VERBAL ABILITY AND READING COMPREHENSION

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.

1. Which one of the following statements is not true about migration in the Indian Ocean world?
(a) The Indian Ocean world's migration networks connected the global north with the global south.
(b) Geographical location rather than geographical proximity determined the choice of destination for migrants.
(c) Migration in the Indian Ocean world was an ambivalent experience.
(d) The Indian Ocean world's migration networks were shaped by religious and commercial histories of the region.

2. All of the following claims contribute to the "remapping" discussed by the passage, EXCEPT:
(a) Indian Ocean novels have gone beyond the specifics of national concerns to explore rich regional pasts.
(b) cosmopolitanism originated in the West and travelled to the East through globalisation.
(c) the global south, as opposed to the global north, was the first centre of globalisation.
(d) the world of early international trade and commerce was not the sole domain of white Europeans.

3. On the basis of the nature of the relationship between the items in each pair below, choose the odd pair out:
(a) Indian Ocean world : Slavery
(b) Postcolonial novels : Anti-colonial nationalism
(c) Indian Ocean novels : Outward-looking
(d) Postcolonial novels : Border-crossing

4. All of the following statements, if true, would weaken the passage's claim about the relationship between mainstream English-language fiction and Indian Ocean novels EXCEPT:

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

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

[Fifty] years after its publication in English [in 1972], and just a year since [Marshall] Sahlins himself died—we may ask: why did [his essay]
"Original Affluent Society" have such an impact, and how has it fared since? . . . Sahlins's principal argument was simple but counterintuitive: before being driven into marginal environments by colonial powers, hunter-gatherers, or foragers, were not engaged in a desperate struggle for meager survival. Quite the contrary, they satisfied their needs with far less work than people in agricultural and industrial societies, leaving them more time to use as they wished. Hunters, he quipped, keep bankers' hours. Refusing to 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 presentday 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.

5. The author mentions Tanzania's Hadza community to illustrate:
(a) how two vastly different ways of living and working were able to coexist in proximity for centuries
(b) that forager communities' lifestyles derived not from ignorance about alternatives, but from their own choice.
(c) that hunter-gatherer communities' subsistence-level techniques equipped them to survive well into contemporary times.
(d) how pre-agrarian societies did not hamper the emergence of more advanced agrarian practices in contiguous communities.

6. The author of the passage mentions Galbraith's "The Affluent Society" to:
(a) contrast the materialist nature of contemporary growth paths with the pacifist content ways of living among the foragers.
(b) show how Sahlins's views complemented Galbraith's criticism of the consumerism and inequality of contemporary society.

(c) show how Galbraith's theories refute Sahlins's thesis on the contentment of pre-hunter-gatherer communities.
(d) document the influence of Galbraith's cynical views on modern consumerism on Sahlins's analysis of pre-historic societies.

7. The author of the passage criticises Sahlins's essay for its:
(a) cursory treatment of the effects of racism and colonialism on societies.
(b) outdated values regarding present-day foragers versus ancient foraging communities.
(c) critique of anthropologists who disparage the choices of foragers in today's society.
(d) failure to supplement its thesis with robust empirical data.

8. We can infer that Sahlins's main goal in writing his essay was to:
(a) put forth the view that, despite egalitarian origins, economic progress brings greater inequality and social hierarchies.
(b) counter Galbraith's pessimistic view of the inevitability of a capitalist trajectory for economic growth.
(c) highlight the fact that while we started off as a fairly contented egalitarian people, we have progressively degenerated into materialism.
(d) hold a mirror to an acquisitive society, with examples of other communities that have chosen successfully to be non-materialistic.

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.

9. Which one of the following has NOT contributed to the growing wolf population in Lozère?
(a) The granting of a protected status to wolves in Europe.
(b) The shutting down of the royal office of the Luparii.
(c) An increase in woodlands and forest cover in Lozère.
(d) A decline in the rural population of Lozère.

10. The author presents a possible economic solution to an existing issue facing Lozère that takes into account the divergent and competing interests of:
(a) environmentalists and politicians.
(b) tourists and environmentalists.
(c) farmers and environmentalists.
(d) politicians and farmers.

11. Which one of the following statements, if true, would weaken the author's claims?
(a) The old mining sites of Lozère are now being used as grazing pastures for sheep.
(b) Having migrated out in the last century, wolves are now returning to Lozère.
(c) Unemployment concerns the residents of Lozère.
(d) Wolf attacks on tourists in Lozère are on the rise.

12. The inhabitants of Lozère have to grapple with all of the following problems, EXCEPT:
(a) decline in the number of hunting licences.
(b) poor rural communication infrastructure.
(c) livestock losses.
(d) lack of educational facilities.

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.

13. All of the following are advanced by the author as reasons why non-geographers disregard geographic influences on human phenomena EXCEPT their:
(a) dismissal of explanations that involve geographical causes for human behaviour
(b) belief in the central role of humans, unrelated to physical surroundings, in influencing phenomena.
(c) lingering impressions of past geographic analyses that were politically offensive.
(d) disciplinary training which typically does not include technical knowledge of geography.

14. All of the following can be inferred from the passage EXCEPT:
(a) individual dictat and contingency were not the causal factors for the use of fur clothing in some very cold climates.
(b) agricultural practices changed drastically in the Australian continent after it was colonised.
(c) several academic studies of human phenomena in the past involved racist interpretations.
(d) while most human phenomena result from culture and individual choice, some have bio-geographic origins.

15. The author criticises scholars who are not geographers for all of the following reasons EXCEPT:
(a) the importance they place on the role of individual decisions when studying human phenomena.
(b) their labelling of geographic explanations as deterministic.
(c) their outdated interpretations of past cultural and historical phenomena.
(d) their rejection of the role of biogeographic factors in social and cultural phenomena.

16. The examples of the Inuit and Aboriginal Australians are offered in the passage to show:
(a) human resourcefulness across cultures in adapting to their surroundings.
(b) that despite geographical isolation, traditional societies were self-sufficient and adaptive.
(c) how physical circumstances can dictate human behaviour and cultures.
(d) how environmental factors lead to comparatively divergent paths in livelihoods and development.

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

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

Paragraph: The researchers also uncovered an unexpected genetic link between Native Americans and Japanese people. ___(1)__. During the deglaciation period, another group branched out from northern coastal China and travelled to Japan. _(2)__. "We were surprised to find that this ancestral source also contributed to the Japanese gene pool, especially the indigenous Ainus," says Li. _(3)__. They shared similarities in how they crafted stemmed projectile points for arrowheads and spears. _(4)__. "This suggests that the Pleistocene connection among 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.

(a) Option 3 (b) Option 2
(c) Option 1 (d) Option 4

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

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

Paragraph: The experience of reading philosophy is often disquieting. When reading philosophy, the values around which one has heretofore organised

one's life may come to look provincial, flatly wrong, or even evil. __(1)__. When beliefs previously held as truths are rendered implausible, new beliefs, values, and ways of living may be required. __(2)__. What's worse, philosophers admonish each other to remain unsutured until such time as a defensible new answer is revealed or constructed. Sometimes philosophical writing is even strictly critical in that it does not even attempt to provide an alternative after tearing down a cultural or conceptual citadel. __(3)__. The reader of philosophy must be prepared for the possibility of this experience. While reading philosophy can help one clarify one's values, and even make one self-conscious for the first time of the fact that there are good reasons for believing what one believes, it can also generate unremediated doubt that is difficult to live with. __(4)__.

(a) Option 1 (b) Option 3
(c) Option 4 (d) Option 2

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

1. Having an appreciation for the workings of another person's mind is considered a prerequisite for natural language acquisition, strategic social interaction, reflexive thought, and moral judgment.
2. It is a 'theory of mind' though some scholars prefer to call it '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.

