. We have y =0, 2 means |x| = 0 and 2 so x can have 3 values i.e. 0, 2, -2. So 3 values.
50.	Sum of roots = -b/a $\alpha + \beta = 3$ and product of roots is = c/a $\alpha * \beta = K/2$ For the second equation, Sum of roots, $\alpha + \beta + \alpha * \beta = -P$ $3 + k/2 = -P$ Product of roots, $(\alpha + \beta)* \alpha * \beta = P$ $3* k/2 = P$ Solving these two, we get K = -3/2 P = -9/4 Solving 8(K - P) = 8 [-3/2 - (-9/4)] = 6 The answer will be 6.
51.	$x^3 + (2r + 1)x^2 + (4r + 1)x + 2 = 0$ Here the product of all three roots = d/a = -2 One of the roots is given as -2 So, product of two roots, a*b = 1 so we can conclude b = 1/a Now sum of all the three roots = -b/a a + 1/a -2 = -(2r + 1) a + 1/a = -2r + 1 we know that, value of a + 1/a lies between -2 and 2. we can conclude $-2 \leq a + 1/a \leq 2$ $= -2 \leq -2r + 1 \leq 2$ Adding 1 $-3 \leq -2r \leq 3$ Dividing by 2 $-3/2 \leq -r \leq 3/2$ multiplying by -1 $3/2 \leq r \leq -3/2$. So minimum possible non negative integral value will be 2.
52.	Using the formula for angle between the hands of clock. $\theta = M\ 11/2 - 30\ H$

	θ = Angle between the two hands. H = Position of hour hand initially M = Position of Minute hand lastly. At 8:48 θ = 48 × 11/2 – 30× 8 = 24 degree increasing 24 by 50%, we get = 36 degree. time between 8 and 9 the hands of a clock make an angle of 36 degree θ = M 11/2 – 30 H 36= M 11/2 – 30× 8 m = 552/11 = 50 (2/11) Difference in minutes = 50 (2/11) – 48 = 24/11
53.	The ratio of coffee and cocoa in the mixture Q is 16 : 9. Means ratio of final to total coffee = 16:25 By applying the formula for repeated mixture, $\frac{16}{9} = 1[1 - \frac{taken\ Out}{total}]^2$ $\frac{taken\ Out}{total} = \frac{1}{5}$ It means, in first go, 1/5 of coffee is replaced be cocoa powder and in second go, 1/5 of mixture was replaced by cocoa powder. cocoa in mixture P = 1/5 and cocoa in mixture Q is = 9/25 ratio of cocoa in mixture P to that in mixture Q is (1/5) / (9/25) = 5:9
54.	Let marks of each girl = g and marks of each boy = m (4 g + 6 b)/ 10 = 24 4 g + 6 b = 240 2 g + 3 b = 120 – (I) Given, marks of any girl is at most double the marks of any boy i.e. g = 2 b (max) but marks of any girl is not less than the marks of any boy i.e. g = b (min) putting max and min value of g in equation (I) , we get at g = 2 b, 4 b + 3 b = 120 ⇒ b = 17.14 at g = b, 2 b + 3 b = 120 ⇒ b = 24 we need to solve for 2 g + 6 b at g = 2 b, 4 b + 6 b ⇒ 10 b ⇒ 10 × 17.14 = 171.4 at g = b, 2 b + 6 b ⇒ 8 b ⇒ 8 × 24 = 192 So value range for 172 till 192, total 21 values
55.	Lets go by options, Option 1, 26862 – 8×80 = 26222 (Not a palindrome) Option 2, 26862 – 8×90 = 26142 (Not a palindrome) Option 3, 26862 – 8×110 = 25980 (Not a palindrome) Option 4, 26862 – 8×100 = 26062 (a palindrome) Correct answer to the question must be option 4.
56.	let CP of first = a and CP of second = b Profit of 20% on a.

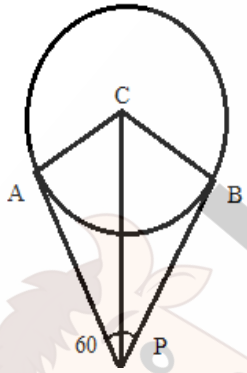
	SP of first will be = 1.2 a Loss of 10% on second. SP of second will be = 0.9 b SP of both is same 1.2 a = 0.9 b or 0.9 b = 1.2 a to have a profit of 10% on b means 1.1 b when 0.9 b = 1.2 a then 1.1 b = 1.466 a that means a profit of 47% on first object A.
57.	Ratio of the salaries of Sita, Gita and Mita is given as 5: 6 : 7 after respective hike of 20% , 25% and 20%, it becomes = 6: 7.5: 8.4. The second year, after Sita and Mita get salary hikes of 40% and 25%, respectively, we get = 8.4: x: 10.5. Now given, the salary of Gita becomes equal to the mean salary of the three friends which is = x (8.4 + x + 10.5) /3 = x x = 9.45 Salary of Gita increases from 7.5 to 9.45, so percentage increase will be = (9.45 – 7.5)/ 7.5 × 100 = 26%
58.	$S_a/S_b = \sqrt{Tb/Ta}$ $54/S_b = \sqrt{(\frac{24}{6})}$ $S_b = 27$ Total distance = 54×6 +27×24 = 972 km. Correct answer to the question must be 972.
59.	Let initial investment made by Sunil be 'x' As compounded half-yearly, time becomes 12 and rate becomes 2% for Anil and time becomes 10 and rate becomes 2% for Sunil. $22000(1.02)^{12} = x(1.02)^{10} \times 1.1$ x = 20808. Correct answer to the question must be 20808.
60.	Kamal takes twice as much time as Amal to do the same amount of job. So, if one day work of Amal is '2a' then one day work of Kamal will be 'a'. Let one day work of Sunil be 'x' Now, amount of job that Amal, Sunil and Kamal can individually do in a day, are inharmonic progression So 2/x = 1/2a + 1/ a x = 4/3a Means, one day work of Sunil is '4/3a' Amal and Sunil work for 4 days and 9 days, respectively, Kamal needs to work for 16 days to finish the remaining job means total work will be = 8 a +12 a + 16 a = 36 a Time taken by Sunil to finish the job working alone = 36a/ (4/3a) = 27 days. Correct answer to the question must be 27 days.
61.	In triangle AED and triangle BEC



∠DAE = ∠CBE (angle by same arc)
∠ADE = ∠BCE (angle by same arc)
So triangle AED and triangle BEC are similar.
AE/BE = AD/BC = DE/CE =4/5. – (I)
Similarly, triangle AED and triangle BEC will be similar.
AE/ED = AB/DC = BE/CE =2/1 – (II)
from (I) and (II)
AE : CE = 8:5.

62.

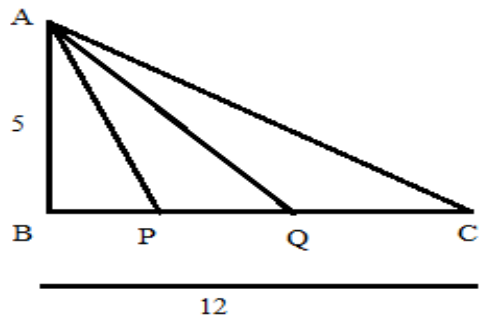
From equation,
$x^2 + y^2 + 4x - 6y - 3 = 0$
We can conclude that centre of circle will be at (-2,3)
Radius $= \sqrt{16}$ $[(-2)^2 + (3)^2 - (-3)]$
Radius $= \sqrt{16} = 4$
In triangle APC,



∠A = 90
∠APC = 30
∠ACP = 60
As AC is 4, then CP will be 8.
For point P, x coordinate is given as 6.
Applying distance formula,
$[(x-x_1)^2+(y-y_1)^2]^{1/2} = 8$
putting x,y =-2,3 and x_1, y_1 = 6,y
we get y =3.
Correct answer to the question must be (6,3)

63.

Here the height of all the 3 triangles are equal, so
area will be dependent on base.
Given, ΔABC is 1.5 times the area of ΔABP

	 So length of BC = 1.5 BP BP = 8 BC = 12 (Given) BP, BQ and BC are in arithmetic progression. BQ = (8+12) / 2 = 10 PQ = 10 – 8 = 2. Correct answer to the question must be 2.
64.	$1/(\sqrt{x}+\sqrt{z}) + 1/(\sqrt{x}+\sqrt{y}) = 2/(\sqrt{y}+\sqrt{z})$ $(\sqrt{x}-\sqrt{z})/(x-z) + (\sqrt{x}+\sqrt{y})/(x-y) = 2(\sqrt{y}-\sqrt{z})/(y-z)$ now going by options, using option 1. when y, x, z are in arithmetic progression, x-z will be d, x-y will be –d and y-z will be 2d. $(\sqrt{x}-\sqrt{z})/d + (\sqrt{x}+\sqrt{y})/-d = 2(\sqrt{y}-\sqrt{z})/2d$ $(\sqrt{x}-\sqrt{z}) - (\sqrt{x}+\sqrt{y}) = \sqrt{y}-\sqrt{z}$ $\sqrt{y}-\sqrt{z} = \sqrt{y}-\sqrt{z}$ it means this is satisfied. Correct answer to the question must be option 1.
65.	Considering all single digit number = 9 numbers Considering 2 digit number = _ × _ First place can be filled in 9 ways because cannot take zero. Second place can be filled in 9 ways because repetition not allowed. = 9×9 = 81 numbers Considering 3 digit number = _ × _ × _ First place can be filled in 9 ways because cannot take zero. Second place can be filled in 9 ways because repetition not allowed. Third place can be filled in 8 ways because repetition not allowed. = 9×9 × 8 = 648 numbers. Total = 9 + 81 + 648 = 738 numbers.
66.	No. of organisms on first day = 2, Second = 2×2+3 = 7, Third = 7 × 2+3 = 17 Forth = 17 × 2 + 3 = 37, Fifth = 37 × 2 + 3 = 77 Sixth = 77× 2 +3 = 157 Seventh = 157× 2 + 3 = 317 When you look carefully you will realize, after 7 steps there is NO much impact of +3 so we can consider that after seventh term it only becomes double. So considering a GP with first term a =157, r =2 and Tn >10,00,000 n will be 12. So total it must be 7 + 12 =19th term. Correct answer to the question must be 19.

Actual CAT 2023 Slot - II

Section - I: Verbal Ability

DIRECTIONS *for the questions 1 to 4:* *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 apriori 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.

1. According to this passage, which one of the following statements best describes the significance of archaeology for historians?

1. Archaeology helps historians to interpret historical facts.
2. Archaeology helps historians to ascertain factual accuracy.
3. Archaeology helps historians to carry out their primary duty.
4. Archaeology helps historians to locate the oldest civilisations in history

2. All of the following, if true, can weaken the passage's claim that facts do not speak for themselves, EXCEPT:

1. the truth value of a fact is independent of the historian who expresses it.
2. facts, like truth, can be relative: what is fact for person X may not be so for person Y.
3. a fact, by its very nature, is objective and universal, irrespective of the context in which it is placed.
4. the order in which a series of facts is presented does not have any bearing on the production of meaning.

3. 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. producing a detailed timeline of the various events that led to the Battle.
3. exploring the socio-political and economic factors that led to the Battle.
4. deriving historical facts from the relevant documents and inscriptions.

4. All of the following describe the "common-sense view" of history, EXCEPT:

1. history can be objective like the sciences if it is derived from historical facts.
2. real history can be found in ancient engravings and archival documents.
3. history is like science: a selective system of cognitive orientations to reality.
4. only the positivist methods can lead to credible historical knowledge.

DIRECTIONS *for the questions 5 to 8:* *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 19th 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.

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

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

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

7. 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 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,'. "
3. "Democracy has degenerated into a theatre of the absurd."
4. ". . . the creation of a business aristocracy, the rise of vast companies"

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

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

DIRECTIONS *for the questions 9 to 12:* *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: 300,000 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. "Thrifting" 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 100,000 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 garments ending 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."

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

10. The act of "thrifting", as described in the passage, can be considered ironic because it:

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

11. The central idea of the passage would be undermined if:

1. second-hand stores sold only high-quality clothes.
2. clothes were not thrown and burnt in landfills.
3. Primark and Boohoo recycled their clothes for vintage stores.
4. customers bought all their clothes online.

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

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

DIRECTIONS ***for the questions 13 to 15:*** *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.

13. The author sees the rise of Netflix in Europe as:

1. a looming cultural threat.
2. a unifying force.
3. filling an entertainment gap.
4. an economic threat.

14. 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 Netflix has been gradually losing market share to other streaming television service providers.

3. Research shows that Netflix hits produced in France are very popular with North American audiences.
4. Research shows that older women across the EU enjoy watching romantic comedies on Netflix, whereas younger women prefer historical fiction dramas.

15. Based on information provided in the passage, all of the following are true, EXCEPT:

1. European television productions have the potential to become global hits.
2. national broadcasters dominate in the EU in terms of total television viewing hours.
3. only half of Netflix's original programming in the EU is now produced in America.
4. Netflix has been able to transform itself into a truly European entity.

16. 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. An Italian comedy show hosted by an international star.
2. An original German TV science fiction production.
3. A murder mystery drama set in North Africa and France.
4. A trans-Atlantic romantic drama set in Europe and America.

DIRECTIONS *for the questions 17 to 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.*

17. **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 characterized 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

18. **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 Arbøll 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 1 2. Option 2 3. Option 3 4. Option 4

DIRECTIONS *for the questions 19 to 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.*

19. 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.

20. 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.

DIRECTIONS *for the questions 21 to 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.

21. 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.

22. 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.

DIRECTIONS ***for the questions 23 to 24:*** *The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage*.

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

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

Section: DI & Reasoning

DIRECTIONS *for the questions 25 to 29:* *Read the information given below and answer the question that follows.*

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 Rs. 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 Rs. 1 crore or by Rs. 2 crores.

The table below provides partial information about the five firms.

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

25. For which firm(s) can the amounts raised by them be concluded with certainty in each year?

1. Only Drjbna
2. Only Czechy
3. Only Czechy and Drjbna
4. Only Bzygoo and Czechy and Drjbna

26. What best can be concluded about the total amount of money raised in 2015?

1. It is either Rs. 8 crores or Rs. 9 crores.
2. It is exactly Rs. 8 crores.
3. It is either Rs. 7 crores or Rs. 8 crores or Rs. 9 crores.
4. It is either Rs. 7 crores or Rs. 8 crores.

27. What is the largest possible total amount of money (in Rs. crores) that could have been raised in 2013?

28. If Elavalaki raised Rs. 3 crores in 2013, then what is the smallest possible total amount of money (in Rs. crores) that could have been raised by all the companies in 2012?

