CAT 2023 Qusetion paper with Solution -Slot1

Verbal Ability & Reading Comprehension (VARC)

Reading Comprehension (RC)

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

RC 1:

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 straightforward 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 professional training.

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

2.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.

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

4.The author criticises scholars who are not geographers for all of the following reasons EXCEPT:
    A. their rejection of the role of biogeographic factors in social and cultural phenomena.
    B. their outdated interpretations of past cultural and historical phenomena.
    C. their labelling of geographic explanations as deterministic.
    D. the importance they place on the role of individual decisions when studying human phenomena.

RC 2:

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 too 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.

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

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

7. On the basis of the nature of the relationship between the items in each pair below, choose the odd pair out:
    A. Postcolonial novels: Border-crossing
    B. Postcolonial novels: Anti-colonial nationalism

C. Indian Ocean world: Slavery
D. Indian Ocean novels: Outward-looking

8. 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. very few mainstream English-language novels have historically been set in American and European metropolitan centres.
   D. the depiction of Africa in most Indian Ocean novels is driven by a postcolonial nostalgia for an idyllic past.

RC 3:

[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 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.

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

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

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

12. 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. document the influence of Galbraith's cynical views on modern consumerism on Sahlins's analysis of pre-historic societies.
    C. show how Galbraith's theories refute Sahlins's thesis on the contentment of pre-hunter-gatherer communities.
    D. show how Sahlins's views complemented Galbraith's criticism of the consumerism and inequality of contemporary society.

RC4

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.

13. The inhabitants of Lozère have to grapple with all of the following problems, EXCEPT:
   A. poor rural communication infrastructure.
   B. lack of educational facilities.
   C. decline in the number of hunting licences.
   D. livestock losses.

14. 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.

15. The author presents a possible economic solution to an existing issue facing Lozère that takes into account the divergent and competing interests of:
   A. tourists and environmentalists.
   B. environmentalists and politicians.
   C. politicians and farmers.
   D. farmers and environmentalists.

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

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: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 2
   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: 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 1
   B. Option 2
   C. Option 4
   D. Option 3

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. 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. 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.

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. 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.

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. 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?

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. Use of misinformation for attaining power, a practice that is as old as the Octavian era, is currently fueled by technology.

    D. Octavian used fake news to manipulate people and attain power and influence, just as people do today.

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. Colonialism, conceptualized in the 16th century, allowed colonizers to expand their territories, establish settlements, and exercise political power.

    D. Technological advancements in navigation in the 16th century, transformed colonialism, enabling Europeans to establish settlements and exert political dominance over distant regions.

Logical Reasoning & Data Interpretation

i. 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.

1. Which two candidates can belong to the same department?
 A. Prof. Pakrasi and Prof. Samuel
 B. Prof. Pakrasi and Prof. Qureshi
 C. Prof. Qureshi and Prof. Ramaswamy
 D. Prof. Ramaswamy and Prof. Samuel

2. Which of the following can be the number of votes that Prof. Qureshi received from a single department?
 A. 8
 B. 7
 C. 9
 D. 6

3. 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. Both statements A and B
 B. Only statement B
 C. Only statement A
 D. Neither statement A nor statement B

4. What best can be concluded about the candidate from O&Q?
 A. It was either Prof. Pakrasi or Prof. Qureshi.
 B. It was Prof. Samuel.
 C. It was Prof. Ramaswamy.
 D. It was either Prof. Ramaswamy or Prof. Samuel.

5. 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. Only statement B
 B. Only statement A
 C. Both statements A and B

D. Neither statement A nor statement B

ii. 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.

6. How many individual ratings cannot be determined from the above info
rmation?
7. To how many workers did R2 give a rating of 4?
8. What rating did R1 give to Xavier?
9. What is the median of the ratings given by R3 to the five workers?
10. Which among the following restaurants gave its median rating to exactly one of the
workers?
   A. R5
   B. R2
   C. R3
   D. R4

iii.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.

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

12. 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?