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

1. In English, there is no systematic rule for the naming of numbers; after ten, we have "eleven" and "twelve" and then the teens: "thirteen", "fourteen", "fifteen" and so on.
2. Even more confusingly, some English words invert the numbers they refer to: the word "fourteen" puts the four first, even though it appears last.
3. It can take children a while to learn all these words, and understand that "fourteen" is different from "forty".
4. For multiples of 10, English speakers switch to a different pattern: "twenty", "thirty", "forty" and so on.
5. If you didn't know the word for "eleven", you would be unable to just guess it – you might come up with something like "one-teen".

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

1. What precisely are the "unusual elements" that make a particular case so attractive to a certain kind of audience?
2. It might be a particularly savage or unfathomable level of depravity, very often it has something to do with the precise amount of mystery involved.
3. Unsolved, and perhaps unsolvable cases offer something that "ordinary" murder 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.

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

Manipulating information was a feature of history long before modern journalism established rules of integrity. A record dates back to ancient Rome, when Antony met Cleopatra and his political enemy Octavian launched a smear campaign against him with "short, sharp slogans written upon coins."

The perpetrator became the first Roman Emperor and "fake news had allowed Octavian to hack the republican system once and for all". But the 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'.

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

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

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

(a) Colonialism surged in the 16th century due to advancements in navigation, enabling British settlements abroad and global dominance.
(b) 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.
(c) Technological advancements in navigation in the 16th century, transformed colonialism, enabling Europeans to establish settlements and exert political dominance over distant regions.
(d) Colonialism, conceptualized in the 16th century, allowed colonizers to expand their territories, establish settlements, and exercise political power.

DATA INTERPRETATION AND LOGICAL REASONING

Directions [Q.25-Q.29]: Answer the following questions based on the information given below:

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.

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

26. 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?

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

(a) 9:35 am (b) 9:37 am
(c) 9:45 am (d) 9:50 am

28. Which of the following statements is false?

(a) The application process of Mahira started after Nandini's.
(b) The application process of Osman was completed before Vijay's.
(c) The application process of Osman was completed before 9:45 am.
(d) The application process of Mahira was completed before Nandini's.

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

(a) 3:40 pm (b) 2:05 pm
(c) 2:25 pm (d) 2:00 pm

Directions [Q.30-Q.34]: Answer the following questions based on the information given below:

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

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

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

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

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

30. Which two candidates can belong to the same department?
(a) Prof. Pakrasi and Prof. Qureshi
(b) Prof. Qureshi and Prof. Ramaswamy
(c) Prof. Pakrasi and Prof. Samuel
(d) Prof. Ramaswamy and Prof. Samuel

31. Which of the following can be the number of votes that Prof. Qureshi received from a single department?
(a) 7 (b) 9
(c) 6 (d) 8

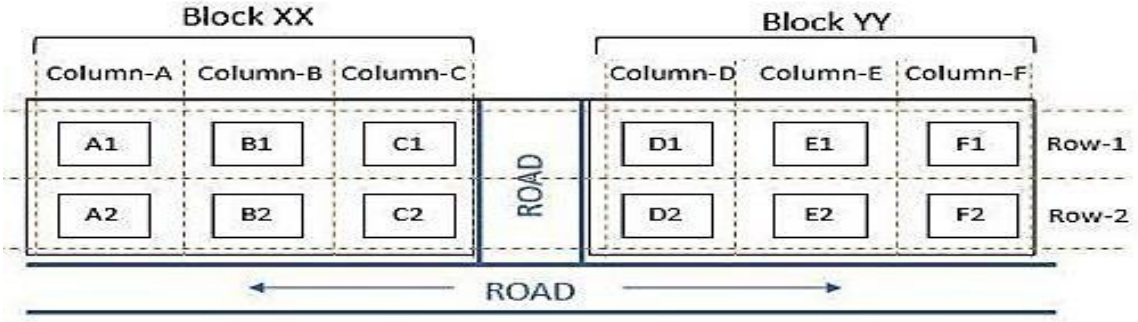
32. If Prof. Samuel belongs to B&H, which of the following statements is/are true?
Statement A: Prof. Pakrasi belongs to M&S.
Statement B: Prof. Ramaswamy belongs to O&Q.
(a) Only statement A
(b) Only statement B
(c) Neither statement A not statement B
(d) Both statements A and B

33. What best can be concluded about the candidate from O&Q?
(a) It was Prof. Samuel.
(b) It was either Prof. Ramaswamy or Prof. Samuel.
(c) It was Prof. Ramaswamy.
(d) It was either Prof. Pakrasi or Prof. Qureshi.

34. 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.
(a) Neither statement A nor statement B
(b) Only statement A
(c) Only statement B
(d) Both statements A and B

Directions [Q.35-Q.39]: Answer the following questions based on the information given below:

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 Row2 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.

35. How many houses are vacant in Block XX?

36. Which of the following houses is definitely occupied?
(a) D2 (b) F2
(c) B1 (d) A1

37. Which of the following options best describes the number of vacant houses in Row-2?
(a) Exactly 3 (b) Exactly 2
(c) Either 3 or 4 (d) Either 2 or 3

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

39. Which house in Block YY has parking space?
(a) F2 (b) E2
(c) E1 (d) F1

Directions [Q.40]: Answer the following questions based on the information given below:

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 ration*	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.

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

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

42. What rating did R1 give to Xavier?

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

44. Which among the following restaurants gave its median rating to exactly one of the workers?
(a) R5 (b) R4
(c) R2 (d) R3

45. The number of all natural numbers up to 1000 with non-repeating digits is:
(a) 648 (b) 585
(c) 738 (d) 504

46. 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

47. 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
(a) 4 : 9 (b) 1 : 3
(c) 1 : 2 (d) 5 : 9

48. Brishti went on an 8-hour trip in a car. Before the trip, the car had travelled a total of x km till then, where x is a whole number and is palindromic, i.e., x remains unchanged when its digits are reversed. At the end of the trip, the car had travelled a total of 26862 kms till then, this number again being palindromic. If Brishti never drove at more than 110 kmph, then the greatest possible average speed at which she drove during the rip, in kmph was?
(a) 110 (b) 80
(c) 90 (d) 100

49. If x and y are real numbers such that $x^2 + (x - 2y - 1)^2 = -4y(x + y)$, then the value of x - 2y is?
(a) 1 (b) -1
(c) 2 (d) 0

50. The number of integral solutions of equation $2|x|(x^2 + 1) = 5x^2$ is?

51. 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
(a) 49% (b) 42%
(c) 45% (d) 47%

52. The minor angle between the hour hand and minute hand of a clock was observed at 8:48 am. The minimum deviation (in min) after 8:48 am when the angle increases by 50% is?
(a) 36/11 (b) 24/11
(c) 2 (d) 4

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

54. 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

55. 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

56. If x and y are positive real numbers such that $\log (x^2 + 12) = 4$ and $3\log x = 1$, then x + y equals?
(a) 11 (b) 68
(c) 20 (d) 10

57. A lab experiment measures the number of organisms at 8 am every day. Starting with 2 organisms on the first day, the number of organisms on any day is equal to 3 more than twice the number on the previous day. If the number of organisms on the nth day exceeds one million, then the lowest possible value of n is

58. 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
(a) 24 (b) 12
(c) 15 (d) 9

59. The equation $x^3 + (2r + 1)x^2 + (4r - 1)x + 2 = 0$ has -2 as one of the roots. If the other roots are real, then the minimum possible non-negative integer value of r is?