1. 11 2. 9 3. 12 4. 10

29. If the total amount of money raised in 2014 is Rs. 12 crores, then which of the following is not possible?

1. Alfloo raised the same amount of money as Bzygoo in 2014.
2. Bzygoo raised more money than Elavalaki in 2014.
3. Alfloo raised the same amount of money as Drjbna in 2013.
4. Bzygoo raised the same amount of money as Elavalaki in 2013.

DIRECTIONS ***for the questions 30 to 34:*** *Read the information given below and answer the question that follows.*

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
Akhil	1	2	2	3	3
Bimal	2	3	2	1	1
Chatur	3	1	1	2	2

The following information is also known.

1. 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.
2. The total score on Day 3 is the same as the total score on Day 4.
3. Bimal's scores are the same on Day 1 and Day 3.

30. What is Akhil's score on Day 1?

1. 7 2. 5 3. 6 4. 8

31. Who attains the maximum total score?

1. Akhil
2. Cannot be determined
3. Bimal
4. Chatur

32. What is the minimum possible total score of Bimal?

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

1. 5
2. 4
3. Cannot be determined
4. 6

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

DIRECTIONS ***for the questions 35 to 39:*** *Read the information given below and answer the question that follows.*

There are nine boxes arranged in a 3×3 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		9	6
2nd row	2		
3rd row	8		

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.

35. What is the total number of coins in all the boxes in the 3rd row?

1. 15 2. 45 3. 36 4. 30

36. How many boxes have at least one sack containing 9 coins?

1. 3 2. 8 3. 4 4. 5

37. For how many boxes are the average and median of the numbers of coins contained in the three sacks in that box the same?

38. How many sacks have exactly one coin?

39. In how many boxes do all three sacks contain different numbers of coins?

DIRECTIONS ***for the questions 40 to 44:*** *Read the information given below and answer the question that follows*

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 am and must be completed by 5 pm except for Ride-3, for which the last ride has to be completed by 1 pm.

Ride gates open every 30 minutes, e.g. 10 am, 10:30 am, 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 Rs. 20, Rs. 50, Rs. 30 and Rs. 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 am after spending Rs. 50 to pay for the ticket(s).
2. Anjali took Ride-1 at 11 am after waiting for 30 mins for Chitra to complete it. It was the only ride where Anjali waited.
3. Bipasha began her first of three rides at 11:30 am. All three visitors incurred the same amount of ticket expense by 12:15 pm.
4. The last ride taken by Anjali and Bipasha was the same, where Bipasha waited 30 mins 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.

40. What was the total amount spent on tickets (in Rs.) by Bipasha?

1. 100
2. 120
3. 110
4. 90

41. Which were all the rides that Anjali completed by 2:00 pm?

1. Ride-1 and Ride-4
2. Ride-1, Ride-2, and Ride-4
3. Ride-1, Ride-2, and Ride-3
4. Ride-1 and Ride-3

42. Which ride was taken by all three visitors?

1. Ride-4
2. Ride-2
3. Ride-3
4. Ride-1

43. How many rides did Anjali and Chitra take in total?

44. What was the total amount spent on tickets (in Rs.) by Anjali?

SECTION: QUANTITATIVE ABILITY

DIRECTIONS ***for the questions 45-66:*** *Solve the following question and mark the best possible option.*

45. 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. $\frac{x}{y} < \frac{y}{x}$
2. If $y > 10$, then $-x > y$
3. If $y < 0$, then $-x < y$
4. If $x < 0$, then $-x < y$

46. 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. 2m and 3n
2. 2m and n
3. m and n
4. m and 2n

47. The sum of all possible values of x satisfying the equations $2^{4x^2} - 2^{2x^2+x+16} + 2^{2x+30} = 0$, is

1. $\frac{3}{2}$
2. $\frac{5}{2}$
3. $\frac{1}{2}$
4. 3

48. 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. 289
2. 580
3. 579
4. 290

49. 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

50. The number of positive integers less than 50, having exactly two distinct factors other than 1 and itself, is

51. 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

52. 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. 75
3. 120
4. 90

53. Minu purchases a pair of sunglasses at Rs.1000 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 Rs.500, then the percentage of profit made by Minu when she sold the pair of sunglasses to Tanu is

1. 31.25%
2. 26%
3. 52%
4. 35.42%

54. 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. 5 : 4
2. 4 : 5
3. 5 : 6
4. 6 : 5

55. Ravi is driving at a speed of 40 km/h on a road. Vijay is 54 meters 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 meters away from Ravi. The speed, in km/h, at which Vijay should drive so that all the three

1. 61.6
2. 64.4
3. 67.2
4. 58.8

56. 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 288000. Then, the price of the original precious stone is

1. 972000
2. 1296000
3. 1620000
4. 1944000

57. Anil borrows Rs 2 lakhs at an interest rate of 8% per annum, compounded half-yearly. He repays Rs 10320 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. 33130
2. 45311
3. 51311
4. 40991

58. Jayant bought a certain number of white shirts at the rate of Rs 1000 per piece and a certain number of blue shirts at the rate of Rs 1125 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 Rs 51000. If he bought both colors of shirts, then the maximum possible total number of shirts that he could have bought is

59. If certain amount of money is divided equally among n person, each one receives Rs.352. However, if two persons receive Rs.506 each and the remaining amount is divided equally among the other persons, each of them received less than or equal to Rs.330. Then, the maximum possible value of n is

60. A container has 40 liters of milk. Then, 4 liters are removed from the container and replaced with 4 liters of water. This process of replacing 4 liters 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

61. 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. $\frac{abr^2}{a^2+b^2}$ 2. $\frac{abr^2}{2(a^2+b^2)}$ 3. $\frac{2abr^2}{a^2+b^2}$ 4. $\frac{4abr^2}{a^2+b^2}$

62. 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. 1 : 1 : 2 2. 2 : 4 : 1 3. 1 : 2 : 1 4. 1 : 2 : 4

63. The area of the quadrilateral bounded by the Y-axis, the line x = 5, and the lines $|x - y| - |x - 5| = 2$, is

64. Let both the series $a_1, a_2, a_3, \ldots$ and $b_1, b_2, b_3 \ldots$ 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. 79 2. 84 3. 83 4. 86

65. 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. 486 2. 378 3. 189 4. 243

66. 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

hitbullseye

Answer Key Actual CAT Slot - II

Q. No	Key	Q. No	Key	Q. No	Key
1.	2	25.	3	45.	3
2.	2	26.	4	46.	4
3.	3	27.	17	47.	3
4.	3	28.	1	48.	3
5.	3	29.	4	49.	6
6.	4	30.	1	50.	15
7.	1	31.	4	51.	7
8.	4	32.	25	52.	4
9.	4	33.	2	53.	1
10.	4	34.	26	54.	2
11.	1	35.	2	55.	1
12.	2	36.	4	56.	2
13.	2	37.	4	57.	3
14.	1	38.	9	58.	407
15.	4	39.	5	59.	16
16.	3	40.	3	60.	7
17.	2	41.	3	61.	3
18.	1	42.	4	62.	2
19.	2	43.	6	63.	45
20.	3	44.	140	64.	1
21.	4132			65.	2
22.	4312			66.	967
23.	1				
24.	3				

Explanation Actual CAT Slot - II

Q. No	Explanation
1.	In the passage, the author mentions that historians, in dealing with basic facts like the date and location of historical events (e.g., the Battle of Hastings in 1066), rely on "auxiliary sciences" of history, which include archaeology. The author notes that accuracy in such basic facts is important for historians but compares praising a historian for accuracy to praising an architect for using well-seasoned timber—a necessary condition but not the essential function. The passage implies that archaeology and other auxiliary sciences support historians in establishing these basic facts. Refer to the lines "But praise a historian….." Therefore, option 2 is the most appropriate choice based on the information provided in the passage.
2.	Option 2 is the correct answer as it agrees with the perspective of the passage that the interpretation of facts can be subjective and influenced by different perspectives. The passage argues that historians play a vital role in selecting and interpreting facts, and Option 2 supports this by suggesting that facts, like truth, can be relative.
3.	According to the passage, the role of historians is not limited to establishing basic facts. They are expected to delve deeper into understanding the context and motivations behind historical events. This requires a selective and interpretive approach to historical writing. Option 3 is the only one that reflects this comprehensive and contextual approach to historical writing, focusing on understanding the underlying causes and influences that shaped the historical event.
4.	Option 2 provides an accurate representation of the common-sense perspective described in the passage. This perspective acknowledges historical methods beyond positivism, as stated in option 4. According to the passage, the common-sense view also involves a fallacious belief that historical facts are objective and independent of interpretation, as mentioned in option 1. That takes us to the right option i.e. option 3 because it is rather contrasting what is being said in the passage.
5.	Option 1- This is a valid criticism according to the passage. The author points out that Deneen fails to recognize liberalism's historical ability to reform itself and address internal problems. Option 2- This is a valid criticism. The passage suggests that while Deneen accurately highlights the current problems with liberalism, he may be overly pessimistic about its future. Option 4 is also a valid criticism. Only option 3 is the right answer. Although the passage is critical of Deneen's extreme pessimism regarding the future of liberalism, his narrow definition of liberalism limited to individual freedoms, and his fixation on the essence of liberalism, it doesn't address his tendency to look back to premodern notions specifically.
6.	Let's evaluate each option- Option 1 introduces the idea of a return to past liberalism, which is not explicitly mentioned in the passage. The author does criticize the current state of liberalism and its problems but doesn't specifically address the possibility of returning to a past form of liberalism. For option 2. While the passage criticizes the Davos elite, it focuses more on their hypocrisy and accumulation of wealth rather than how they have captured the debate around liberalism. The primary emphasis is on their actions rather than their control of the debate. Option 3 introduces a positive aspect of the rise in liberalism, which is not consistent with the author's overall criticism of the current state of liberalism and the actions of the Davos elite. In contrast, option 4 aligns with the passage's emphasis on the hypocrisy of the liberal rich and their accumulation of wealth while professing to adhere to liberal values. Therefore, option 4 is the most accurate interpretation based on the information provided in the passage.
7.	For option 2- "'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.'" - This statement highlights a significant gap between liberalism's claims and the lived reality of the citizens, indicating a disillusionment with liberalism. For option 3-"Democracy has degenerated into a theatre of the absurd." - This statement suggests a

	negative assessment of the current state of democracy, indicating a decline in its quality. For option 4- ". . . the creation of a business aristocracy, the rise of vast companies." - This statement points to the creation of a business aristocracy and the rise of large companies, indicating a concentration of economic power, which could be seen as evidence of the decline of liberalism. So except option 1 rest are evidence in the context of the passage.
8.	The author is most likely to agree with Option 4 as it supports the author's argument in the passage that liberalism has a history of reforming itself in response to challenges. The author emphasizes that liberalism's success is not solely due to its dominance over the past century, but rather its ability to address internal issues and adapt to change. Rest all options are eliminated. For example, in the case of option 3, the passage doesn't explicitly address the need to find a substitute for liberalism, and the author's emphasis is more on the potential for reform within liberalism. Therefore, the author is likely to disagree with this statement.
9.	The passage suggests that one solution to the environmental impact of fast fashion is to buy high-quality items that shed less and last longer. This aligns with the concept of 'slow fashion,' which emphasizes durable and long-lasting clothing as opposed to the disposable nature of fast fashion.
10.	The irony of "thrifting" and its potential for unforeseen environmental effects are discussed in the chapter. The paragraph raises a possible environmental concern with thrift shopping, despite the fact that it is frequently viewed as a sustainable and environmentally beneficial activity. The article specifically cites a study that Patagonia commissioned that shows worn-out clothing—often seen in thrift stores—has a tendency to shed a greater number of microfibers. These microfibers contribute to the microfiber pollution that can wind up in rivers and seas. Therefore, by shedding microfibers during the washing of old items, thrift shopping—despite its ecologically conscientious objectives to decrease waste—may cause environmental difficulties.
11.	The central idea of the passage revolves around the environmental impact of the fashion industry, the promotion of second-hand shopping as a sustainable alternative, and the potential challenges and considerations associated with second-hand consumption. To identify the statement that would undermine the central idea, we need to look for an option that contradicts or diminishes the importance of these key elements. For option 2- This statement supports the central idea by addressing the environmental impact of clothes ending up in landfills. It does not undermine the central idea. For option 4- This statement is not directly related to the central idea of the environmental impact of the fashion industry and the benefits of second-hand shopping. It introduces a new aspect of purchasing behaviour but does not necessarily undermine the main focus of the passage. Option 1 would go against the main idea of the passage because it emphasizes the significance of second-hand shopping not only for purchasing high-quality clothing but also as a sustainable and eco-friendly alternative to fast fashion. If second-hand stores limit their inventory to only high-quality items, it could reduce the variety and affordability that make second-hand shopping accessible and eco-friendly for a larger audience.
12.	The author does not explicitly mention the reasons why companies like ThredUP have not caught on in the UK. However, based on the information provided in the passage, we can infer the likely reasons. Let's analyze each option: Option 1- This is consistent with the passage, as it suggests that high-end retailers prioritize their brand image over sustainability. Option 2- The passage does not provide information about the purchasing habits of the British regarding second-hand clothing, so we cannot confirm or deny this statement. Option 3- This is consistent with the passage, as it mentions that high-end retailers would rather put brand before sustainability, implying that recycling might not be financially attractive for them. Option 4- This is consistent with the passage, as it suggests that luxury brands are hesitant to circulate their latest season stock at lower prices, indicating a concern about devaluing their products.
13.	The passage suggests that Netflix, along with other global firms, contributes to a shared cultural experience by providing content that can be enjoyed across different European countries. The author emphasizes the importance of having something in common, such as binge-watching the same series, as a form of cultural unity. The use of Netflix to pump the same content into homes across the continent is portrayed as a positive aspect of cultural integration.