13. Which of the following is the closest to the time when Nandini's application process got over?
   A. 9:35 am
   B. 9:50 am
   C. 9:37 am
   D. 9:45 am

14. Which of the following statements is false?
   A. The application process of Mahira was completed before 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 started after Nandini's.

15. When did the application processing for all US applicants get over on that day?
   A. 2:25 pm
   B. 3:40 pm
   C. 2:00 pm
   D. 2:05 pm

iv. 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.
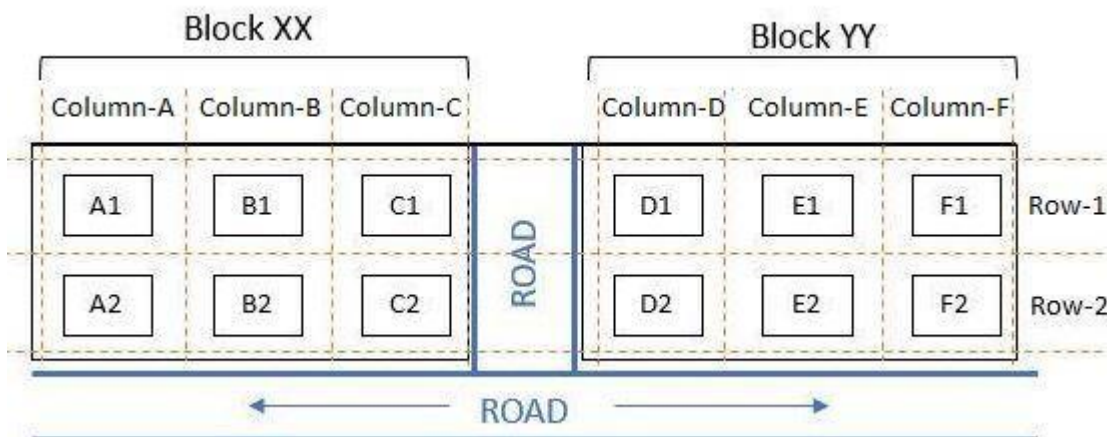
Some of the houses are occupied. The remaining ones are vacant and are the only ones available for

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) + $5 \times$ (road adjacency value) + $3 \times$ (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.

16. How many houses are vacant in Block XX?

17. Which of the following houses is definitely occupied?
    A. F2
    B. D2
    C. D2 or B1
    D. A1

18. Which of the following options best describes the number of vacant houses in Row-2?
    A. Either 3 or 4
    B. Either 2 or 3
    C. Exactly 3
    D. Exactly 2

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

20. Which house in Block YY has parking space?
    A. F2
    B. F1
    C. E2
    D. E1

Quantitative Ability

1.If x and y are positive real numbers such that $\log_x(x^2+12)=4\log$ and $3\log_y x=1$,then x+y equals
    A. 20
    B. 11
    C. 68
    D. 10

2. If x and y are real numbers such that $x^2+(x-2y-1)2=-4y(x+y)$, then the value $x-2y$ is
    A. 0
    B. 1

C. 2
D. -1

3. $\sqrt{5x+9} + \sqrt{5x-9} = 3(2+\sqrt{2})$ then, $\sqrt{10x+9}$ is equal to
   A. $4\sqrt{5}$
   B. $2\sqrt{7}$
   C. $3\sqrt{31}$
   D. $3\sqrt{7}$

4. Let n be the least positive integer such that 168 is a factor of 1134^n1134. If m is the least positive integer such that 1134^n is a factor of 168^m, then $m+n$ equals
   A. 12
   B. 9
   C. 15
   D. 24

5. The number of integer solutions of equation $2|x|[x^2+1] = 5x^2$ is

6. Let α and be the two distinct roots of the equation $x^2-6x+\kappa=0$, such that $(\alpha+\beta)$ and $\alpha\beta$ are the distinct roots of the equation $x^2+px+p=0$. Then, the value of $8(\kappa-p)$ is