60. 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
(a) 26% (b) 25%
(c) 30% (d) 28%

61. 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

(a) 20 (b) 19
(c) 21 (d) 22

62. 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

63. If $\sqrt{5x+9}+\sqrt{5x-9} = 3(2+\sqrt{2})$, then find the value of $\sqrt{10x+9}$?

(a) $3\sqrt{7}$ (b) $3\sqrt{5}$
(c) $4\sqrt{3}$ (d) $7\sqrt{3}$

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

(a) x, y and z are in Arithmetic Progression
(b) y, x and z are in Arithmetic Progression
(c) $\sqrt{x}, \sqrt{y}$ and $\sqrt{z}$ are in Arithmetic Progression
(d) $\sqrt{y}, \sqrt{x}$ and $\sqrt{z}$ are in Arithmetic Progression

65. 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 degree. Then, the point at which L touches the line x = 6 is?

(a) (6, 6) (b) (6, 8)
(c) (6, 3) (d) (6, 4)

66. 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

(a) 2 :1 (b) 5 : 8
(c) 1 : 2 (d) 8 : 5

ANSWER KEY AND EXPLANATIONS

VERBAL ABILITY AND READING COMPREHENSION

1. **(a)** Option (a): Para 2 statest "This has the effect of remapping the world in the reader's mind, as centred in the interconnected global south ". The passage talks only about south-south connection and does not mention about north-south connection. Hence, option (a) is the correct answer.
   Option (b): Para 3 states: "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. ". Therefore, option (b) is mentioned in the passage and is not the correct answer.
   Option (c): Para 5 states: "Migration is often a matter of force; travel is portrayed as abandonment rather than adventure...". Therefore, option (c) is mentioned in the passage and is not the correct answer.
   Option (d): Para 4 states: '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. ". Therefore, option (d) is mentioned in the passage and is not the correct answer.
   Hence, option (a).
2. **(b)** The term 'Indian Ocean world' in the passage refers to the interconnected maritime realm of the global south, encompassing East Africa, the Arab coasts, and South and East Asia. These regions maintained enduring connections facilitated by sea voyages across the Indian Ocean. The passage contends that the global south served as the initial hub of globalization ('Historical and archaeological evidence suggests that the origins of globalization can be traced to the Indian Ocean') and emphasizes that early international trade and commerce were not exclusively dominated by white Europeans ('Those [commonly found ones] are mostly centered 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..."). Thus, options (a), (c), and (d) contribute to the "remapping" discussed by the passage.
   Hence, option (b).
3. **(d) is the correct answer.**
4. **(a)** The passage has established a relationship about mainstream English-language fiction and Indian Ocean novels. We have to find an option which does not weaken this relationship.
   Option (a): This strengthens the idea given in para 4: "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."
   Hence, option (a) is the right answer.
   Option (b) states that Indian Ocean Novels were influenced by western imagination of its culture. This is not true as stated in para 4: "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". This option weakens the relationship given in the passage and hence is not the correct choice.
   Option (c) states that Indian Ocean Novels were driven by postcolonial nostalgia i.e., they were inward looking. This is not true as stated in para 4: " 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 option weakens the relationship given in the passage and hence is not the correct choice.
   Option (d): Para 4 clearly states: "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". This option weakens this detail about English literature and hence is not the correct choice.
   Hence, option (a).
5. **(b)** In the second paragragh the author mentions: '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.'
   Hence, option (b) is the correct choice.
   Hence, option (b).
6. **(b)** In reference to Galbraith's "The Affluent Society," the fourth paragraph states "With its title's nod toward The Affluent Society...: The passage notes that Sahlins' essay title is a subtle acknowledgment of Galbraith's renowned critique of America's postwar abundance and social disparities. This suggests Sahlin's alignment with Galbraith's perspective. Sahlin's ideas harmonize with Galbraith's condemnation of contemporary society's consumerism and inequality.
   Hence, option (b).
7. **(a)** In the last paragraph, author mentions: '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.'
   Although Sahlins mentions Racism and Colonialism, but only gives cursory treatment of these on societies.
   Hence, option (a).
8. **(d)** The passage articulates that Sahlin's essay aimed to present a conceptual challenge to modern economic norms and bourgeois individualism. It served as both a philosophical and political endeavor, acting as a thought experiment that encouraged readers to imagine alternative possibilities beyond the confines of capitalist society. Through this, Sahlin sought to reflect upon the acquisitive nature of capitalism while showcasing successful examples of nonmaterialistic communities. Thus, Option C is the accurate selection.
   Option (a) misinterprets Sahlin's essay, as it does not suggest that economic progress originated from egalitarian principles.

The passage clarifies that Sahlin's essay's title is a nod to Galbraith's work, indicating agreement with Galbraith's ideas. Therefore, Option (b) is also incorrect.
Option (c) is inaccurate as the passage does not assert that foragers maintained an egalitarian society, nor does Sahlin's essay claim a progressive degeneration into materialism.
Hence, option (d).

9. **(b)** Option (a) is mentioned in 3rd paragraph, last line - "The mostly protected status of the wolf in Europe..."
Option (c) & (d) are mentioned in 3rd paragrah - "As humans withdraw, forests are expanding."
Hence, option (b).
10. **(c)** While increase in lupine (wolf) population is a matter of concern for farmers, it brings delight to environmentalists as mentioned in 2 nd paragraph "Wolves have since spread to areas such as Lozère, delighting environmentalists, who see the predators' presence as a sign of wider ecological health."
Hence, option (c).
11. **(d)** In the last paragraph author mentions - "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."
Option (d) would definitely weaken this claim of the author. If wolves attack tourists, it will lead to lesser tourists visiting these parks resulting in loss of income and jobs.
Hence, option (d).
12. **(a)** Option (b), (c) & (d) are mentioned in the first paragraph - "mayors grumble about a lack of local schools, jobs, or phone and internet connections." and "...but farmers fret over their livestock and their livelihoods..."
Decline in number of hunting licences is mentioned to give a reason for increase in forest area. But this is not a concern for inhabitants of Lozère. Hence, option (a).
13. **(a)** Option (a): The author criticises non geographical scholars for dismissing geographcial factors for human behaviour in para 3 and provides reasons in subsequent paras. But this is not a reason.
Option (b) is mentioned in the last para 5 when the author talks about "...the role of contingency (a favorite word among historians) based on individual decisions and chance..."
Option (c) is mentioned in para 4 when the author talks about "...geographic explanations advanced a century ago were racist ".
Option (d) is mentioned in the last para of the passage.
14. **(d)** Option (a): This can be inferred from para 5. "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."
Option (b): This can be inferred from para 2. "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"
Option (c): This can be inferred from para 4. " many genetic, historical, psychological, and anthropological explanations advanced a century ago were also racist "
Option (d): The passage does talk about cultural, individual choices affecting human phenomenon as well as bio-geographical factors but it there is no comparison as to which type of factors are more prevalent.
Hence, option (d).
15. **(c)** The author criticises scholars who are not geographers for 3 main reasons.
    1. Denouncing of geographical determinism. [option (b)]. Para 3.
    2. Stressing the role of contingency (a favorite word among historians) based on individual decisions and chance. [option (a)]. Para 5.
    3. Their lack of detailed knowledge about geographical factors. [option (d)]. This is mentioned in last para.
16. **(d)** The examples of the Inuit and Aboriginal Australians are offered in the passage to show how geographical factors lead to different human behaviours.
Option (a) talks mainly about human resourcefullness, which is not the point of author in taking these two examples. The main point is geographical factors affecting human behaviours.
Option (b): The passage no where mentions geographical isolation.
Option (c): This is the best description of why author mentions these two examples.
Option (d): The main point is not that environmental factors lead to divergent paths, but that these factors influence human behaviour.
Hence, option (c).
17. **(a)** The given sentence mentions discovery, which can be correlated with the statement before option 3 which mentions the ancestrol source's contribution to japanese gene pool.
The given statement mentions archeological similarities, while sentence after option 3 mentions these archeological similarities i.e., projectile points and spears.
Hence, option (a).
18. **(d)** The sentence after option 2 starts with 'what's worse...', suggesting that there was something bad that was mentioned earlier.
The given sentence mentions the philosophical cut at one's core beliefs, values, and way of life 'is difficult enough', suggesting there is something ever worse, and this fits well with the sentence which follows option 2.
Also, the sentence before option 2 talks about how one's beliefs are rendered implausibe and this is the philosophical cut which is mentioned in the given sentence.
Hence, option (d).
19. **(2)** Here the theme of the paragraph is the ability to perceive and interpret other people's behaviour.
Based on this theme, it is clear that sentence 2 is the odd one out as it talks about one's own conginitive abilities.
Hence, 2.
20. **(3)** Here, the theme of the paragraph is the unsystematic way numbers are named.
All sentences focus on this theme except sentence 3, which focuses on children learning these numbers.
Hence, 3.
21. **(4123)** Sentence 4 is the best opening sentence as it puts forward the question that why are some crimes examined more than other.