14.	First, we will eliminate options 3 and 4. If anything, suggests success in appealing to audiences outside of Europe and does not necessarily weaken the idea of cultural unity within Europe and 4th one is only information about age-related preferences but doesn't specifically address the shared cultural experience or lack thereof. Option 2 is something related to Netflix's business so eliminated. Considering the options, **Option 1 (Research shows there is a wide variance in the popularity and viewing of Netflix shows across different EU countries)** is the one that would likely weaken the author's conclusion by indicating that the popularity and viewing habits of Netflix shows vary significantly across European countries, suggesting a lack of a unified cultural experience.
15.	According to the passage, although Netflix has established offices in various European countries, the ultimate decision-making power still lies with the American executives. As a result, the content produced by Netflix may still exhibit a somewhat mid-Atlantic quality, and the company's executive decisions are still primarily controlled by Americans. Thus, it would be inaccurate to claim that Netflix has fully transformed into a truly European entity. Rest all are options can be considered from the author's point of view so eliminated.
16.	The passage suggests that certain genres, like murder mystery dramas, have a more universal appeal. Additionally, given the emphasis on Netflix's ability to provide content that can be enjoyed across borders and the success of shows like "Lupin," which is a French crime caper, a murder mystery drama set in North Africa and France aligns with the potential for a more widespread appeal across the EU. So option 3 is the right choice.
17.	The highlighted sentence talks about the traditional view held dualism, the coexistence of advanced and traditional economic sectors, as a defining feature of developing countries, in contrast to developed countries where advanced technologies and high productivity were assumed to dominate. The reason for placing the missing sentence in **Option 2** is to maintain the logical flow of ideas within the paragraph. The sentence talks about "productive dualism" in developing countries, and it logically fits right after the introduction of this concept in the first sentence of the paragraph. This placement helps to establish the context and sets the stage for the subsequent discussion about the changing relevance of this dualism and the widening gap between winners and those left behind.
18.	The highlighted sentence emphasizes a re-evaluation of historical documentation regarding kissing practices. In the first two lines, the passage suggests that lip kissing's earliest evidence, traced to South Asia 3,500 years ago, possibly influenced the spread of the practice and herpes simplex virus 1 to other regions. Additionally, the research by Dr. Troels Pank Arbøll and Dr. Sophie Lund Rasmussen indicates that kissing was established in the Middle East 4,500 years ago, drawing from early Mesopotamian sources. So it will be correct to put the emphasis part after this to continue the correct flow of information. So option 1 is the right choice.
19.	Sentence 2 is the odd one out. The sentences form a coherent paragraph discussing an early indication of broader censorship, the escalating trend in banning and challenging books in the US, the specific example of the widely acclaimed fantasy novel Northern Lights being banned, and the American Library Association documenting an unprecedented number of reported book challenges in 2022. While option 2 is talking about efforts to ban books are essentially attempts to stifle the voices of authors who have demonstrated immense bravery in sharing their stories, highlighting the censorship's impact on freedom of expression and diverse narratives and making it the odd one in the same order.
20.	The other sentences (1, 2, 4, and 5) form a coherent paragraph discussing the concept of "children in self-care," its association with negative outcomes like loneliness and academic problems, the replacement of "latchkey" with "children in self-care" in research and practice, and recent research findings contradicting the belief that self-care is beneficial for development. While sentence 3 highlights a cautionary note in the discussion about self-care and its association with negative outcomes.
21.	The correct sequence is 4132: sentence 4 introduces the idea that human consciousness is considered an emergent property of the brain, setting the context for the discussion. sentence 1 then elaborates on the concept introduced in Sentence 4, comparing the organization of neurons to that of ants in a colony and emphasizing that no single neuron holds complex information.

	sentence 3 builds on the idea by highlighting the collective contribution of all neurons to generate complex human emotions. Sentence 2 finally provides additional information about the complexity of the human brain and how neurobiologists recognize that complex interconnections give rise to emergent qualities. Together, these sentences form a coherent paragraph that explores the concept of human consciousness as an emergent property of the brain and the intricate interplay of neurons in generating complex mental processes.
22.	The correct sequence 4312: Sentence 4 introduces the idea that Western Christian concepts often overlook or deny the presence of a genuine and lasting African tradition. Sentence 3 follows up on the idea from Sentence 4, contradicting the views that deny the existence of African tradition and asserting the reality of a rich local cultural ethos. Sentence 1 introduces an example of contemporary African writing, 'The Bottled Leopard,' that expresses the theme discussed earlier by using two children and backgrounds to contrast different cultures. Sentence 2 provides more information about Chukwuemeka Ike's exploration of the conflict, portraying the Western tradition as condescending and unaccommodating towards local African practices. Together, these sentences form a coherent paragraph by presenting the theme of conflict between Western and African traditions, offering an example from contemporary African writing, and providing insights into the views and realities of the coexistence of these cultures.
23.	Option 1 is the right choice as the passage talks about how Heatwaves are worsening due to climate change, disproportionately affecting vulnerable groups like the elderly, children, and those with medical conditions or low incomes. Research in the UK suggests that even at-risk individuals may not perceive themselves as vulnerable during extreme heat, impacting the effectiveness of early warnings. The passage emphasizes the role of news media in conveying the dangers and societal impacts of extreme heat.
24.	The passage talks about how People naturally create counterfactual alternatives to reality, pondering "if only" or "what if" scenarios that explain the past and influence future decisions. This cognitive process, develops ping throughout childhood, also impacts emotions, moral judgments, and reasoning about others' beliefs. Counterfactual thinking serves multifaceted roles, shaping perceptions of causality and contributing to various aspects of human cognition and decision-making. So, option 3 is the right choice.
25 to 29	Given that each firm raised Rs 1 crore in its first and last year. Also, each annual increase and decrease was either of Rs 1 crore or by Rs 2 crores. Let us consider for Alfloo, First year of existence, 2009 = Rs 1 crore = Last year of existence, 2016 Let amount raised in 2010, 2011, 2012, 2013, 2014, 2015 be a, b, c, d, e and f respectively Solving, 1 + a + b + c + d + e + f + 1 = 21 ⇒ a + b + c + d + e + f = 19 Now, even if we consider minimum annual increase and decrease annually, The values can be a = 2, b = 3, c = 4 or 5, d = 5 or 4, e = 3 and f = 2 Now for Bzygoo, First year of existence, 2012 = Rs 1 crore = Last year of existence, 2015 The possibilities for the amount raised in 2013 = 2 or 3 and in 2014 = 3 or 2 respectively Thus the total amount raised by Bzygoo = Rs 7 crores Now for Czechy, First year of existence, 2013 = Rs 1 crore Total amount raised = Rs 9 crores Now, if we consider Year 2016 as the last year of existence The possible values of amount raised for Year 2014 = 2 or 3, Year 2015 = 3 or 2 and Year 2016 = 1 The possible sum = Rs 7 crores (maximum) So, the last year of existence for the firm Czechy has to be 2017 with only possible values

Year 2013 = 1, Year 2014 = 2, Year 2015 = 3, Year 2016 = 2 and Year 2017 = 1
Thus, the total amount raised = Rs 9 crores
Now for Drjbna,
First year of existence, 2011 = Rs 1 crore = Last year of existence, 2015
Total amount raised = Rs 10 crores
The only possible value of amount raised for
Year 2012 = 2, Year 2013 = 4 and Year 2014 = 2
Now for Elavalaki,
Total amount raised = Rs 13 crores
First year of existence, 2011 = Rs 1 crore but last year of existence is not given
Considering the minimum amounts the possible values of amount raised for
Year 2010 = 1, Year 2011 = 2, Year 2012 = 3 or 4, Year 2013 = 4 or 3, Year 2014 = 2 and Year 2015 = 1 (such that Year 2015 is the last year of existence)
Considering the maximum amounts the possible values of amount raised for
Year 2010 = 1, Year 2011 = 3, Year 2012 = 5, Year 2013 = 3, Year 2014 = 1 (such that Year 2014 is the last year of existence)
The rest of the information can be gathered as follows-

Year/Firm	Alfloo	Bzygoo	Czechy	Drjbna	Elavalaki		Total (crores)
2009	1	-	-	-	-	-	1
2010	2	-	-	-	1	1	3
2011	3	-	-	1	2	3	6/7
2012	4/5	1	-	2	3/4	5	10/11/12/13
2013	5/4	2/3	1	4	4/3	3	14/15/16/17
2014	3	3/2	2	2	2	1	10/11/12
2015	2	1	3	1	1	-	7/8
2016	1	-	2	-	-	-	3
2017	-	-	1	-	-	-	1
Total (crores)	21	7	9	10	13	13	60

25 The amount raised by only firms Czechy and Drjbna can be concluded with certainty in each year.

26 The total amount of money raised in 2015 can be either Rs. 7 crores or Rs. 8 crores

27 The largest possible total amount of money that could have been raised in 2013 = Rs. 17 crores

28 If Elavalaki raised Rs. 3 crores in 2013, then Elavalaki raised Rs. 4 crores in 2014
Hence, the smallest possible total amount of money raised in 2012
= 4 + 1 + 2 + 4 = Rs. 11 crores

29 If total amount raised in 2014 = Rs. 12 crores
⇒ amount raised by Bzygoo in 2014 = Rs. 3 crores
⇒ amount raised by Bzygoo in 2013 = Rs 2 crores
Also, amount raised by Elavalaki in 2013 = Rs 3 crore or Rs 4 crores
Hence, Bzygoo raised the same amount of money as Elavalaki in 2013, it is not possible

30 to 34 Let the total score of Day 1, Day 2, Day 3, Day 4 and Day 5 of all the participants be a, b, c, d and e respectively.
As per the Table 1,
a + b = 15 × 2 = 30, b + c = 15.5 × 2 = 31, c + d = 16 × 2 = 32 and d + e = 17 × 2 = 34
Point 2, total score on Day 3 = total score on Day 4
⇒ c = d = 16 (each)
⇒ e = 34 - 16 = 18, b = 31 - 16 = 15 and a = 30 - 15 = 15
Point 1, Chatur score on any day = 3, 6 or 9
The only possibility of his Day 2 score being unique highest = 9
His only minimum score on Day 1 = 3
⇒ Chatur's score on Day 3, Day 4 and Day 5 = 6 (each)
Also, Akhil's Day 4 score = Chatur's Day 1 score = 3
⇒ Bimal's Day 4 score = 16 - (3 + 6) = 7
Now being same rank,
Akhil's Day 3 score = Bimal's Day 3 score = 5 (each)

Point 3, Bimal's Day 1 score = Bimal's Day 3 score = 5
⇒ Akhil's Day 1 score = 15 - (5 + 3) = 7
Now for Day 2, let the score of Akhil = p and Bimal = q
Solving, p + q + 9 = 15 ⇒ p + q = 6
Since, the rank of Akhil is 2 and Bimal is 3
Possible values of p = 4 or 5 and q = 2 or 1
Now for Day 5, let the score of Akhil = x and Bimal = y
Solving, x + y + 6 = 18 ⇒ x + y = 12
Since, the rank of Akhil is 3 and Bimal is 1
Possible value of x = 5 or 4 and y = 7 or 8
(y cannot be 9 as that being unique highest)
The rest of the information can be gathered as follows-

	Day 1	Day 2	Day 3	Day 4	Day 5	Total
Akhil	7	4/5	5	3	5/4	23/24/ 25
Bimal	5	2/1	5	7	7/8	27/26/25
Chatur	3	9	6	6	6	30
Total	15	15	16	16	18	80

30 Akhil's score on Day 1 = 7

31 Chatur attains the maximum possible score

32 The minimum possible total score of Bimal = 25

33 If the total score of Bimal is a multiple of 3, the only possibility = 27
⇒ Bimal's Day 2 score = 2 ⇒ Akhil's Day 2 score = 4

34 If Akhil's total score = 24 ⇒ Bimal's total score = 26. Answer is 26

35 to 39 Firstly, if all the given three conditions satisfy, the sum of number of coins in the box could be = 1 + 1 + 9 = 11, but that is not giving the average as distinct integer. Thus, either exactly one condition satisfies or exactly two conditions satisfy.
For 1st row, 2nd column box, the median number of coins is 9, so the maximum number of coins is also 9. Thus as mentioned in Table 2, two sacks have more than 5 coins and exactly one condition (iii) satisfies. So, the third sack must contain coins less than or equal to 5. Also, the average number of coins per sack in any box is a distinct integer, so the only value that satisfies the coins in third sack = 3, such that the average coins in the box = (3 + 9 + 9)/3 = 7
For 2nd row, 1st column box, given that two or more conditions satisfies, but since the median number of coins = 2, so, exactly two conditions (i and iii) satisfies. Also, only one sack contains more than 5 coins. Thus the average coins in the box = 1 + 2 + 9 = 12/3 = 4
For 3rd row, 1st column, median number of coins in the box = 8, all three sacks contains more than 5 coins and only 1 condition satisfies. So, that condition must be (iii) condition i.e. the maximum coins = 9. Also, to make average an integer, the number of coins in third sack must be 7. The average number of coins in the box = (7 + 8 + 9)/3 = 8
For 3rd row, 2nd column, two conditions satisfies and two sacks contain more than 5 coins. Thus, the conditions that satisfy must be (i) and (iii). So, the only possible average in the box = (1 + 8 + 9)/3 = 6
Now, since for each and each column the total is same, so the average is also the same. Sum of distinct integers from 1 to 9 = 45, so the sum of each row and each column = 15, which is also the average of the boxes for each row and each column. Hence, the sum of number of coins in each row and each column must be = 45
The sum for 1st row, 1st column = 45 - (12 + 36) = 9
Only possible average = (1 + 1 + 7)/3 = 3 satisfying other given conditions as well
The sum of 2nd row, 2nd column = 45 - (21 + 18) = 6
Only possible average = (1 + 2 + 3)/3 = 2 satisfying other given conditions as well
The sum of 1st row, 3rd column = 45 - (9 + 21) = 15
Only possible average = (1 + 6 + 8)/3 = 5 satisfying other given conditions as well
The sum of 2nd row, 3rd column = 45 - (12 + 6) = 27
Only possible average = (9 + 9 + 9)/3 = 9 satisfying other given conditions as well
The sum of 3rd row, 3rd column = 45 - (24 + 18) = 3

Only possible average = (1 + 1 + 1)/3 = 1 satisfying other given conditions as well
The rest of the information can be gathered as follows-

	1st column	2nd column	3rd column	Total
1st row	Sum = 1 + 1 + 7 = 9 Average = 3	Sum = 3 + 9 + 9 = 21 Average = 7	Sum = 1 + 6 + 8 = 15 Average = 5	45
2nd row	Sum = 1 + 2 + 9 = 12 Average = 4	Sum = 1 + 2 + 3 = 6 Average = 2	Sum = 9 + 9 + 9 = 27 Average = 9	45
3rd row	Sum = 7 + 8 + 9 = 24 Average = 8	Sum = 1 + 8 + 9 = 18 Average = 6	Sum = 1 + 1 + 1 = 3 Average = 1	45
Total	45	45	45	

35 The total number of coins in all the boxes in the 3rd row = 45

36 The boxes having at least one sack containing 9 coins = 5
(1st row, 2nd column), (2nd row, 1st column), (2nd row, 3rd column), (3rd row, 1st column) and (3rd row, 2nd column)

37 The number of boxes having the average and median number of coins in the three sacks in that box is same = 4
(2nd row, 2nd column), 2nd row, 3rd column), (3rd row, 1st column) and (3rd row, 3rd column)

38 Number of sacks having exactly one coin = 9

39 Number of boxes having all three sacks contain different number of coins = 5
(1st row, 3rd column), (2nd row, 1st column), (2nd row, 2nd column), (3rd row, 1st column) and (3rd row, 2nd column)