Sentence 1 should follow 4 as it carries on the question from sentence 4 and asks what are the element that make a case attractive.
Sentence 2 follows sentence 1 as it explores the 'unusual elements' mentioned in setence 1.
Sentence 3 concludes the paragraph stating that unsolved or unsolvable cases offer something that "ordinary" murder does not.
Hence, 4123.

22. **(4123)** Sentence 4 introduces the concept that biased decisions, initially localized when made by humans, gain a broader impact with the emergence of Al, laying the groundwork for subsequent discussion.
Considering Sentences 1 and 2, we observe Sentence 1 elaborating on the ramifications of biased decisions within the Al context, emphasizing that algorithms, accessible to many via the internet, magnify adverse effects on larger populations. Hence, sentence 1 follows sentence 4.
Sentence 2 clarifies "algorithmic bias," stressing that biases stem from the data rather than the algorithms themselves, reflecting persistent patterns in training data. Hence, sentence 2 logically follows sentence 1.
Sentence 3 highlights that despite Al biases' widespread impact, rectifying them is comparatively easier than human biases since it's simpler to detect and address algorithmic biases than to unlearn ingrained human behaviors over generations. This conclusion logically extends from the point made in Sentence 2.
Hence, 4123.

23. **(d)** Main points of the passage:
1. Information manipulation has existed for before modern journalism's integrity rules.
2. Octavian is mentioned as example from ancient Rome to support this point.
3. In 21st century, technology has led to fabrication of context for propaganda and trolling by states, politicians and corporates.

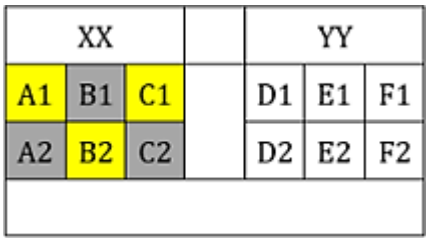
Option (a): The passage does not mention anything about technology mediating disinformation. Hence, this is not the best summary.
Option (b): People's point of view or what action they need to take is not mentioned in the passage.
Option (c): Though this is true but this is used only as an example to prove the point that misinformation is peddled to attain power. This point misses an important point about how technology today leads to wider scale of misinformation. Hence, this is not the best summary.
Option (d): Captures the main points of the passage and is the best summary.
Hence, option (d).

24. **(c)** Main points of the passage:
1 Colonialism is not a modern phenomenon but has existed for many centuries.
2 It gained momentum due to advancement in navigational technologies.
3 Colonialism is the process of European settlement over the rest of the world.

Option (a): The passage mentions Europeans and not specifically British. Hence, this is not the best summary.
Option (b): The passage talks about Europeans being able to move their people across geographies. It does not mention anything about displacement of indigenous populations. Hence, this is not the best summary.
Option (d): Colonialism has existed for many centuries. It wasn't conceptualized in sixth century, it gained momentum in sixth century. Hence, this is not the best summary.
Option (c): Captures the main points of the passage and is the best summary.
Hence, option (c).

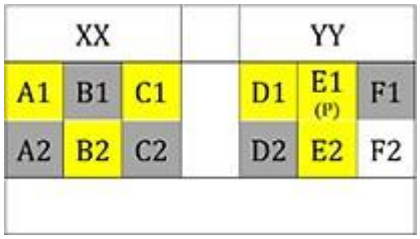
DATA INTERPRETATION AND LOGICAL REASONING

25. (0)
26. **(200)**
27. **(c)**
28. **(a)**
29. **(b)**
30. **(a)**
31. **(b)**
32. **(d)**
33. **(b)**
34. **(c)**
35. **(3)** [**Note:** There might be discrepancy in one of the questions of this set. We will update the solution once the objections window closes and answers are updated by IIM Lucknow.]
Price of a house = (base price) + 5 × (road adjacency value) + 3 × (neighbor count)
Block XX:
Maximum price of a house in XX is 24
∴ 24 = (10 or 12) + 5 × (0 or 1 or 2) + 3 × (0 or 1 or 2 or 3)
This is only possible when:
base price = 10 lakhs, road adjacency = 1 and neighbor count = 3.
⇒ Only house B2 satisfies the given criteria i.e., road adjacency = 1 and neighbor count = 3.
∴ B2 is vacant and its price is 24 lakhs.
⇒ A2, B1 and C2 are occupied houses.
There is only one occupied house in Row 1 and block XX.
Since B1 is occupied, ⇒ A1 and C1 are vacant.



Block YY:
Both E1 and E2 are vacant and one of them costs 15 lakhs.
Let us focus on E1
For E1 neighbor count = 1 (exactly one of D1 or F1 is occupied)
For E1 road adjacency = 0
∴ Cost of E1 = (10 or 12) + 5 × 0 + 3 × 1 = 13 or 15 lakhs
Since 15 lakhs is the least cost of a house in block YY, E1 must cost 15 lakhs.
⇒ E1 is the only house in YY which has a parking space.
Given, Row-1 has two occupied houses, one in each block.
∴ Exactly one of D1 or F1 is occupied.
If F1 is vacant, let's calculate its price.

It should not have parking space as only 1 house has parking space in block YY. Hence, it's base price is 10 lakhs. Now even if F2 is occupied, F1's price will be 10 + 0 + 3 = 13 lakhs.
This is not possible as least price for a house in YY is 15 lakhs.
∴ F1 should be occupied.
⇒ D1 is vacant.
Also, at least one house in column D is occupied, hence D2 must be occupied.
Now, F2 may be vacant or occupied, both cases are possible.



∴ 3 houses are vacant in block XX.
Hence, 3.

36. **(c)** Consider the solution to first question of this set.
B1 and D2 are definitely occupied.
[There might be discrepancy in this question. We will update the solution once the objections window closes and answers are updated by IIM Lucknow]
Hence, option (c).

37. **(d)** Consider the solution to first question of this set.
In row 2, B2 and E2 are definitely vacant.
Out of D2 and F2, at least one is occupied, hence either 1 is vacant or 0 are vacant.
Case 1: One of D2 or F2 is vacant.
∴ We have B2, F2 and (D2 or F2), i.e., 3 houses vacant in row 2.
Case 2: None of D2 or F2 is vacant.
∴ We have B2 and F2, i.e., 2 houses vacant in row 2.
∴ In row 2, either only 2 houses are vacant or 3 houses are vacant.
Hence, option (d).

38. **(21)** Consider the solution to first question of this set.
E1 costs 15 laks.
Let us calculate the maximum possible price of E2.
E2's base price is 10 lakh as it cannot have a parking space. (Only 1 house in YY i.e., E1 has a parking space.)
Road adjancecy for E2 = 1 and maximum neighbor count of E2 will be 2 (Both D2 and F2 are occupied and E1 is vacant)
∴ E2's price = 10 + 5 × 1 + 3 × 2 = 21 lakhs
Hence, 21.