40 to 44 Since the time slot varies for different visitors as well as rides, so let's arrange the data with respect to rides vs visitors and fill the time slot and corresponding spending accordingly.
From point 1, Chitra spend Rs 50 and completed her rides by 11 am without any wait, so she must have taken 2 rides Ride-1 (Rs 20) and Ride-3 (Rs 30)
From point 2, Anjali took Ride-1 at 11 am after waiting for Chitra to complete, so Chitra took Ride-3 from 9 am to 10 am and Ride-1 from 10 am to 11 am respectively
From point 3, Bipasha first of three rides is from 11:30 am to 12:30 pm
Also, by 12:15 pm, all three have spent same amount = Rs 50 each (same as Chitra's complete spending by 11 am)
So, Bipasha's ride from 11:30 am to 12:30 am must be Ride 2 amounting Rs 50
Also, Anjali's second ride must be Ride-3 from 12 pm to 1 pm (without any wait and total spending of Rs 50 by 12:15 pm)
Also, Bipasha's other two rides cannot be Ride-3 as it should be completed by 1 pm
From point 4, the last ride taken by Anjali and Bipasha was the same
Let's say Anjali's last ride was Ride-4 from 1 pm to 2 pm just after Ride-3 taken from 12 pm to 1 pm as Anjali never took a break mentioned
So, for Bipasha's last ride, she could have reached 1:30 pm and taken the Ride-4 from 2 pm to 3 pm after 30 mins wait for Anjali
So, Bipasha's second ride could be Ride-1 from 12:30 pm to 1:30 pm
But that is not possible as she took a 1-hour coffee break after completing her second ride.
Thus, this is only possible if Anjali took Ride-2 from 1 pm to 2 pm and her last ride is Ride-4 from 2 pm to 3 pm respectively
Such that Bipasha's second ride is Ride-1 from 12:30 pm to 1:30 pm and then 1-hour coffee break from 1:30 pm to 2:30 pm and then 30 min wait for Anjali from 2:30 pm to 3 pm and finally the last ride, Ride-4 from 3 pm to 4 pm
The rest of the information can be gathered as follows-

Ride	Price (Rs)	Anjali	Bipasha	Chitra
Ride-1	20	11 am to 12 pm	12:30 pm to 1:30 pm	10 am to 11 am
Ride-2	50	1 pm to 2 pm	11:30 am to 12:30 pm	-
Ride-3	30	12 pm to 1	-	9 am to 10 am

			pm		
	Ride-4	40	2 pm to 3 pm	3 pm to 4 pm	-
	Total Spending		Rs 140	Rs 110	Rs 50

40 The total amount spent on tickets by Bipasha = Rs 110

41 All the rides that Anjali completed by 2 pm were Ride-1, Ride-2, and Ride-3

42 Ride-1 was taken by all three visitors

43 Total rides taken by Anjali and Chitra = 4 + 2 = 6

44 The total amount spent by Anjali = Rs 140

45.

$$\frac{x}{y} < \frac{x+3}{y-3}$$

$$\Rightarrow \frac{x}{y} - \frac{x+3}{y-3} < 0$$

$$\Rightarrow \frac{-3(x+y)}{y(y-3)} < 0 \Rightarrow \frac{x+y}{y(y-3)} > 0 \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Three cases arise:

Case 1: When $y < 0$ then
Y & y - 3 both are negative.
From (1), $x + y > 0$
So, when $y < 0$ then $y > -x$
Which is the answer.

Case 2: When $0 < y < 3$ then $y > 0$ but $y - 3 < 0$
So, from (1), $x + y < 0$
So, when $0 < y < 3$ then $x + y < 0$

Case 3: When $y > 3$, then both y & y - 3 are +ve
So, $x + y > 0$ from (1)
So, when $y > 3$ then $x + y > 0$

46. Concept (s) used in question
If a divides x and y
Then a divides (x + y)
& a divides (x - y)
& a divides kx and ky for any k.

Since k divides both (m + 2n) & (3m + 4n).
the k will also divide their multiples

So, we can consider k divides 3 (m + 2n).
So, we can further deduce k divides 3(m + 2n) - (3m + 4n) = 2n

Also, k will also divide (3m + 4n) - 2 (m + 2n) = m
So, k is a common divisor of both m and 2n.

47. Given equation can be written as

$$\left(2^{2x^2}\right)^2 - 2 \cdot 2^{2x^2} \cdot 2^{x+15} + \left(2^{x+15}\right)^2 = 0 \ldots\ldots\ldots\ldots (1)$$

As we know, $(x-y)^2 = x^2 - 2xy + y^2$
So, from (1), equation reduces to

$$\left(2^{2x^2} - 2^{x+15}\right)^2 = 0$$

	$\Rightarrow 2^{2x^2} = 2^{x+15}$ $\Rightarrow 2x^2 = x + 15$ $\Rightarrow 2x^2 - x - 15 = 0$ **1st approach** $\Rightarrow 2x^2 - 6x + 5x - 15 = 0$ $\Rightarrow 2x(x - 3) + 5(x - 3) = 0$ $\Rightarrow x = -5/2, 3$ So, Required sum = $3 - \frac{5}{2} = \frac{1}{2}$ **2nd approach** In equation $ax^2 + bx + c = 0$ Sum of roots = $-b/a$ So in equation $2x^2 - x - 15 = 0$ Required Sum = $-\left(-\frac{1}{2}\right) = \frac{1}{2}$
48.	To maximize n - m, n has to be maximized and m has to be minimized. Given $a^m \cdot b^n = 2^{580} \times 3^{290}$ Since m has to be minimized, we can take $a = 3^{290}$ so that $a^m = (3^{290})^1$ and m becomes 1. Since n has to be maximized, we can take $b^m = 2^{580}$ where $b = 2$ and $n = 580$ So, n - m = 580 - 1 = 579
49.	**Concept used in question** 1. Quadratic equation $ax^2+bx + c = 0$ has no real roots if $b^2-4ac < 0$ 2. Arithmetic Mean ≥ Geometric Mean ≥ Harmonic mean Given equation can be rewritten as; $x^2 + x(2k - 2) + 12 = 0$ Since roots are not real means $(2k - 2)^2 - 4 \times 1 \times 12 < 0$ $\Rightarrow 4k^2 + 4 - 8k - 48 < 0$ $\Rightarrow 4k^2 - 8k - 44 < 0$ $\Rightarrow k^2 - 2k - 11 < 0$ $\Rightarrow k^2 - 2k + 1 - 12 < 0$ $\Rightarrow (k - 1)^2 < 12$…….. (1) So, the largest integral value of k which satisfies inequality (1) is 4. Now let us apply A.M. ≥ G.M. property to $\frac{k}{4y}$ and 9y. So, $\frac{\frac{k}{4y} + 9y}{2} \geq \sqrt{\frac{k}{4y}.9y}$ $\Rightarrow \frac{k}{4y} + 9y \geq 2\sqrt{\frac{9k}{4}}$ $\Rightarrow \frac{k}{4y} + 9y \geq 3\sqrt{k}$

	Now k = 4, So, $\frac{k}{4y}+9y\geq 3\sqrt{4}$ i.e. 6 So, answer is 6
50.	Since the number has exactly 4 factors. So, the number should be in the form of p^3 or p'q' where p and q are primes. **Case 1:** $p^3 = 2^3, 3^3$. (Since the number should be less than 50) **Case 2:** $p^1 . q^1 = 2 \times 3, 2 \times 5, 2\times7, 2\times11, 2\times13, 2\times17, 2\times19, 2\times23, 3\times5, 3\times7, 3\times11, 3\times13, 5\times7,$ So, in total, there are 15 numbers.
51.	**1.** $\log_a m + \log_a n = \log_a (m / n)$ **2.** $\log_a m - \log_a n = \log_a (m / n)$ **3.** $\log_b (a^m) = m \log_b (a)$ Given $\log_{\sqrt{3}} x+\frac{\log_x 5^2}{\log_x 5^{-3}}=\frac{16}{3}$ (because $5^2 = 25$ and $0.008 = 5^{-3}$) $\Rightarrow 2\log_3 x+\frac{2\log_x 5}{(-3)\log_x 5}=\frac{16}{3}$ $\Rightarrow 2\log_3 x=\frac{16}{3}+\frac{2}{3}=6$ $\Rightarrow \log_3 x = 3$ ……. (1) Now, $\log_3 (3x^2) = \log_3 3 + \log_3 x^2 = 1 + 2 \log_3 x$ $\Rightarrow 1 + 2(3) = 7$ ……. From (1)
52.	Let time taken by inlet pipe A = a hrs. Then time taken by outlet pipe B = (a - 1) hrs. Then time taken by outlet pipe C = C hrs. When all pipes work together, tank gets filled in 2 hrs. So, $\frac{1}{a}+\frac{1}{c}-\frac{1}{a-1}=\frac{1}{2}$ …….. (1) When B & C are turned on together and pipe B is turned off after one hour, then pipe C takes another 1. 25 hours to fill the tank. $\frac{2.25}{C}-\frac{1}{a-1}=1\Rightarrow\frac{9}{4C}-\frac{1}{a-1}=1$…….. (2) Also, a < 5. Solving (1) & (2) $\frac{9}{4}\left(\frac{1}{2}-\frac{1}{a}+\frac{1}{a-1}\right)-\frac{1}{a-1}=1$ $\Rightarrow\frac{9}{8}-\frac{9}{4a}+\frac{9}{4(a-1)}-\frac{1}{a-1}=1$ $\Rightarrow\frac{9}{4a}-\frac{5}{4(a-1)}=\frac{1}{8}$ $\Rightarrow\frac{9}{a}-\frac{5}{a-1}=\frac{1}{2}\Rightarrow\frac{9a-9-5a}{a(a-1)}=\frac{1}{2}$ $\Rightarrow 8a - 18 = a^2 - a$ $\Rightarrow a^2 - 9a + 18 = 0 \Rightarrow a = 6, 3$ but $a < 5$ So, a = 3

Put a = 3 in (2),

$$\frac{9}{4C}-\frac{1}{a-1}=1 \Rightarrow \frac{9}{4C}-\frac{1}{2}=1$$

$$\Rightarrow \frac{9}{4C}=\frac{3}{2}$$

$$\Rightarrow C=\frac{3}{2}\text{hrs}=1.5\text{ hrs}=90\text{mins.}$$

53.

	C.P.	S.P.	P%	Profit	Loss	Loss%
$Minu_1$	1000	1200	20%	200	X	X
Kanu	1200	960	X	X	240	20%
$Minu_2$	960	1260	?	300	X	X
Tanu	1260					

So, profit % earned by Minu = $\frac{300}{960}\times 100=\frac{5}{16}\times 100=31.25\%$

54.

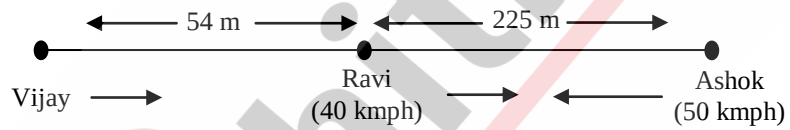
Let us assume total number of employee is 5x & total salary is 6y.

Then Number of employees in manufacturing is = 20% of total = 20% of 5x = x.
Number of non-manufacturing employees = 5x - x = 4x.

Total salary withdrawn by manufacturing employees = $\frac{1}{6}\times(6y)=y$

Total salary withdrawn by non-manufacturing employee = 5y
Required ratio = Average salary of manufacturing employee: Avg salary of non-manufacturing employee $=\frac{y}{x}:\frac{5y}{4x}=4:5$

55.



Time taken by R & A to meet = $\frac{225}{(40+50)\frac{5}{18}}$ secs

$=\frac{225}{90}\times\frac{18}{5}=9$ secs.

That means V should meet R after 9 secs

So, speed of Ravi = $\frac{54}{(V-40)\frac{5}{18}}=9$

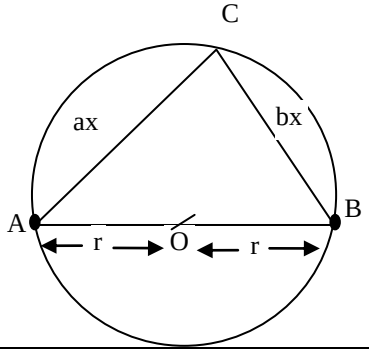
$\Rightarrow V-40=\frac{54}{9}\times\frac{18}{5}=\frac{108}{5}$ kmph

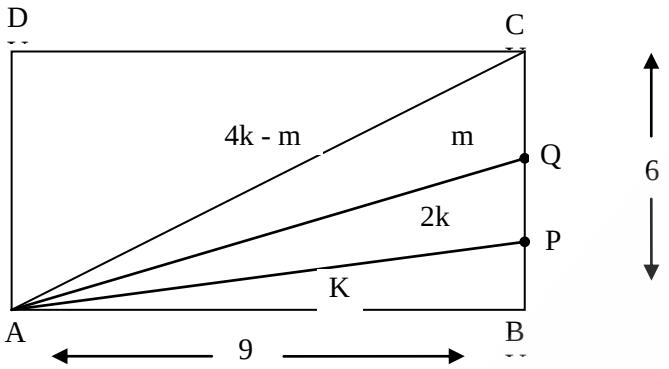
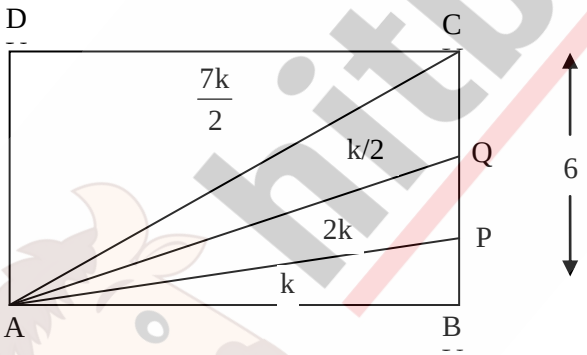
So, V = 40 + 21.6 = 61.6 kmph

56.

Let price and weight of stone be p and w.
So, p is directly proportional to w^2.
$\Rightarrow p = kw^2$ where k is a constant.
Weight of stone is 18 units. So, P = 324k.
Now, stone is broken into four parts of distinct weights.
Now, maximum possible total price of all 4 pieces would be when one of the piece has maximum

	possible weight. That happens when the weights are 1, 2, 3, 12. And similarly, minimum possible total price of all 4 pieces would be when the weights are as closest as possible i.e. 3, 4, 5, 6 So, maximum price = k ($1^2 + 2^2 + 3^2 + 12^2$) = k (1 + 4 + 9 + 144) = 158 k and minimum price = k ($3^2 + 4^2 + 5^2 + 6^2$) = k (9 + 16 + 25 + 36) = 86k Given 158k - 86 k = 72k = 288000 ⇒ k = 4000 Price of original piece = $kw^2 = 4000\ (18)^2$ = 1296000 Rs.
57.	P = 200000 Rs. R% = 8% p.a. = 4% per half year Compound Amount after first year = $200000\left(1+\frac{4}{100}\right)^2$ = 216320 Rs. Compound interest after 1st year = 216320 - 200000 = 16320 Rs. Interest paid after 1st year = 10320 Rs. Outstanding interest after 1st year = 16320 - 10320 = 6000 Rs. Outstanding amount that has to be paid after 1st year = P + remaining interest = 200000 + 6000 = Rs.206000 Rs. Compound amount after two more years $= 206000\left(1+\frac{4}{100}\right)^4$ = 240991 Rs. (approx.) C.I. of last 2 years = 40991 C.I. paid in all 3 years = 10320 + 40991 = 51311 Rs.
58.	Let Jayant buy x white shirts and y blue shirts. So, Total CP = 1000 x + 1125y …… (1) Where x & y are natural numbers. Now, let us find effective profit percentage. Jayant earns by selling all the shirts. Let total CP = 100 MP = 25% more than 100 = 125 D % = 10% Discount = $\frac{10}{100}\times 125 = 12.5$ Then S.P. = 125 - 12.5 = 112.5 So, profit = 112.5 - 100 = 12.5. i.e. effective profit % = 12.5% Given in the question, total profit made is 51000 Rs. So, $\frac{12.5}{100}\times(1000x+1125y) = 51000$…… (from (1) ⇒ 1000 x + 1125 y = 408000 Rs. …… (2) Now we need to maximize (x + y) stipulated to condition (2) ⇒ 1125 y = 408000 - 1000 x ⇒ 9 × 125 y = 3 × 125 × 1088 - 125×8 x ⇒ 9y = 3264 - 8x ⇒ 9y = 8 (408 - x) i.e. y should be a multiple of 8. If y = 8, x = 399 & x + y = 407 If y = 16, y = 390 & x + y = 406 If y = 24, y = 381 & x + y = 405…. So, maximum possible value of x + y = 407. **Alternate approach** Let average cost of all shirts = 4a

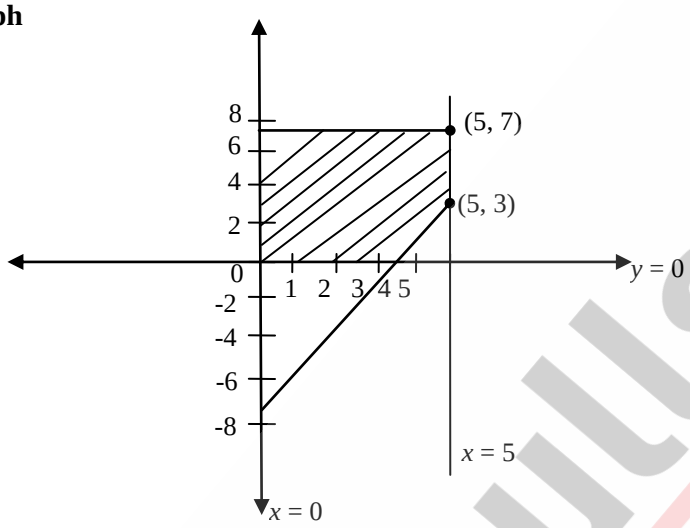
	Then average MP = 4a + 25% of 4a = 5a Average S.P. = $5a - \frac{10}{100}(5a) = 4.5a$ Average Profit = S.P. - C.P. = 0.5a Let the total number of shirts = n Then n (0.5) a = 51000 $\Rightarrow$ an = 102000 …… (1) Now n has to be maximized i.e. a has to be minimized i.e. 4a has to be minimized. i.e. 4a > 1000 $\Rightarrow$ a > 250 $\Rightarrow \frac{102000}{n} > 250$ …….(from (1)) $\Rightarrow$ n < 408 n_{max} = 407
59.	Let the total amount = 352 n According to give condition, 352n = 2 × 506 + (n - 2)y ; y ≤ 330 Where y = per head money received by other people $\Rightarrow \frac{352n-1012}{n-2} = y$ $\Rightarrow \frac{352n-1012}{n-2} \le 330$ $\Rightarrow \frac{352n-1012-330n+660}{n-2} \le 0$ $\Rightarrow \frac{22n-352}{n-2} \le 0$ $\Rightarrow \frac{n-16}{n-2} \le 0$ $\Rightarrow \frac{(n-16)(n-2)}{(n-2)^2} \le 0 \Rightarrow (n-16)(n-2) \le 0$ $\Rightarrow 2 \le n \le 16$ So, the maximum possible value of n = 16.
60.	According to question, M < 50% of total Every time 4 litres out of 40 i.e. 1/10th is removed. Suppose the process is repeated n number of times. So, the remaining milk $= 1 \times \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10} \ldots\ldots$ n times $< \frac{1}{2}$ $\Rightarrow \left(\frac{9}{10}\right)^n < \frac{1}{2}$ By hit and trial, we can see minimum value of n = 7
61.	Given AC : BC = a : b So, let us assume AC = ax, BC = bx Since angle made in semi-circle is 90° So, $AC^2 + BC^2 = AB^2$ $\Rightarrow (ax)^2 + (bx)^2 = (2r)^2$ $\Rightarrow x^2 = \frac{4r^2}{a^2+b^2}$ 

	Ar. $(\Delta ABC) = \frac{1}{2}(ax)(bx) = \frac{1}{2}(abx^2) = \frac{1}{2}ab(\frac{4r^2}{a^2+b^2}) = \frac{2abr^2}{a^2+b^2}$
62.	 Given area of □ AQCD = 4 (Area of ΔABP) = 4k. Where we have assumed area of ΔABP = K Now Ar. (ABP), Ar. (APQ) & Ar. (AQCD) make a G.P. ⇒ k , ?, 4k make a G.P. So, definitely Ar. (APQ) = 2k Now 4 k - m = Ar. (ADC) = half of the rectangle = Ar. (ΔACB) = 3k + m ⇒ 4k - m = 3 k + m ⇒ k = 2m Now the rectangle looks like  Now Ar. (APB) : Ar. (AQP): Ar. (ACQ) $= \frac{1}{2}AB \cdot BP : \frac{1}{2}AB \cdot PQ : \frac{1}{2}AB \cdot CQ$ $= BP : PQ : CQ = K : 2k : \frac{k}{2} = 2 : 4 : 1$
63.	**Case 1:** When x - y > 0 & x - 5 > 0 Equation becomes, x - y - (x - 5) = 2 ⇒ y = 3 where x > 5 and x > y **Case 2:** When x - y < 0 and x - 5 < 0 ⇒ x < y and x < 5 So, equation becomes, - (x - y) + (x - 5) = 2 ⇒ y = 7 where x < 5 and x < y **Case 3:** When x - y < 0 & x - 5 > 0 ⇒ x < y & x > 5

So, equation becomes
$-(x - y) - (x - 5) = 2$
$\Rightarrow y - 2x = -3 \Rightarrow 2x - y = 3, x < y, x > 5$

Case 4: When $x - y > 0$ and $x - 5 < 0$
$\Rightarrow x > y$ and $x < 5$
So, equation becomes
$x - y + x - 5 = 2$
$\Rightarrow 2x - y = 7$ where $x > y$ and $x < 5$

Graph



So, we can see the required figure is a trapezium.
So required area is 1/2. (14 + 4) 5 = 45

64. Let both the series are
$a, a + q, a + 2q \ldots\ldots = a_1, a_2, a_3 \ldots\ldots$
and $b, b + p, b + 2p \ldots\ldots = b_1, b_2, b_3 \ldots\ldots$
Where p & q are prime nos.
Given $b_2 = 0 \Rightarrow b + p = 0 \Rightarrow b = -p$
So, the series becomes,
$-p, 0, p, 2p, \ldots\ldots$ = bn series.
Now, $b_{19} = -p + (19 - 1)p = 17p$.
And similarly $b_9 = 7p$
$a_5 = b_9 = 7p$ & $a_{19} = b_{19} = 17p$
$\Rightarrow a + 4q = 7p$ and $a + 18q = 17p$
By solving both eqns, we will get $q = \frac{5}{7}p$
Since p & q are primes; So, p = 7, q = 5 & a = 29.
So, $a_{11} = a + 10q = 29 + 10(5) = 79$ Ans.

65. Since $2pq - 20 = 52 - 2pq$
$\Rightarrow 4pq = 72 \Rightarrow pq = 18$
Also, $p^2 + q^2 - 29 = 2pq - 20$
$\Rightarrow p^2 + q^2 = 36 - 20 + 29 = 45$.
Now $p^3 - q^3 = (p - q)(p^2 + q^2 + pq)$
$= (p - q)(45 + 18) = 63(p - q) \ldots\ldots$ (1)
Also, $p^2 + q^2 - 29 = 2pq - 20$
$\Rightarrow p^2 + q^2 - 2pq = 9$
$\Rightarrow (p - q)^2 = 9 \Rightarrow p - q = \pm 3 \ldots\ldots\ldots\ldots$ (2)
Combining (1) & (2),
$(p^3 - q^3)_{max} = 63 \times 3 = 189$

	$(p^3 - q^3)_{min} = 63 \times (-3) = -189$ So, required difference = 189 - (- 189) = 378 answer.
66.	$a_n = 13 + 6(n-1) = 6n + 7 = 7, 13, 19, 25, 31, 37, 43\ldots$ $b_n = 15 + 7(n-1) = 8 + 7n = 8, 15, 22, 29, 36, 43\ldots..$ Since, we are looking for common terms. First common term is 43. All the common terms should be in the form of n(L.C.M. (6, 7)) + 43 = 42n + 43. Now $42n + 43 < 1000$ $\Rightarrow 42n < 957$ $\Rightarrow n < \frac{957}{42}$ $\Rightarrow n < 22.7\ldots\ldots$ $\Rightarrow$ the largest possible value of n = 22. So, the largest 3 digit integer = 42n + 43 = 42 (22) + 43 = 967.

Actual CAT 2023 Slot - III

SECTION: VERBAL ABILITY

DIRECTIONS *for the questions 1 to 4:* *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 analyzes 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 analyzing 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% century chemist Friedrich August Kekulé'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 behavior is also underexplored. Pinker recognizes 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.

1. The author endorses Pinker's views on the importance of logical reasoning as it:

1. focuses public attention on real issues like development rather than sensational events.
2. provides a moral compass for resolving important ethical dilemmas.
3. helps people to gain expertise in statistics and other scientific disciplines.
4. equips people with the ability to tackle challenging practical problems.

2. 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. an awareness of underlying assumptions in an argument and gaps in one's own knowledge.
3. arriving at independent conclusions irrespective of who is presenting the argument.
4. the primacy of conscious sequential reasoning as the basis for seminal human achievements.

3. The author refers to the ancient Greek philosophers to:

1. indicate the various similarities between their thinking and Pinker's conclusions.
2. reveal gaps in Pinker's discussion of the importance of ethical considerations in rational behaviour.
3. highlight the influence of their thinking on the development of Pinker's arguments.
4. show how dreams and visions have for centuries influenced subconscious behaviour and path breaking inventions.

4. The author mentions Kekulé'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.

DIRECTIONS *for the questions 5 to 8:* *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 um that had been a museum draw since 1972. In 2007, the Getty [art museum in the US] agreed to retum 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 19t and early 20th century — an era former Met director Thomas Having 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, non governmental organizations 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.

5. Which one of the following statements, if true, would undermine the central idea of the passage?

1. Museums established in economically deprived archaeologically-rich source countries can display the antiques discovered there.
2. Affluent archaeologically-rich source countries can afford to carry out their own excavations.
3. UNESCO finances archaeological research in poor, but archaeologically-rich source countries.
4. Western countries will have to apologise to countries for looting their cultural property in the past century.

6. 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 aimed at protecting cultural property, but instead reduced business for auctioneers like Sotheby's.
3. They were intended to protect cultural property, but instead resulted in the withholding of national treasure from museums.
4. They were intended to protect cultural property, but instead resulted in the neglect of historical sites.

7. It can be inferred from the passage that archaeological sites are considered important by some source countries because they:

1. give a boost to the tourism sector.
2. are subject to strict patrimony laws.
3. generate funds for future discoveries.
4. are a symbol of Western imperialism.

8. 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. fund institutes in other countries to undertake archaeological exploration in the source country reaping the benefits of cutting-edge techniques.
4. to find ways to motivate other countries to finance archaeological explorations in their country.

DIRECTIONS *for the questions 9 to 12:* *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 characterizing 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 characterize 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 characterizing 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 characterization: "[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 characterize 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 characterize romanticism, not in terms of a single definition, a specific time, or a specific place, but in terms of "particular philosophical questions and concems" . . .

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.

9. Which one of the following statements is NOT supported by the passage?

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

10. According to the passage, recent studies on romanticism avoid "a single definition, a specific time, or a specific place" because they:

1. prefer to focus on the fundamental concerns of the romantics.
2. seek to discredit Lovejoy's scepticism regarding romanticism.

3. understand that the variety of romanticisms renders a general analysis impossible.
4. prefer to highlight the paradox of romantic aesthetics as a concept.

11. The main difficulty in studying romanticism is the:

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

12. According to the romantics, aesthetics:

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

DIRECTIONS *for the questions 13 to 16:* *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 18th century and worsened with the mass adoption of oil and natural gas in the 20th, Ghosh takes this history at least three centuries back, to the start of European colonialism in the 15% 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. 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.

13. 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 global dominance of oil economies and international politics built around it.
4. The decentralised characteristic of renewable energy resources like solar power.

14. Which one of the following, if true, would make the reviewer's choice of the pronoun "who" for Gala Inappropriate?

1. There is a direct cause—effect relationship between human activities and global climate change.
2. Ghosh's book has a different title: "The Nutmeg's Revenge".
3. Modem western science discovers new evidence for the Earth being an inanimate object.
4. Non-European societies have perceived the Earth as a non-living source of all resources.

15. 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 how systemic violence against the colonized constituted the cornerstone of colonialism.
2. To illustrate the first instance in history when the processes responsible for climate change were initiated.
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.

16. All of the following can be inferred from the reviewer's discussion of "The Nutmeg"s Curse", EXCEPT:

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

DIRECTIONS *for the questions 17 to 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.* 423-66

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

Paragraph : ___ (A)___. 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 favor of the conclusion), an act of concluding, and a stated or implicit marker ("hence", "therefore) that indicates that the conclusion follows from the premises.__ (B)___. 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).__ (C)___. 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. (D).

1. A 2. B 3. C 4. D

18. **Sentence:** Beyond undermining the monopoly of the State on the use of force, armed conflict also creates an environment that can enable organized crime to prosper.
Paragraph: __(1)___. Linkages between illicit arms, organized 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 'criminalized peace' that obstructs sustainable peace building efforts. (4)___.

1. A 2. B 3. C 4. D

DIRECTIONS *for the questions 19 to 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.*

19. 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 senlor recrulter at Cenlar FSB.