39. **(c)** Consider the solution to first question of this set.
Only 1 house in YY i.e., E1 has a parking space.
Hence, option (c).

40. **(0)** 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 sum of rating given by R1, R2, R3, R4 and R5 were 17, 11, 19, 14 and 17 respectively. (Multiplied with 5)
Similarly, we can find the sum of rating of all the 5 people.
Filling the data given in point 1 and 2, we get the following table:

	R1	R2	R3	R4	R5	Sum	Median	Mode	H/L
Ullas	1					11	2	2	
Vasu					5	19	4	4	
Waman	5	1	5			17	4	5	
Xavier		5	5			18	4	5	
Yusuf		1	1			13	3	1 and 4	
Sum	17	11	19	14	17				

Range of ratings:
Ullas: lowest is given as 1, hence his highest = 1 + 3 = 4.
Vasu: highest is given as 5, hence his lowest = 5 – 3 = 2.
Waman: highest is 5 and lowest is 1.
Xavier: highest is given as 5, hence his lowest = 5 – 4 = 1.
Yusuf: lowest is given as 1, hence his highest = 1 + 3 = 4.

	R1	R2	R3	R4	R5	Sum	Median	Mode	H/L
Ullas	1					11	2	2	4/1
Vasu					5	19	4	4	5/2
Waman	5	1	5			17	4	5	5/1
Xavier		5	5			18	4	5	5/1
Yusuf		1	1			13	3	1 and 4	4/1
Sum	17	11	19	14	17				

Ullas: Highest = 4, Lowest = 1, Median = 2 and Mode = 2
∴ Since median is 2, his reading in ascending order can be

1st	2nd	3rd	4th	5th
1	1 or 2	2	2 or 3 or 4	4

Sum of reading of Ullas = 11, and his mode is 2
This is possible only when his readings in ascending order must be 1, 2, 2, 2, 4.
Vasu: Highest = 5, Lowest = 2, Median = 4 and Mode = 4.
∴ Since median is 4, his reading in ascending order can be

1st	2nd	3rd	4th	5th
2	2 or 3 or 4	4	4 or 5	5

Sum of reading of Vasu = 19, and his mode is 2
This is possible when his readings in ascending order must be 2, 4, 4, 4, 5.
Waman: Highest = 5, Lowest = 1, Median = 4 and Mode = 5.
∴ Since median is 4, his reading in ascending order can be

1st	2nd	3rd	4th	5th
1	1 or 2 or 3 or 4	4	4 or 5	5

Sum of reading of Waman = 17, and his mode is 5
This is possible when his readings in ascending order must be 1, 2, 4, 5, 5.
Xavier: Highest = 5, Lowest = 1, Median = 4 and Mode = 5.
∴ Since median is 4, his reading in ascending order can be

1st	2nd	3rd	4th	5th
1	1 or 2 or 3 or 4	4	4 or 5	5

Sum of reading of Xavier = 18, and his mode is 5
This is possible when his readings in ascending order must be 1, 3, 4, 5, 5.
Yusuf: Highest = 4, Lowest = 1, Median = 3 and Mode = 1 and 4.
∴ Since median is 4, his reading in ascending order can be

1st	2nd	3rd	4th	5th
1	1 or 2 or 3	3	3 or 4	4

Sum of reading of Yusuf = 17, and his mode is 1 and 4
This is possible when his readings in ascending order must be 1, 1, 3, 4, 4.
Now, we have the following table.

	R1	R2	R3	R4	R5	Sum	Median	Mode	H/L	Readings remaining
Ullas	1					11	2	2	4/1	2, 2, 2, 4
Vasu					5	19	4	4	5/2	2, 4, 4, 4
Waman	5	1	5			17	4	5	5/1	2, 4
Xavier		5	5			18	4	5	5/1	1, 3, 4
Yusuf		1	1			13	3	1 and 4	4/1	3, 4, 4
Sum	17	11	19	14	17					

For R3, sum of ratings is 19, hence R3's sum of rating for Ullas and Vasu = 19 – 5 – 5 – 1 = 8.
This is possible only when R3 gives a rating of 4 to both Ullas and Vasu.
For Ullas, the remaining 3 2's would be given by R2, R4 and R5.

	R1	R2	R3	R4	R5	Sum	Median	Mode	H/L	Readings remaining
Ullas	1	2	4	2	2	11	2	2	4/1	
Vasu			4		5	19	4	4	5/2	2, 4, 4
Waman	5	1	5			17	4	5	5/1	2, 4
Xavier		5	5			18	4	5	5/1	1, 3, 4
Yusuf		1	1			13	3	1 and 4	4/1	3, 4, 4
Sum	17	11	19	14	17					

For R2, rating given to Vasu = 11 – 2 – 1 – 5 – 1 = 2.
∴ For Vasu the remaining 2 4s would be given by R1 and R4.

	R1	R2	R3	R4	R5	Sum	Median	Mode	H/L	Readings remaining
Ullas	1	2	4	2	2	11	2	2	4/1	
Vasu	4	2	4	4	5	19	4	4	5/2	
Waman	5	1	5			17	4	5	5/1	2, 4
Xavier		5	5			18	4	5	5/1	1, 3, 4
Yusuf		1	1			13	3	1 and 4	4/1	3, 4, 4
Sum	17	11	19	14	17					

Xavier receives a rating of 1. This can only be given by R4. If R1 or R5 give a rating of 1 to Xavier, their sum of 17 each could not be achieved.

Now, the sum of ratings given by R4 to Waman and Yusuf = 14 – 2 – 4 – 1 = 7.
This is only possible when Waman gets a rating of 4 from R4 and Yusuf gets a rating of 3 from R4.
∴ The remaining rating of 2 for Waman must have come from R5.
∴ The remaining 2 4s for Yusuf must have come from R1 and R5.

	R1	R2	R3	R4	R5	Sum	Median	Mode	H/L	Readings remaining
Ullas	1	2	4	2	2	11	2	2	4/1	
Vasu	4	2	4	4	5	19	4	4	5/2	
Waman	5	1	5	4	2	17	4	5	5/1	
Xavier		5	5	1		18	4	5	5/1	3, 4
Yusuf	4	1	1	3	4	13	3	1 and 4	4/1	
Sum	17	11	19	14	17					

For R1, rating given to Xavier = 17 – 1 – 4 – 5 – 4 = 3
⇒ The remaining rating of 4 for Xavier must have been given by R5.

	R1	R2	R3	R4	R5	Sum	Median	Mode	H/L	Readings remaining
Ullas	1	2	4	2	2	11	2	2	4/1	
Vasu	4	2	4	4	5	19	4	4	5/2	
Waman	5	1	5	4	2	17	4	5	5/1	
Xavier	3	5	5	1	4	18	4	5	5/1	
Yusuf	4	1	1	3	4	13	3	1 and 4	4/1	
Sum	17	11	19	14	17					

Ratings of all can be uniquely determined.
Hence, 0.

41. **(0)** Consider the solution to first question of this set.

	R1	R2	R3	R4	R5	Sum	Median	Mode	H/L	Readings remaining
Ullas	1	2	4	2	2	11	2	2	4/1	
Vasu	4	2	4	4	5	19	4	4	5/2	
Waman	5	1	5	4	2	17	4	5	5/1	
Xavier	3	5	5	1	4	18	4	5	5/1	
Yusuf	4	1	1	3	4	13	3	1 and 4	4/1	
Sum	17	11	19	14	17					

R2 gave a rating of 4 to no one.
Hence, 0.

42. **(3)** Consider the solution to first question of this set.

	R1	R2	R3	R4	R5	Sum	Median	Mode	H/L	Readings remaining
Ullas	1	2	4	2	2	11	2	2	4/1	
Vasu	4	2	4	4	5	19	4	4	5/2	
Waman	5	1	5	4	2	17	4	5	5/1	
Xavier	3	5	5	1	4	18	4	5	5/1	
Yusuf	4	1	1	3	4	13	3	1 and 4	4/1	
Sum	17	11	19	14	17					

R1 gave a rating of 3 to Xavier.
Hence, 3.

43. **(4)** Consider the solution to first question of this set.

	R1	R2	R3	R4	R5	Sum	Median	Mode	H/L	Readings remaining
Ullas	1	2	4	2	2	11	2	2	4/1	
Vasu	4	2	4	4	5	19	4	4	5/2	
Waman	5	1	5	4	2	17	4	5	5/1	
Xavier	3	5	5	1	4	18	4	5	5/1	
Yusuf	4	1	1	3	4	13	3	1 and 4	4/1	
Sum	17	11	19	14	17					

R3 gave ratings of 1, 4, 4, 5, 5.
∴ Median rating is 4.
Hence, 4.

44. **(b)** Consider the solution to first question of this set.

	R1	R2	R3	R4	R5	Sum	Median	Mode	H/L	Readings remaining
Ullas	1	2	4	2	2	11	2	2	4/1	
Vasu	4	2	4	4	5	19	4	4	5/2	
Waman	5	1	5	4	2	17	4	5	5/1	
Xavier	3	5	5	1	4	18	4	5	5/1	
Yusuf	4	1	1	3	4	13	3	1 and 4	4/1	
Sum	17	11	19	14	17					

Median rating for:
R1 is 4, given to 2 persons.
R2 is 2, given to 2 persons.
R3 is 4, given to 2 persons.
R4 is 3, given to only 1 person.
R5 is 4, given to 2 persons.
∴ R4 gave median rating to only 1 person.
Hence, option (b).

QUANTITATIVE APTITUDE

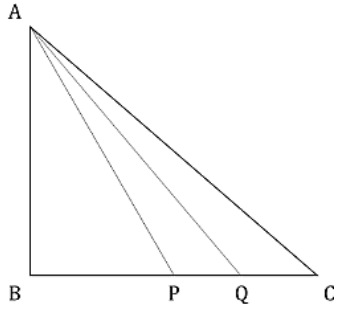
45. **(c)** Single-digit such numbers = 9

2-digit such numbers: __ __
Ten's digit can be filled in 9 ways (i.e., 1, 2, 3, …, 9)
Unit's digit can be filled in 9 ways (i.e., any of the 10 single digits except the one at ten's place)
⇒ Total such 2-digit numbers = 9 × 9 = 81

3-digit such numbers: __ __ __
Hundred's digit can be filled in 9 ways (i.e., 1, 2, 3, …, 9)
Ten's digit can be filled in 9 ways (i.e., any of the 10 single digits except the one at hundred's place)
Unit's digit can be filled in 8 ways (i.e., any of the 10 single digits except the ones at hundred's and ten's place)
⇒ Total such 3-digit numbers = 9 × 9 × 8 = 648

∴ Total such numbers = 9 + 81 + 648 = 738.
Hence, option (c).

46. **(2)**



Given, AB = 5 and BC = 12
Area of ΔABP = ½ × AB × BP = 2.5 × BP ...(1)
Area of ΔABQ = ½ × AB × BQ = 2.5 × BQ ...(2)
Area of ΔABC = ½ × AB × BC = 2.5 × BC ...(3)
Given, (3) = 1.5 × (1)
⇒ 2.5 BC = 1.5 × 2.5 × BP
⇒ BC = 1.5 × BP
⇒ 12 = 1.5 × BP
⇒ BP = 8
Also, Areas of ΔABP, ΔABQ and ABC are in arithmetic progression.
⇒ 2 × (2) = (1) + (3)
⇒ 2 × 2.5 × BQ = 2.5 × BP + 2.5 × BC
⇒ 2BQ = BP + BC
⇒ 2BQ = 8 + 12
⇒ BQ = 10
∴ PQ = BQ – BP = 10 – 8 = 2
Hence, 2.

47. **(d)** Let the initial quantity of coffee in the jar be 100 kg and r kg is replaced each time.
Since r kg out of 100 kg is removed, fraction of coffee removed = r/100
∴ fraction of coffee remaining = $(1-\frac{r}{100})$
⇒ Quantity of coffee remaining after first replacement = $100 \times (1-\frac{r}{100})$
And quantity of cocoa after first replacement = r kgs.
⇒ Similarly, quantity of coffee remaining after second replacement = $100 \times (1-\frac{r}{100})^2$
Now, after 2nd replacement coffee and cocoa are in the ratio of 16 : 9
⇒ Quantity of coffee left after 2nd replacement = $\frac{16}{16+9} \times 100$ = 64 kg
⇒ $100 \times (1-\frac{r}{100})^2 = 64$
⇒ $(1-\frac{r}{100})^2 = \frac{64}{100}$
⇒ $= (1-\frac{r}{100}) = \frac{8}{10} = \frac{4}{5}$
⇒ r = 20 kg
∴ 20 kg of cocoa is added after 1st replacement.
Also, quantity of cocoa after 2nd replacement = 100 – 64 = 36 kgs
⇒ Required ratio = 20 : 36 = 5 : 9.
Hence, option (d).

48. **(d)** Total distance travelled at the end of the trip = 26,862.
This includes the distance which car had travelled before the trip and the distance it travels in the 8 hours of the trip.
To maximize speed in 8 hours, we need to maximize distance travelled in 8 hours.
∴ We need to minimize the distance travelled by car before the trip starts, hence we need to minimize x.
Since Brishti drove at less than 110 kmph, hence she must have travelled less than 110 × 8 = 880 kms in the last 8 hours.
∴ She must have travelled more than 26862 – 880 = 25,982 kms before the last 8 hours.
⇒ x > 25,982 and it has to be a palindrome.
Least palindrome greater than 25,982 is 26062.
∴ Car travelled at least 26062 kms before the trip, hence maximum distance travelled during the trip = 26862 – 26062 = 800 kms.
⇒ Maximum average speed for the trip = 800/8 = 100 kmph.
Hence, option (d).

49. **(a)** Given, $x^2 + (x - 2y - 1)^2 = -4y(x + y)$
⇒ $x^2 + (x - 2y - 1)^2 = -4yx - 4y^2$
⇒ $x^2 + 4yx + 4y^2 + (x - 2y - 1)^2 = 0$
⇒ $(x^2 + 2 \times x \times 2y + (2y)^2) + (x - 2y - 1)^2 = 0$
⇒ $(x + 2y)^2 + (x - 2y - 1)^2 = 0$
Sum of squares of two number can be 0 only when both the numbers are 0.
∴ x + 2y = 0 and x – 2y – 1 = 0
⇒ x – 2y = 1
Hence, option (a).

50. **(3) Case 1:** $x \geq 0 \Rightarrow |x| = x^2$
∴ $2 \times x \times (x^2 + 1) = 5x^2$
⇒ $2x(x^2 + 1) = 5x^2$
⇒ $2x(x^2 + 1) - 5x^2 = 0$
⇒ $x(2x^2 – 5x + 2) = 0$
⇒ $x(2x^2 – 4x - x + 2) = 0$
⇒ x(2x - 1)(x - 2) = 0
⇒ x = 0 or ½ or 2.
We need only integral solutions hence acceptable answers are 0 and 2.
Case 1: $x < 0 \Rightarrow |x| = -x$
∴ $2 \times -x \times (x + 1) = 5x^2$
⇒ $-2x(x^2 + 1) = 5x^2$
⇒ $2x(x^2 + 1) + 5x^2 = 0$
⇒ $x(2x^2 + 5x + 2) = 0$
⇒ $x(2x^2 + 4x + x + 2) = 0$
⇒ x(2x + 1)(x + 2) = 0
⇒ x = 0 or -1/2 or -2
We need only integral solutions hence acceptable answers are 0 and -2.
∴ Acceptable integral solutions are -2, 0 and 2, i.e., 3 integral solutions.
Hence, 3.