20.
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 colonized 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.

DIRECTIONS *for the questions 21 to 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.*

21. 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.

22. 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 memorization 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 memorization gradually gave way to reading and learning no longer required the presence of a mentor; it could be done privately.

DIRECTIONS *for the questions 23 to 24:* *The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.*

23. 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. 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.
3. The image of perfectionism is reflected in and perpetuated by the media; and people do their best to adhere to these ideals.
4. 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.

24. 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. 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.
2. There is a huge positive transformation of the ecosystem of the island when brought under environmental protection.
3. There is an increasing number of predatory birds and plants on the island despite the presence of pests which is a positive development.
4. Flowering plants, herbs and birds are now being protected on this wonderful Antarctic island.

SECTION: DI & REASONING

DIRECTIONS *for the questions 25 to 29:* *Read the information given below and answer the question that follows.*

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.

25. How many Split Inverter ACs did D2 sell?

26. What percentage of ACs sold were of Non-Inverter type?

27. What was the total number of ACs sold by D2 and D4?

28. Which of the following statements is necessarily false?

1. D1 and D3 together sold more ACs as compared to D2 and D4 together.
2. D4 sold more Split ACs as compared to D3.
3. D2 sold the highest number of ACs.
4. D1 and D3 sold an equal number of Split ACs.

29. If D3 and D4 sold an equal number of ACs, then what was the number of Non-Inverter ACs sold by D2?

1.5 2.7 3.6 4.4

DIRECTIONS *for the questions 30 to 34:* *Read the information given below and answer the question that follows.*

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.
1. The minimum, maximum and the average of both project and test scores were identical —40, 80 and 60, respectively.
2. 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.
3. 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.
4. Shyamal scored the second highest in the test. He scored two more than Koli, but two less than Amala in the aggregate.
5. Biman scored the second lowest in the test and the lowest in the aggregate.
6. Mathew scored more than Rini in the project, but less than her in the test.

30. What was Rini's score in the project?

31. What was the weight of the test component?

1. 0.50 2. 0.60 3. 0.40 4. 075

32. What was the maximum aggregate score obtained by the students?

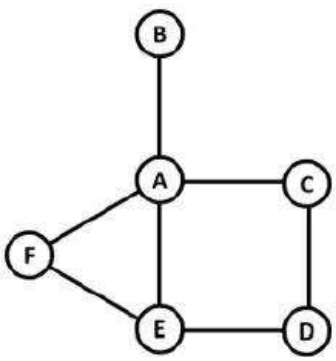
1.68 2.80 3.66 4.62

33. What was Mathew's score in the test?

34. Which of the following pairs of students were part of the same project team?
i) Amala and Biman
ii) Koli and Mathew

1. Both (i) and (ii)
2. Only (ii)
3. Neither (i) nor (ii)
4. Only (i)

DIRECTIONS *for the questions 35 to 39:* *Read the information given below and answer the question that follows.*
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 hrs and 12:00 hrs 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 hrs and must return to Station A by 12:00 hrs. They can also pass via Station A at any point on their journeys.
The following facts are known.
1. None of the streets has more than one team traveling along it in any direction at any point in time.
2. Teams 2 and 3 are the only ones in stations E and D respectively at 10:00 hrs.
3. Teams 1 and 3 are the only ones in station E at 10:30 hrs.
4. Teams 1 and 4 are the only ones in stations B and E respectively at 11:30 hrs.
5. Team 1 and Team 4 are the only teams that patrol the street connecting stations A and E.
6. Team 4 never passes through Stations B, D or F.

35. Which one among the following stations is visited the largest number of times?

1. Station F
2. Station C
3. Station D
4. Station E

36. How many times do the teams pass through Station B in a day?

37. Which team patrols the street connecting Stations D and E at 10:15 hrs?

1. Team 3
2. Team 4
3. Team 2
4. Team 1

38. How many times does Team 4 pass through Station E in a day?

39. How many teams pass through Station C in a day?

1. 1.4
2. 2.1
3. 3.2
4. 4.3

DIRECTIONS ***for the questions 40 to 44:*** *Read the information given below and answer the question that follows.*

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**
Online	40	100	80
Offline	30	80	50
Total	110	130	120

40. What was the total number of registrations in April?

41. What was the number of online registrations in January?

42. 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.

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

43. What best can be concluded about the number of offline registrations in February?

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

44. Which pair of months definitely had the same total number of registrations?

I. January and April
II. February and May

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

SECTION: QUANTITATIVE ABILITY

DIRECTIONS *for the questions 45-66:* *Solve the following question and mark the best possible option.*

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

46. 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. $30\sqrt{5}$
2. $34\sqrt{5}$
3. $40\sqrt{5}$
4. $36\sqrt{5}$

47. 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. 25
2. 33
3. 55
4. 15

48. 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. 16
2. 44
3. 14
4. 42

49. 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

50. 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

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

52. 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. 17 2. 24 3. 16 4. 21

53. 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. 17 2. 16 3. 21 4. 20

54. The population of a town in 2020 was 100000. 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. 72000 2. 75000 3. 74000 4. 73000

55. A merchant purchases a cloth at a rate of Rs.100 per meter 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 Rs.110 per meter 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. 15.5% 2. 4.2% 3. 9.7% 4. 16%

56. 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. 0.5 4. 1.5

57. A boat takes 2 hours to travel downstream a river from port A to port B, and 3 hours to return to port A. Another boat takes a total of 6 hours to travel from port B to port A and return to port 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 port A to port B is

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

58. 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

59. 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

60. 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

61. Let ΔABC 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 $\angle AOB = 105°$, then $\frac{AD}{AB}$ equals

1. $\cos 15°$
2. $2 \sin 15°$
3. $2 \cos 15°$
4. $\sin 15°$

62. 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. $\sqrt{5}:1$
2. 2 : 1
3. $\sqrt{2}:1$
4. 1 : 1

63. In a regular polygon, any interior angle exceeds the exterior angle by 120 degrees. Then, the number of diagonals of this polygon is

64. The value of $1+\left(1+\frac{1}{3}\right)\frac{1}{4}+\left(1+\frac{1}{3}+\frac{1}{9}\right)\frac{1}{16}+\left(1+\frac{1}{3}+\frac{1}{9}+\frac{1}{27}\right)\frac{1}{64}+\ldots.$, is

1. $\frac{27}{12}$
2. $\frac{15}{8}$
3. $\frac{16}{11}$
4. $\frac{15}{13}$

65. 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. 15000
2. 14900
3. 14602
4. 14798

66. 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 & Explanations

Q.	Key	Explanation
1.	4	The passage emphasizes Pinker's focus on how rationality improves decision-making in various real-world contexts. - 1 is incorrect because the passage doesn't specifically link Pinker's views to public attention on development issues. - 2 is incorrect as the passage suggests that Pinker doesn't fully develop the ethical dimensions of rationality. - 3 is incorrect because, although Pinker discusses statistics, the passage doesn't limit his views on rationality to gaining expertise in scientific disciplines.
2.	4	The passage suggests that Pinker's focus on conscious reasoning contrasts with the role of epiphanies in significant achievements, a point not fully aligned with ancient philosophers. - 1 is incorrect to eliminate because both Pinker and the philosophers recognize an ethical dimension to rationality. - 2 is incorrect to eliminate as awareness of assumptions and knowledge gaps is central to both Pinker's and the philosophers' views. - 3 is incorrect to eliminate because independent conclusions regardless of speaker authority are in line with both Pinker's and the philosophers' rational approach.
3.	2	The author highlights that Pinker's treatment of the moral aspects of rationality is less developed compared to ancient philosophers. - 1 is incorrect because the author doesn't focus on similarities but rather on Pinker's lack of depth compared to the philosophers. - 3 is incorrect because there's no explicit mention of the philosophers' influence on Pinker's arguments. - 4 is incorrect as the reference to philosophers is more about ethical and rational thinking, not about dreams and visions.
4.	2	These examples are used to show that significant achievements can arise from intuitive insights, not just conscious reasoning. - 1 is incorrect because the passage doesn't make a distinction between sciences and other fields in the context of these achievements. - 3 is incorrect as it focuses narrowly on scientific fields, whereas the passage discusses broader domains including music and arts. - 4 is incorrect because the passage doesn't suggest that European achievements contradict Pinker's views; rather, it highlights the role of intuition alongside reasoning.
5.	3	The central idea is that strict cultural property laws diminish archaeological discoveries. If UNESCO finances research, it counters the negative impact of these laws. - 1 is incorrect because museums in source countries displaying antiques align with the passage's emphasis on cultural property laws. - 2 is incorrect as it doesn't undermine the central idea; the passage focuses on poor countries. - 4 is incorrect because apologies from Western countries don't directly address the issue of reduced archaeological discoveries.
6.	1	The paradox in the passage is that while patrimony laws were meant to protect artifacts, they led to fewer discoveries. - 2 is incorrect as it focuses on auctioneers, which is not the central paradox discussed. - 3 is incorrect because the withholding of treasures from museums is not the paradox addressed. - 4 is incorrect as it suggests neglect of historical sites, which is not the main issue presented in the passage.
7.	1	The passage mentions that new archaeological discoveries typically increase tourism and enhance cultural pride. - 2 is incorrect as it's the strictness of the laws, not the laws themselves, that's a

		concern. - 3 is incorrect because generating funds for future discoveries isn't directly stated as a reason for their importance. - 4 is incorrect as Western imperialism is not cited as a reason for their importance in the passage.
8.	3	The author advocates for collaborative international archaeological research but does not suggest allowing foreign countries to exhibit artifacts found in the source countries. - 2 is incorrect to eliminate because the author praises China's approach of dropping restrictive laws and engaging in international collaboration. - 3 is incorrect to eliminate as it aligns with the author's suggestion of using foreign expertise. - 4 is incorrect to eliminate because it aligns with the author's suggestion to incentivize foreign investment in archaeological explorations.
9.	3	The passage mentions that recent studies do not overlook the differences between national romanticisms but characterize them in terms of philosophical questions and concerns. - 1 is incorrect to eliminate as the passage supports the idea that characterizing romantic aesthetics is both possible and desirable. - 2 is incorrect to eliminate because the passage states that romantic aesthetics are often expressed through fragments, aphorisms, and poems. - 4 is incorrect to eliminate as the passage mentions that many romantics rejected the idea of aesthetics as a separate domain.
10.	1	The passage suggests that recent studies characterize romanticism in terms of "particular philosophical questions and concerns" rather than a single definition or specific time/place. - 2 is incorrect because discrediting Lovejoy's skepticism is not the stated reason for their approach. - 3 is incorrect as the passage doesn't suggest that a general analysis is impossible. - 4 is incorrect because the passage does not indicate that recent studies prefer to highlight the paradox of romantic aesthetics.
11.	4	The passage quotes Lovejoy, who pointed out the difficulty due to the lack of a "single real entity, or type of entity" that romanticism designates, indicating unclear conceptual contours. - 1 is incorrect because the passage doesn't describe the history of romantic literature as controversial or scandalous. - 2 is incorrect because the elusive nature of romantic aesthetics is a challenge, but not the main difficulty. - 3 is incorrect as the passage does not suggest the absence of written accounts as the main difficulty.
12.	2	The passage states that the most characteristic romantic commitment is the idea that the character of art and beauty should shape all aspects of human life. - 1 is incorrect because the passage explicitly states that many romantics rejected this view. - 3 is incorrect as the passage suggests that beauty and art should be central in the lives of ordinary people, not just philosophers and artists. - 4 is incorrect because the passage does not suggest that aesthetics is considered irrelevant to human existence.
13.	4	The passage does not suggest that the decentralized nature of renewable resources like solar power is a reason for the failure of climate change policies. Instead, it points to power utilities sabotaging decentralized solar power for their own interests.

		- 1 is incorrect to eliminate because the marginalization of non-European perspectives is mentioned as a contributing factor to policy failures. - 2 is incorrect to eliminate as it's mentioned that greed benefiting from non-renewable resources is a challenge. - 3 is incorrect to eliminate because the global dominance of oil economies is discussed as a significant hurdle.
14.	4	The use of the pronoun "who" for Gaia reflects a view of the Earth as a living entity, which is aligned with Ghosh's incorporation of non-European perspectives on the Earth. If it were true that non-European societies predominantly perceived the Earth as a non-living resource, this would contradict the basis for using a pronoun that implies personification, making its use inappropriate. - 1 is incorrect because establishing a cause-effect relationship between human activities and climate change aligns with personifying the Earth, not contradicting it. - 2 is incorrect as the title of Ghosh's book is irrelevant to the appropriateness of the pronoun for Gaia. - 3 is incorrect because new evidence from modern western science about the Earth being inanimate does not directly relate to the use of the pronoun in the context of Ghosh's focus on non-European perspectives.
15.	3	The passage suggests that the colonization of the Banda Islands by the Dutch is used by Ghosh as an example of how European colonialism's view of Earth as a resource to exploit contributed to the current climate crisis. - 1 is incorrect because systemic violence is not the main focus of the discussion in the context of climate change. - 2 is incorrect as the passage does not imply that this was the first historical instance of climate change processes. - 4 is incorrect because the passage does not primarily focus on the role of crop cultivation in contributing to climate change.
16.	4	The passage suggests that academic discourses have often supported the viewpoints of colonialists and their backers, rather than consistently raising awareness about environmental preservation. - 1 is incorrect to eliminate as the passage implies a connection between colonialism and climate change. - 2 is incorrect to eliminate because the passage suggests that contemporary perceptions of nature are rooted in colonialist processes. - 3 is incorrect to eliminate as it's implied that there is much to learn from non-European and pre-colonial societies regarding environmental policy.
17.	2	The sentence fits best at position (C). The paragraph initially discusses how an argument can be defined and how the relation of support between premises and conclusion works. After these theoretical definitions and views, the sentence at C provides a contrasting perspective by suggesting a shift from theoretical abstraction to considering arguments within the context of actual human activities. It serves as a transitional statement that bridges the more abstract, theoretical discussion of arguments with their practical, real-world applications, as mentioned in the final sentence of the paragraph. - (A) is incorrect because the beginning of the paragraph is already defining an argument, and the missing sentence would be out of context as an introduction. - (B) is incorrect because it continues the theoretical discussion on how premises support conclusions, and the missing sentence introduces a different perspective. - (D) is incorrect as it is the conclusion of the paragraph where the focus shifts to the

		practical applications of arguments in human communication, and the sentence would be out of place here.
18.	2	The paragraph introduces the interconnected nature of different elements and their collective impact on violence and governance. It further Delves into how criminal activities can financially fuel armed conflicts, supporting NSAGs. Finally Concluding with the aftermath of conflicts, discussing the surplus arms and the challenges in achieving sustainable peace. The right placement of the given sentence should be 3rd blank as the sentence Expands on the consequences of armed conflicts by highlighting how they weaken state control and foster an environment conducive to organized crime. This can be seen as a continuation of the idea that armed conflicts provide financial streams to NSAGs, indicating a broader socio-political impact.
19.	2	Sentence 2 is the odd one out as sentence 1 introduces the shift from a focus on hafd skills to incorporating soft skills in hiring. Sentence 3 provides specific examples of the soft skils that companies are now seeking. Sentence 4 adds a balance to the discussion, acknowledging that while there's a shift towards soft skills, hard skills are still necessary in certain jobs. Sentence 5 provides a contextual reason (the pandemic) for the shift towards soft skills, rounding off the discussion on changing hiring practices. In this arrangement, sentence 2 seems less connected.
20.	2	Sentence 2, while related to the broader theme of indigenous populations and their decline, is more focused on the historical context of colonization and its impact on the indigenous population as a whole, rather than specifically on the Bo language or its speakers. Therefore, the odd sentence should be 2 It addresses the broader historical context of the decline of the indigenous population due to colonization, which, although related, does not directly tie into the specific narrative about the Bo language and its last speaker, which is the central theme in the other sentences.
21.	3142	The correct sequence is 3-1-4-2 3rd sentence sets the stage by introducing the issue of e-waste and its potential for recycling. It identifies the problem, making it a natural starting point for the paragraph. 1st sentence introduces Veena Sahajwalla and her belief in a new solution to this problem. This builds on the context provided in sentence 3. 4th sentence describes Sahajwalla's specific plan to address the e-waste problem, which logically follows her introduction and her belief in a new solution. 2nd sentence provides the detailed method of how Sahajwalla's plan (introduced in sentence 4) will be executed, making it an appropriate conclusion to the paragraph. In this sequence, the paragraph flows logically from identifying the broader issue (e-waste recycling), to introducing an expert who believes in a new solution, to outlining her specific plan, and finally detailing the execution of that plan.
22.	3421	The correct sequence is: 2-4-3-1 - Start with sentence 2, which sets the historical context of learning methods before the printing press. Continue with sentence 4, which describes the direct impact of the printing press on learning. Follow with sentence 3, which elaborates on the broader cultural shift to reading and literacy. Conclude with sentence 1, which brings the discussion to the present day, showing the lasting influence of these historical changes.
23.	2	The passage discusses how societal expectations of perfectionism have shifted over time. In the 1950s, perfectionism was about conforming to the mass culture's norms, while contemporary perfectionism involves standing out through individuality. This summary effectively encapsulates this evolution from conformism to non-conformism. The essence is captured by 2nd option only. 1 is incorrect because it oversimplifies the passage's focus on perfectionism as a means to attract attention, which is not the main point. 3 is incorrect

<table>
<tr><td></td><td></td><td>as it focuses solely on the role of media in reflecting and perpetuating perfectionism, while the passage discusses a broader societal shift in the concept of perfectionism. 4 is incorrect because it emphasizes the tension and conflict arising from the changing definition of perfectionism, which isn't the central focus of the passage. The passage is more about the evolution of what constitutes perfectionism rather than the conflicts it causes.</td></tr>
<tr><td>24.</td><td>1</td><td>Option 1 effectively encapsulates the main idea of the passage, which is the improvement in the island's ecosystem, particularly the increase in bird populations and plant growth, following the reduction or absence of pests. It covers both the revival of birds and the positive impact on the plant life. 2 is incorrect because it overemphasizes the aspect of environmental protection without specifically mentioning the crucial role of the absence of pests, which is a key point in the passage. 3 is incorrect as it inaccurately suggests an increase in predatory birds due to pests, which contradicts the passage's focus on the recovery of the ecosystem after the reduction of pests. 4 is incorrect because it narrows the focus to only the protection of plants and birds, missing the broader ecological improvement and the interconnectedness of various elements in the ecosystem described in the passage.</td></tr>
<tr><td>25-29</td><td></td><td>From the information and conditions, we can make the following table
<table>
<tr><td></td><td colspan="2">Window</td><td colspan="2">Split</td></tr>
<tr><td></td><td>INV</td><td>Non INV</td><td>NON INV</td><td>NON INV</td></tr>
<tr><td>D1</td><td>x</td><td>0</td><td>13-x</td><td>3x-13</td></tr>
<tr><td>D2</td><td>3k-2y</td><td>2y</td><td>2z</td><td>a</td></tr>
<tr><td>D3</td><td>k-y</td><td>y</td><td>z</td><td>5-y</td></tr>
<tr><td>D4</td><td>k</td><td>0</td><td>z</td><td>b</td></tr>
<tr><td>Total</td><td>9</td><td>6</td><td>36</td><td>9</td></tr>
</table>
From window in Non inv we get the value of y as 2. Also only possible value of k is 2. So we get the value of x as 5. From that we get the value of z as 7 so finally we are left with a + b as 4
So final table is :
<table>
<tr><td></td><td colspan="2">Window</td><td colspan="2">Split</td></tr>
<tr><td></td><td>INV</td><td>Non INV</td><td>NON INV</td><td>NON INV</td></tr>
<tr><td>D1</td><td>5</td><td>0</td><td>8</td><td>2</td></tr>
<tr><td>D2</td><td>2</td><td>4</td><td>14</td><td>a</td></tr>
<tr><td>D3</td><td>0</td><td>2</td><td>7</td><td>3</td></tr>
<tr><td>D4</td><td>2</td><td>0</td><td>7</td><td>b</td></tr>
<tr><td>Total</td><td>9</td><td>6</td><td>36</td><td>9</td></tr>
</table></td></tr>
<tr><td>25.</td><td>14</td><td>As shown D2 sell 14 non invertor split AC</td></tr>
<tr><td>26.</td><td>25</td><td>Non invertor ac = 6 + 9 = 15 so required percentage = 15/60 × 100 = 25%</td></tr>
<tr><td>27.</td><td>33</td><td>Ac sold by D2 and D4 = 2 + 4 + 2 + 14 + 7 + a + b = 33
(a + b =4)</td></tr>
<tr><td>28.</td><td>1</td><td>D1 and D3 = 60 - 33 = 27
So option 1 is false</td></tr>
<tr><td>29.</td><td>1</td><td>In this case b =3 and a = 1
So non invertor by D2 = 4 + 1 =5</td></tr>
<tr><td>30. - 34.</td><td></td><td>Step 1 :
As project is in group having one male and one female and having same scores. So possible scores are 40,40,60,60,80 and 80 and two members in same group have same scores</td></tr>
</table>

Step 2:
As test is done without team and two have average score i.e. 60 and rest distinct and multiple of 10 so possible scores are 40,50,60,70 and 80
Now from the conditions given we can conclude as
Project

GROUP	MALE	FEMALE	SCORE(EACH)
I	Mathew	Amla	80
II	Bimal	Koli	40
III	Shyam lal	Rani	60

Now to fill table for test we need to have the idea of weights that could have been taken from the question2 as hint and put 60% as weight for test and 40% for project and checking condition 4 , would have solved the block and table for test is shown below

TEST

NAME	SCORE
Koli	80
Shyam lal	70
Rini	60
Amla	60
Bimal	50
Mathew	40

30.	60	As shown, it is 60
31.	2	As shown, it is 0.60
32.	1	It is for Amla i.e. 80 x 0.4 +60 x 0.6 =32+36 =68
33.	40	As shown, it is 40
34.	3	It is neither
35. - 39		**STEP 1** Taking 9:00 and 12:00 as A for all teams **STEP 2** To do the placement as given in conditions 2 to 6 **STEP 3** Taking into consideration that no street has two teams at same time in any direction we can conclude the following

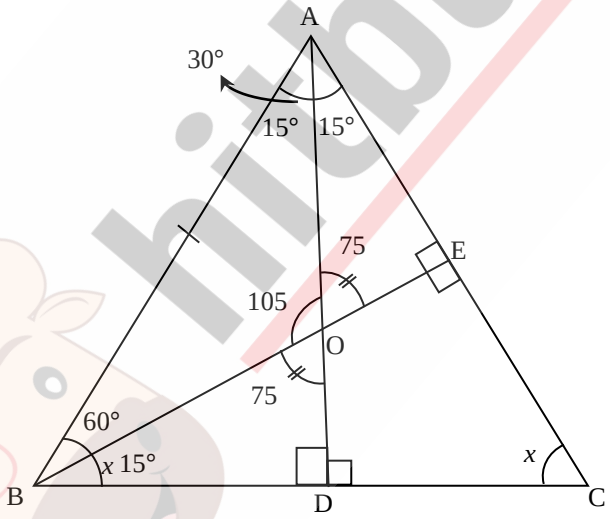
	9:00	9:30	10:00	10:30	11:00	11:30	12:00
Team 1	A	B	A	E	A	B	A
Team 2	A	F	E	F	A	F	A
Team 3	A	C	D	E	D	C	A
Team 4	A	E	A	C	A	E	A

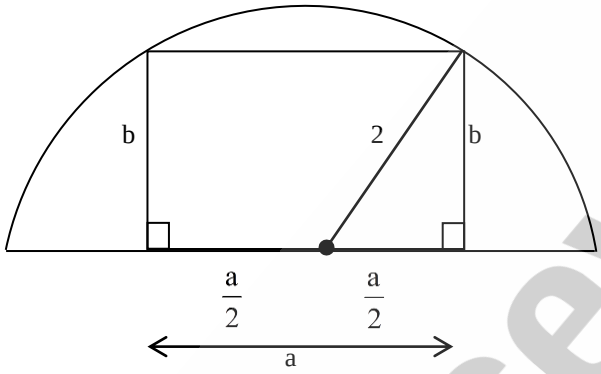
35.	4	Station E is visited largest number of times
36.	2	It is 2
37.	1	As shown between D and E at 10:15 it is team 3
38.	2	It is 2
39.	3	As shown option 3 is the answer.
40. - 44.		Considering the median into consideration and total of min , max and median following table is concluded

		<table><tr><td></td><td>Jan</td><td>Feb</td><td>March</td><td>April</td><td>May</td></tr><tr><td>online</td><td>40</td><td>80</td><td>50</td><td>80</td><td>100</td></tr><tr><td>offline</td><td>80</td><td>50</td><td>60</td><td>40</td><td>30</td></tr><tr><td></td><td>120</td><td>130</td><td>110</td><td>120</td><td>130</td></tr></table>
40.	120	As shown, it 40 +80 =120
41.	40	As shown, it is 40
42.	1	As shown, only 1 is true
43.	3	Number of offline registrations in Feb is 50
44.	3	Both I and II are true
45.	1	If 3 terms a, b and c are in AP, then we know that 2b = a + c. Using Base Change rule in this question, we can say that $\frac{\log_3(2^x-9)}{\log_3 4}$ can be written as $\log_4(2^x-9)$ and $\frac{\log_5(2^x+\frac{17}{2})}{\log_5 4}$ can be written as $\log_4(2^x+\frac{17}{2})$. Also $\frac{1}{2}$ can be written as $\log_4 2$. So we get the new terms as $\log_4 2$, $\log_4(2^x-9)$ and $\log_4(2^x+\frac{17}{2})$. Using the concept of AP, we get $2\times\log_4(2^x-9)=\log_4 2+\log_4(2^x+\frac{17}{2})$. $\Rightarrow \log_4(2^x-9)^2=\log_4[2(2^x+\frac{17}{2})]\Rightarrow(2^x-9)^2=2.2^x+17$. If we put $2^x=y$, we get $y^2-18y+81=2y+17\Rightarrow y^2-20y+64=0\Rightarrow(y-4)(y-16)=0$ $\Rightarrow y=4$ or $16\Rightarrow x=2$ or 4. But x = 2 is not valid because then (2^x-9) will become negative. Hence x = 4 is the right solution. So terms will be $\log_4 2$, $\log_4 7$. $\log_4(\frac{49}{2})$. $\Rightarrow$ common difference = $\log_4 7-\log_4 2=\log_4(\frac{7}{2})$.
46.	2	$x^8+\frac{1}{x^8}=47$. Let us put $x^4=a\Rightarrow a^2+\frac{1}{a^2}=47$ Now $(a+\frac{1}{a})^2=a^2+\frac{1}{a^2}+2\Rightarrow(a+\frac{1}{a})^2=49\Rightarrow a+\frac{1}{a}=7\Rightarrow x^4+\frac{1}{x^4}=7$ Put $x^2=b\Rightarrow b^2+\frac{1}{b^2}=47$. Now $(b+\frac{1}{b})^2=b^2+\frac{1}{b^2}+2\Rightarrow(b+\frac{1}{b})^2=9$ $\Rightarrow b+\frac{1}{b}=3\Rightarrow x^2+\frac{1}{x^2}=3$. Also $(x+\frac{1}{x})^2=x^2+\frac{1}{x^2}+2\Rightarrow(x+\frac{1}{x})^2=5\Rightarrow x+\frac{1}{x}=\sqrt{5}$ Now $(x+\frac{1}{x})^3=x^3+\frac{1}{x^3}+3(x+\frac{1}{x})\Rightarrow 5\sqrt{5}=x^3+\frac{1}{x^3}+3\sqrt{5}\Rightarrow x^3+\frac{1}{x^3}=2\sqrt{5}$ Lets put $x^3=d\Rightarrow d+\frac{1}{d}=2\sqrt{5}$.