51. **(d)** Let the selling price be Rs. x
Cost price of item sold to A = x/1.2
Cost price of item sold to B = x/0.9
To make calculations easier assume x = 108 (LCM of 12 and 9)
∴ Cost price of item sold to A = x/1.2 = 90
∴ Cost price of item sold to B = x/0.9 = 120
Now, selling price is increased such that a profit of 10% is made for item B.
⇒ New selling price = 120 × 1.1 = Rs. 132
∴ For A, cost price = Rs. 90 and selling price = Rs. 132.
⇒ % profit for A = $\frac{(132-90)}{90} \times 100\% = 46.66\% \approx 47\%$.
Hence, option (d).

52. **(24/11)** The angle between the two hands at h hours and m minutes = $|30h - \frac{11}{2} m|$
∴ Angle at 8:48 am = $|30 \times 8 - \frac{11}{2} \times 48| = |240 - 264| = 24°$.
Now, the angle between the two hands should increase by 50% i.e., 12°.
Relative speed of the two hands = 6 – ½ = 11/2°/min.
∴ Time taken for angle to increase 12° = $\frac{12}{11/2} = \frac{24}{11}$ minutes.

53. **(6)** α and β be two distinct root of $2x^2 – 6x + k = 0$,

$\therefore \alpha + \beta = -(-6)/2 = 3$
And, $\alpha \times \beta = k/2 = k/2$
Now, 3 and k are the roots of the equation $x^2 - px - p = 0$.
$\therefore$ Sum of the roots $= 3 + k/2 = -(p)/1 = -p$ ...(1)
$\therefore$ Product of the roots $= 3 \times k/2 = (p)/1 = p$ ...(2)
(1) + (2)
$\Rightarrow 3 + k/2 + 3k/2 = p - p = 0$
$\Rightarrow k = -3/2$
$\Rightarrow p = -9/4$ [from (2)]
Now, we need to find 8(k - p)
$= 8\left(\frac{-3}{2} - \frac{-9}{4}\right)$
$= 8\left(\frac{3}{4}\right)$
$= 6$
Hence, 6.

54. **(20808)** Half yearly interest = 4/2 = 2%.
Amount Anil gets after 6 years $= 22000 \times \left(1 + \frac{2}{100}\right)^{6\times2}$
Let the amount which Sunil invests = S.
Amount Sunil gets after 5 years $= S \times \left(1 + \frac{2}{100}\right)^{5\times2}$
Sunil invests this amount for 6th year at 10% p.a.
$\therefore$ Amount Sunil gets at the end of 6 years $= S \times \left(1 + \frac{2}{100}\right)^{5\times2} \times 1.1$
$\Rightarrow S \times \left(1 + \frac{2}{100}\right)^{5\times2} \times 1.1 = 22000 \times \left(1 + \frac{2}{100}\right)^{5\times2}$
$\Rightarrow S \times 1.1 = 22000 \times \left(1 + \frac{2}{100}\right)^{2}$
$\Rightarrow S = 20000 \times (1.02)^2$
$\Rightarrow S = 20000 \times 1.0404 = 20,808.$
Hence, 20808.

55. **(972)** After meeting they take 6 and 24 hours to reach opposite end.
$\therefore$ Time taken to meet $= \sqrt{6 \times 24} = \sqrt{144} = 12$ hours.
$\Rightarrow$ X takes a total of 12 + 6 = 18 hours to reach from A to B.
$\therefore$ Distance between A and B = distance travelled by X in 18 hours $= 18 \times 54 = 972$ kms.
Hence, 972.

56. **(d)** Given, $\log(x^2 + 12) = 4$
$\Rightarrow x^2 + 12 = x4$
$\Rightarrow a + 12 = a^2$ [Take $x^2 = a$]
$\Rightarrow a^2 - a - 12 = 0$
$\Rightarrow (a - 4)(a + 3) = 0$
$\Rightarrow a = -3$ or 4. [$a = x^2$ cannot be negative hence -3 is rejected]
$\Rightarrow x^2 = 4$
$\Rightarrow x = \pm 2$ [x = -2 is rejected as log is not defined for negative numbers]
$\Rightarrow x = 2$
Also, $3\log_y x = 1$
$\Rightarrow 3\log_y 2 = 1$
$\Rightarrow \log y\ 2^3 = 1$
$\Rightarrow 2^3 = y^1$
$\Rightarrow y = 8$
$\therefore x + y = 2 + 8 = 10$
Hence, option (d).

57. **(19)** Number of micro-organisms on day 1 = 2
Number of micro-organisms on day $2 = 2 \times 2 + 3 = 2^2 + 3$
Number of micro-organisms on day $3 = 2 \times (2 + 3) + 3 = 2^3 + 3 \times (2 + 1)$
Number of micro-organisms on day $4 = 2 \times (2 + 3 \times (2 + 1)) + 3 = 2^4 + 3 \times (2^2 + 2 + 1)$
Number of micro-organisms on day $5 = 2 \times (24 + 3 \times (22 + 2 + 1)) + 3 = 2^5 + 3 \times (2^3 + 2^2 + 2 + 1)$
$\therefore$ Number of micro-organisms at the end of day $n = 2^n + 3 \times (2^{n-2} + \ldots + 2 + 2 + 1) = 2 \times 2^{n+1} + 3 \times (2^{n-1} - 1)$
$= 5 \times 2^{n-1} - 3$
Now, $5 \times 2^{n-1} - 3 \geq 10,00,000$
$\Rightarrow 2^{n-1} \geq 2,00,000 + 3/5$
The least value of (n - 1) satisfying above inequality is 18.
$\Rightarrow n - 1 = 18$
$\Rightarrow n = 19$
Hence, 19.

58. **(c)** $168 = 2^3 \times 21 = 2^3 \times 3 \times 7$
$1134 = 2 \times 567 = 2 \times 3^4 \times 7$
Now $(1134)^n = 2^n \times 34^n \times 7^n$
Since 168 ($2^3 \times 3 \times 7$) completely divides 1134_n ($2^n \times 34^n \times 7^n$)
$\Rightarrow$ Power of 2 in $1134_n \geq$ Power of 2 in 168
$\Rightarrow n \geq 3$
Similarly, we can check for power of 3 and power of 7 and we get the least value of n = 3.
Now $(168)^m = 2^{3m} \times 3^m \times 7^m$
Since 1134^n ($2^n \times 3^{4n} \times 7^n = 2^3 \times 3^{12} \times 7^3$) completely divides $168m$ ($2^{3m} \times 3^m \times 7^m$)
$\Rightarrow$ Power of 3 in $168^m \geq$ Power of 3 in 1134^n
$\Rightarrow m \geq 12$
Similarly, we can check for power of 2 and power of 7 and we get the least value of m = 12.
$\therefore n + m = 3 + 12 = 15$
Hence, option (c).