		Now $x^9+\frac{1}{x^9}=d^3+\frac{1}{d^3}$ is to be calculated. $(d+\frac{1}{d})^3=d^3+\frac{1}{d^3}+3(d+\frac{1}{d})\Rightarrow 40\sqrt{5}=d^3+\frac{1}{d^3}+6\sqrt{5}\Rightarrow d^3+\frac{1}{d^3}=34\sqrt{5}$ $\Rightarrow x^9+\frac{1}{x^9}=34\sqrt{5}$
47.	2	$x + y = 4$ and $(a+5)x + (b^2 - 15)y = 8b$ have infinitely many solutions for x and y. Hence $\frac{a+5}{1}=\frac{b^2-15}{1}=\frac{8b}{4}$. So $b^2 - 15 = 2b \Rightarrow b^2 - 2b - 15 = 0 \Rightarrow (b - 5)(b+3) = 0 \Rightarrow b = 5$ or -3. Also $a + 5 = 2b \Rightarrow a + 5 = 10$ or $a + 5 = -6 \Rightarrow a = -11$ or 5. Maximum value of ab will be when we take a = -11 and b = -3. So maximum product = 33.
48.	1	$8^m = 2^{3m}$ and $8^n = 2^{3n}$. Smallest value of n + m is asked. So we will take m as $1 \Rightarrow 2^{3m} = 2^3$. Since there are 41 integers between 8^m and 8^n, so they would be $2^4, 2^5, \ldots$till 2^{44}. So 2^{3n} should be $2^{45} \Rightarrow n = 15$. Hence minimum value of n + m is 1 + 15 = 16.
49.	5	$5^{n-1} < 3^{n+1}$. n can take values from 1 to 5 because if n = 6, then we get $5^5 < 3^7$ which is wrong as 3125 is greater than 2187. Hence maximum value of n is 5. If we take n = 5, we get $3^{5+1} < 2^{5+m} \Rightarrow 729 < 2^{5+m} \Rightarrow$ m has to minimum 5 so that we get $729 < 2^{10}$ or $729 < 1024$. Hence answer is 5.
50.	9	$x^2 + bx + c = 0$. Let its roots be m and n. Hence $m + n = -b$ and $mn = c$. Also $\frac{1}{n}-\frac{1}{m}=\frac{1}{3}$ and $\frac{1}{n^2}+\frac{1}{m^2}=\frac{5}{9}$. Now $(\frac{1}{n}-\frac{1}{m})^2=\frac{1}{n^2}+\frac{1}{m^2}-\frac{2}{mn}\Rightarrow\frac{1}{9}=\frac{5}{9}-\frac{2}{mn}\Rightarrow mn=\frac{9}{2}$ $(\frac{1}{n}+\frac{1}{m})^2=\frac{1}{n^2}+\frac{1}{m^2}+\frac{2}{mn}\Rightarrow\frac{5}{9}+\frac{4}{9}=1$ $\Rightarrow\frac{1}{n}+\frac{1}{m}=1\Rightarrow\frac{m+n}{mn}=1\Rightarrow m+n=\frac{9}{2}\Rightarrow b=-\frac{9}{2}$ or $\frac{1}{n}+\frac{1}{m}=-1\Rightarrow\frac{m+n}{mn}=-1\Rightarrow m+n=-\frac{9}{2}\Rightarrow b=\frac{9}{2}\Rightarrow b+c=\frac{9}{2}+\frac{9}{2}=9$
51.	468	Number of factors in number $N = a^p \times b^q \times c^r \ldots\ldots$ where a, b and c are prime numbers. As numbers have 15 factors $\Rightarrow a^2 \times b^4$ form is possible only. $\Rightarrow 3^2 \times 2^4 = 144$ and $2^2 \times 3^4 = 324$ are the two numbers. Hence their sum = 144 + 324 = 468.
52.	1	Ratio of cocoa : sugar is 3 : 2 and ratio of coffee : sugar is 7 : 3. Total 5 litres of A has 3 litres of cocoa and 2 litres of sugar Total 10 litres of B has 7 litres of coffee and 3 litres of sugar Since A and B are mixed in the ratio 2 : 3, so total 15 litres will be divided in this ratio. Hence we take 6 litres of A and 9 litres of B. Quantity of cocoa will be $\frac{3}{5}\times 6$ = 3.6 litres (From A) Quantity of sugar will be $\frac{2}{5}\times 6$ = 2.4 litres (From A) Quantity of coffee will be $\frac{7}{10}\times 9$ = 6.3 litres (From B) Quantity of sugar will be $\frac{3}{10}\times 9$ = 2.7 litres (From B)

		Total mixture = 15 + 15 = 30 litres. Mixture C will have 3.6 litres cocoa, 6.3 litres coffee and 2.4 + 2.7 = 5.1 litres of sugar. Hence required percentage = $\frac{5.1}{30}\times 100 = 17\%$.
53.	3	Suppose Rahul takes a days, Rakshita takes b days and Gurmeet takes c days. As per the question, $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}<\frac{1}{7}$ .....(1) and $\frac{1}{a}+\frac{1}{c}>\frac{1}{15}$ .....(2). Also it is given that $6(\frac{1}{a}+\frac{1}{b}+\frac{1}{c})+\frac{3}{b}=1$.....(3). Putting the values from equation (1) and (2), we get $6(<\frac{1}{7})+\frac{3}{b}=1\Rightarrow \frac{3}{b}=1-(<\frac{1}{7})\Rightarrow$ $\frac{3}{b}>\frac{1}{7}\Rightarrow$ b < 21. Also $\frac{9}{b}+(>\frac{6}{15})=1\Rightarrow \frac{9}{b}=1-(>\frac{6}{15})\Rightarrow \frac{9}{b}<\frac{9}{15}\Rightarrow$ b > 15. Hence b can be 16, 17 and 20. So 21 is not possible.
54.	4	Population in 2020 = 100000 It is given that there is y% decrease in population from 2020 to 2021 and x% increase in population from 2021 to 2022. Also it is given that population of 2022 is greater than population of 2020. This means x is greater than y because had it been x = y, even then population of 2022 would have been less the population of 2020. Difference between x and y is 10. Minimum popuation in 2021 is to be calculated by options:: Option (1) which is 72000 ⇒ y = 28 and x = 38 ⇒ Population in 2022 = 72000 × 1.38 = 99360. Hence it is possible. Option (2) which is 75000 ⇒ y = 25 and x = 35 ⇒ Population in 2022 = 75000 × 1.35 = 101250. Hence it is possible. Option (3) which is 74000 ⇒ y = 26 and x = 36 ⇒ Population in 2022 = 74000 × 1.36 = 100640. Hence it is possible. Option (4) which is 73000 ⇒ y = 27 and x = 37 ⇒ Population in 2022 = 73000 × 1.37 = 100010. Since 100010 is minimum of all ⇒ 73000 is the answer.
55.	1	CP of cloth = 100 per metre. SP of cloth = 110 per metre. But he gets 5 cm free for 100 cm and also gives 95 cm instead of 100 cm. So he gets $\frac{5}{100}$ and $\frac{5}{95}$ extra ⇒ $\frac{1}{20}$ and $\frac{1}{19}$. So SP = $110\times(1+\frac{1}{20})(1+\frac{1}{19})$ But he gives 5% discount ⇒ Net SP = $110\times\frac{21}{20}\times\frac{20}{19}\times\frac{95}{100}$ = 115.5. So profit = 15.5%
56.	2	Let the average of A, B and C = a ⇒ A + B + C = 3a.....(1) Also $\frac{A+B+C+D}{4}$ = a – x .....(2) and $\frac{A+B+C+E}{4}$ = a + 2x .....(3) It is given that E – D = 12 ⇒ 3a + D = 4a – 4x ⇒ D = a – 4x. Also 3a + E = 4a + 8x ⇒ E = a + 8x. As E – D = 12, so a + 8x – a + 4x = 12 ⇒ x = 1.
57.	4	Let x be the speed of 1st boat in still water and y be the speed of river ⇒ speed of d/s = x + y and speed of u/s = x – y. As per the question, (x +y)2 = (x –y)3 ⇒ x +y : x – y = 3 : 2. Hence the ratio of speed of d/s : speed of u/s = 3 : 2 ⇒ x + y = 3 and x – y = 2 ⇒ x = 2.5 and y = 0.5 or x = 5 and y = 1⇒ Distance = (5 + 1)2 = 12 km Let the speed of the other boat = a ⇒ $\frac{12}{a-1}+\frac{12}{a+1}=6\Rightarrow a^2-1=4a\Rightarrow a^2-4a-1=0$ ⇒ a = $\frac{4\pm 2\sqrt{5}}{2}=2+\sqrt{5}$. Hence speed of slower boat = $2+\sqrt{5}$.

		Time taken by slower boat to reach from A to B is $\frac{12}{2+\sqrt{5}+1}=\frac{12}{3+\sqrt{5}}\times\frac{3-\sqrt{5}}{3-\sqrt{5}}=\frac{36-12\sqrt{5}}{4}$ $= 9 - 3\sqrt{5}$ $= 3(3 - \sqrt{5})$
58.	36	Let us assume the efficiency of Gautam as G and efficiency of Suhani as S. Hence we get the equation as (G + S)20 = (0.6G + 1.5S)20 ⇒ 4G = 5S ⇒ G : S = 5 : 4. So ratio of time taken by G and S will be in the ratio 4 : 5. Lets assume Gautam takes 4x days and Suhani takes 5x days to complete the work ⇒ $\frac{1}{4x}+\frac{1}{5x}=\frac{1}{20}$ ⇒ x = 9. Hence faster worker takes 36 days to complete the work.
59.	42	A : B = 3 : 4. Let us take collection/week of A as 3x and B as 4x ⇒ In 5 weeks, A collected 3x × 5 = 15x which is a multiple of 7. In 3 weeks, B collected 4x × 3 = 12x which is a multiple of 24 ⇒ x is an even multiple of 7 ⇒ Lowest possible value of x is 14. So number of coins collections by A in one week is 3x = 3 × 14 = 42.
60.	340	Let M be the number of mangoes, B be the number of bananas and A be the number of apples. So as per the question, M = 0.4 (M + B + A) ⇒ 5M = 2M + 2B + 2A ⇒ 3M = 2B + 2A…..(1). Also $\frac{M}{2}$ + B – 96 + $\frac{3}{5}$A = $\frac{1}{2}$(M + B + A) ⇒ 5B + 10B – 960 + 6A = 5M + 5B + 5A ⇒ A +5B = 960……(2). Now we need to minimise M + B + A, so we should maximise B which should be 189. Hence we get A = 15. Putting these values in equation (1), we get the value of M as 136. Hence min imum total of M, B and A is 136 + 189 + 15 = 340.
61.	3	 As ∠AOB = 105°, so ∠EOD = 105° (Vertically opp. angles) Also as triangle ABC is isoceles with AB = AC, so ∠ABC = ∠ACB = x (say) Now in Quadrilateral OECD, 105° + 90° + x + 90° = 360° ⇒ x = 75° Hence ∠BAC = 180° – (75 + 75)° = 30°. Also ∠AOE = ∠BOD = $\frac{360-(105+105)}{2}$ = 75° Now in triangle OBD, 75° + 90° + ∠OBD = 180° ⇒ ∠OBD = 15°. Hence ∠ABO = 75° - 15° = 60°. Also in triangle BAO, 60° + ∠BAO + 105° = 180° ⇒ ∠BAO = 15°. Now we can see that triangle BAE is a 30° – 60° – 90° triangle. If we take AB = h (hypotenuse), then BE = $\frac{h}{2}$ (side opposite to 30°).

		Now in triangle ABD, $\frac{AD}{AB} = \sin 75 \Rightarrow \frac{AD}{h} = \sin 75 \Rightarrow AD = h \sin 75 = h \cos 15$ Hence ratio of $\frac{AD}{BE} = \frac{h\cos 15}{h/2} = 2\cos 15$
62.	2	 Let length of the rectangle be a and breadth be b. So we get the equation as $2^2 = b^2 + \left(\frac{a}{2}\right)^2$ $\Rightarrow \frac{a^2}{4} + b^2 = 4$ ……..(1). Area of rectangle = ab which can be written as twice of Geometric Mean of $\frac{a^2}{4}$ and b^2 which is equal to $2\sqrt{\frac{a^2}{4} \times b^2}$ For maximum area, equality condition of AM and GM should be satisfied $\Rightarrow \frac{\frac{a}{4} + b^2}{2} = \sqrt{\frac{a^2}{4} \times b^2} \Rightarrow \frac{a^2}{4} + b^2 = 2\sqrt{\frac{a^2}{4} \times b^2}$ Squaring both sides, $(\frac{a^2}{4} + b^2)^2 = 4(\frac{a^2 \times b^2}{4}) \Rightarrow \frac{a^2}{16} + b^4 + \frac{2a^2b^2}{4} = a^2b^2 \Rightarrow \frac{a^2}{16} + b^4 = \frac{a^2b^2}{2}$ $\Rightarrow a^4 + 16b^4 = 8a^2b^2 \Rightarrow a^4 - 8a^2b^2 + 16b^4 = 0 \Rightarrow (a^2 - 4b^2)^2 = 0 \Rightarrow a^2 = 4b^2$. Hence $\frac{a^2}{b^2} = 4 \Rightarrow \frac{a}{b} = 2 \Rightarrow a : b = 2 : 1$
63.	54	Let number of sides be n. Hence $180 - \frac{360}{n} - \frac{360}{n} = 120 \Rightarrow \frac{720}{n} = 60 \Rightarrow n = 12$. Number of diagonals = ${}^nC_2 - n$. Putting n = 12, we get ${}^{12}C_2 - 12 = 66 - 12 = 54$
64.	3	Given sequence is $1 + (1 + \frac{1}{3})\frac{1}{4} + (1 + \frac{1}{3} + \frac{1}{9})\frac{1}{16} + (1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27})\frac{1}{64} + \ldots\ldots$ Which can be written as $1(1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} \ldots\ldots) + \frac{1}{3}(\frac{1}{4} + \frac{1}{16} + \frac{1}{64} \ldots\ldots) + \frac{1}{9}(\frac{1}{16} + \frac{1}{64} + \frac{1}{256} + \ldots\ldots$ These are 3 different infinite GPs whose sums will be the first 3 terms of the final GP whose sum is required. Hence 1st three terms of the final GP are $S_1 = \frac{1}{1 - \frac{1}{4}} = \frac{4}{3}$,

		$S_2 = \frac{1}{3}(\frac{\frac{1}{4}}{1-\frac{1}{4}}) = \frac{1}{9}$ and $S_3 = \frac{1}{9}(\frac{\frac{1}{16}}{1-\frac{1}{4}}) = \frac{1}{108}$. Hence final sequence becomes $\frac{4}{3} + \frac{1}{9} + \frac{1}{108} + \ldots\ldots$ It is an infinite GP with 1st term $\frac{4}{3}$ and r = $\frac{1}{12}$ $\Rightarrow$ Final answer = $\frac{\frac{4}{3}}{1-\frac{1}{12}} = \frac{4}{3} \times \frac{12}{11} = \frac{16}{11}$
65.	2	$a_n = 46 + 8n$, $b_n = 98 + 4n$. Putting the values of n as 1, 2, 3….. in the 1st sequence we get values as 54, 62, 70…… Putting the values of n as 1, 2, 3….. in the 2nd sequence we get values as 102, 106, 110, 114…… So the common terms to both the sequences is 102, 110, 118…… But last term in the 1st sequence is 846 when we put n = 100 and last term in the 2nd sequence is 498 when we put n = 10. Also the common sequence is 102, 110…….. is of the form 8k + 6. Hence last number of this form in this sequence is 494. So we get the final sequence as 102, 110, 118, …….494. Number of terms in this sequence: 102 + (n -1) 8 = 494 $\Rightarrow$ n = 50. Sum of these terms = 50/2 (102 + 494) = 14900.
66.	3	Given that f(3x+2y, 2x – 5y) = 19x. Multiplying 1st function by 5 and 2nd function by 2, we get 15x + 10y and 4x – 10y. Now on adding these 2 functions, we get 15x + 10y + 4x – 10y = 19x. Using the same operation for f(x,2x), we get 5x + 2(2x) = 27 $\Rightarrow$ 9x = 27 $\Rightarrow$ x = 3