59. **(2)** Let p and q be the other two real roots of the given cubic equation.
Product of the three roots of the given cubic equation $= -\frac{2}{1}$
$= -2 \times p \times q$
$\Rightarrow q = 1/p$
$\therefore$ The three roots are -2, p and 1/p
Sum of the three roots of the given cubic equation $= -\frac{2r+1}{1} =$
$-2 + p + \frac{1}{p}$
$\Rightarrow p + \frac{1}{p} = -2r + 1$
We know than sum of a number and its reciprocal is either less than or equal to - 2 or greater than or equal to 2.
$\Rightarrow 2 \leq p + \frac{1}{p} \leq -2$
$\Rightarrow 2 \leq -2r + 1 \leq -2$
$\Rightarrow 1 \leq -2r \leq -3$
$\Rightarrow -1/2 \geq r \geq 3/2$
$\therefore$ Least non-negative integral value of r is 2.
Hence, 2.

60. **(a)** Let the initial salaries of A, B and C be 5x, 6x and 7x respectively.
Salary of A increases by 20% and then by 40%.
$\therefore$ Salary of A after 2 years $= 5x \times 1.2 \times 1.4 = 8.4x$
Salary of C increases by 20% and then by 25%.
$\therefore$ Salary of C after 2 years $= 7x \times 1.2 \times 1.25 = 10.5x$
At the end of 2 years, B's salary is average of all three, hence B's salary will also be average of salaries of A and C.
$\Rightarrow$ Salary of B after 2 years $= (8.4x + 10.5x)/2 = 9.45$
Let the % increase in B's salary be P% in 2 year. Increase in first year is 25%.
$\Rightarrow 9.45x = 6x \times 1.25 \times (1 + P/100)$

⇒ (1 + P/100) = 9.45/7.5 = 1.26
⇒ P = 26%
Hence, option (a).

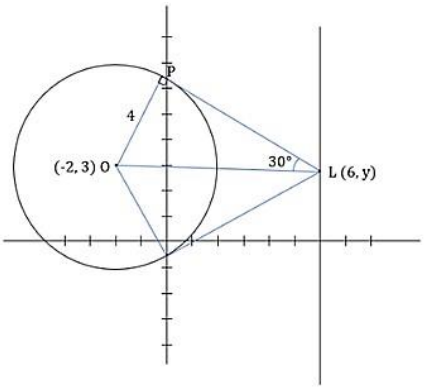
61. **(c)** Let the average marks of a boy and girl be b and g respectively.
Given, (4g + 6b)/10 = 24
⇒ 4g + 6b = 240
⇒ 2g + 3b = 120 ...(1)
Also, b ≤ g ≤ 2b
⇒ 2b ≤ 2g ≤ 4b
⇒ 5b ≤ 2g + 3b ≤ 7b ...(2)
From (1) & (2), we get
5b ≤ 120 ≤ 7b
⇒ b ≤ 24 and b ≤ 17(1/7) ...(3)
Now we need to find integral values of 2g + 6b
= 2g + 3b + 3b
= 120 + 3b
120 + 3 × 120/7 ≤ 120 + 3b ≤ 120 + 3 × 24 ...from (3)
⇒ 171.42 ≤ 120 + 3b ≤ 192
∴ Integral possible values of 2g + 6b are from 172 till 192 i.e., 21 possible integral values.
Hence, option (c).

62. **(27)** Let the time taken by A and K to complete a work is x and 2x days respectively.
Work done in a day is the efficiency of a person.
Hence, if efficiencies of A, S and K are in Harmonic Progression, time taken by them to finish a work will be in Arithmetic Progression.
∴ Time taken by S alone is arithmetic mean of time taken by A and K alone.
⇒ Time taken by S alone = (x + 2x)/2 = 1.5x
Using unitary method
$\Rightarrow 1 = \frac{1}{x} \times 4 + \frac{1}{1.5x} \times 9 + \frac{1}{2x} \times 16$
⇒ x = 4 + 6 + 8
⇒ x = 18
∴ S will take 1.5 × 18 = 27 days to finish the job alone.
Hence, 27.

63. **(a)** Given, $\sqrt{5x+9} + \sqrt{5x-9} = 6 + 3\sqrt{2}$
$\Rightarrow \sqrt{5x+9} + \sqrt{5x-9} = \sqrt{36} + \sqrt{18}$
$\therefore \sqrt{5x+9} = \sqrt{36}$ and $\sqrt{5x-9} = \sqrt{18}$
$\Rightarrow 5x + 9 = 36$ and $5x - 9 = 18$
$\Rightarrow 5x = 27$
$\Rightarrow 10x = 54$
$\Rightarrow 10x + 9 = 63$
$\Rightarrow \sqrt{10x+9} = \sqrt{63}$
$\Rightarrow \sqrt{10x+9} = 3\sqrt{7}$
Hence, option (a).

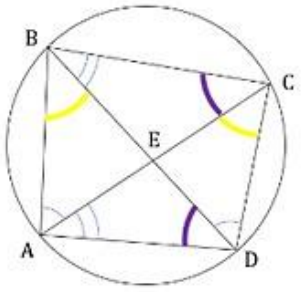
64. **(b)** Given, $\frac{2}{\sqrt{y}+\sqrt{z}} = \frac{1}{\sqrt{x}+\sqrt{z}} + \frac{1}{\sqrt{x}+\sqrt{y}}$
$\Rightarrow \frac{2}{\sqrt{y}+\sqrt{z}} = \frac{\sqrt{x}+\sqrt{y}+\sqrt{x}+\sqrt{z}}{(\sqrt{x}+\sqrt{z})(\sqrt{x}+\sqrt{y})}$
$\Rightarrow 2(\sqrt{x}+\sqrt{z})(\sqrt{x}+\sqrt{y}) = (2\sqrt{x}+\sqrt{y}+\sqrt{z})(\sqrt{y}+\sqrt{z})$
$\Rightarrow 2x + 2\sqrt{xy} + 2\sqrt{zx} + 2\sqrt{zy} = 2\sqrt{xy} + 2\sqrt{xz} + y + \sqrt{yz} + zy + z$
$\Rightarrow 2x = y + z$
∴y, x and z are in Arithmetic Progression
Hence, option (b).

65. **(c)** 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 degree. Then, the point at which L touches the line x = 6 is?
Given, $x^2 + y^2 + 4x - 6y - 3 = 0$
⇒ $x^2 + 4x + 4 + y - 6y + 9 - 3 - 4 - 9 = 0$ [Adding and Subtracting 4 and 9]
⇒ $(x + 2)^2 + (y - 3)^2 = 16$
⇒ $(x + 2)^2 + (y - 3)^2 = 4^2$
This represents the equation of a circle with radius = 4 units and center (O) at (-2, 3).
Point L lies on line x = 6, hence x-coordinate of L is 6. Let y-coordinate of L be 'y'.
Let P be the point where tangent from L touches the given circle.



ΔLOP is a 30-60-90° triangle.
⇒ OL = 2 × OP = 8
$\therefore$ OL = $8 = \sqrt{(6-(-2))^2 + (3-y)^2}$
⇒ $64 = (8)^2 + (3 - y)^2$
⇒ y = 3
∴ Coordinate of L = (6, 3)
Hence, option (c).

66. **(d)**



∠DAC = ∠DBC [angle subtended in same segment by same chord are equal]
Similarly,
∠ADB = ∠ACB
∠CDB = ∠CAB
∠ACD = ∠ABD
ΔAED is similar to ΔBEC
[∠DAC = ∠DBC and ∠ADB = ∠ACB]
$\therefore \frac{ED}{EC} = \frac{AD}{BC} = \frac{4}{5}$...(1)
ΔAEB is similar to ΔDEC
[∠CDB = ∠CAB and ∠ACD = ∠ABD]
$\therefore \frac{AE}{ED} = \frac{AB}{CD} = \frac{2}{1}$...(2)
(1) × (2)

$\Rightarrow \frac{ED}{EC} = \frac{AE}{ED} = \frac{4}{5} \times \frac{2}{1} = \frac{8}{5}$

Hence, option (d).