7. 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

8. Brishti went on an 8-hour trip in a car. Before the trip, the car had travelled a total of x km till then, where x is a whole number and is palindromic, i.e., x remains unchanged when its digits are reversed. At the end of the trip, the car had travelled a total of 26862 km till then, this number again being palindromic. If Brishti never drove at more than 110 km/h, then the greatest possible average speed at which she drove during the trip, in km/hkm/h, was
   A. 90
   B. 100
   C. 80
   D. 110

9. The minor angle between the hours hand and minutes hand of a clock was observed at 8:48am. The minimum duration, in minutes, after 8.48 am when this angle increases by 50% is
   A. 36/11
   B. 24/11
   C. 2
   D. 4

10. 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. 19
   B. 21
   C. 20
   D. 22

11. 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. 5: 9
    D. 1: 2

12. 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. 28%
    C. 25%
    D. 30%

13. 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. 42%
    B. 47%
    C. 45%
    D. 49%

14. 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

15. The amount of job that Amal, Sunil and Kamal can individually do in a day, are in harmonic progression. Kamal takes twice as much time as Amal to do the same amount of job. If Amal and Sunil work for 4 days and 9 days, respectively, Kamal needs to work for 16 days to finish the remaining job. Then the number of days Sunil will take to finish the job working alone, is

16. 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

17. Let CC 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. (6,4)
B. (6,8)
C. (6,3)
D. (6,6)

18. 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. 1: 2
    B. 5: 8
    C. 8: 5
    D. 2: 1

19. In a right-angled triangle ABC, the altitude AB is 5 cm, and the base BC is 12 cm. P and Q are two points on BC such that the areas of 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

20. For some positive and distinct real numbers x,yand 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. √x, √ z and √y are in arithmetic progression.
    C. y, x and z are in arithmetic progression.
    D. x, y and z are in arithmetic progression.

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

    A. 585
    B. 504
    C. 648
    D. 738

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

Answers
Verbal Ability & Reading Comprehension (VARC)

1. C	2.A	3.C	4.B	5.C	6.C	7.A	8.A	9.C	10.A	11.D	12.D
13.C	14.B	15.D	16.A	17.C	18.D	19.**3**	20.**2**	21.**4123**	22.**4123**	23.C	24.D

Logical Reasoning & Data Interpretation (LRDI)

1.**B**	2.**C**	3.A	4.**D**	5.A	6.**0**	7.**0**	8.**3**	9.**4**	10.**D**
11.**0**	12.**200**	13.D	14. D	15.D	16.**3**	17.C	18.**B**	19.**21**	20.D

Quantitative Aptitude (QA)

1.**D**	2.**B**	3.**D**	4.**C**	5.**3**	6.**6**	7.**2**	8.**B**	9.**B**	10.**B**	11.**C**
12.**A**	13.**B**	14.**972**	15.**27**	16.**20808**	17.**C**	18.**C**	19.**2**	20.**C**	21.**D**	22.**19**

Solution
Verbal Ability & Reading Comprehension (VARC)
Solution 1
All options except C are inferred from the passage. The passage does not state or imply that 'most' human phenomena result from culture and individual choice and only some by biogeographic factors. The main idea of the passage is that human phenomena are influenced both by geographic factors and by non-geographic factors and that denouncing geographic determinism is nonsensical.

Option A is inferred from the lines,'...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.'

Option B is inferred from the line, '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 D is inferred from the lines, '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...'

The question is **" All of the following can be inferred from the passage EXCEPT: "**
Hence, the answer is 'while most human phenomena result from culture and individual choice, some have bio-geographic origins.'
Choice C is the correct answer.

Solution 2
The reasons mentioned in options B, C and D are clearly stated in the passage.

The line, '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' relates to option B.

Option C relates to the line, 'One reason is that some geographic explanations advanced a century ago were racist...'

Option D relates to the last two lines of the passage.

Option A, on the other hand, does not provide a reason for the disregard of geographic influences by non-geographers. So, this is the correct answer choice.

The question is **" All of the following are advanced by the author as reasons why non-geographers disregard geographic influences on human phenomena EXCEPT their: "**

Hence, the answer is 'dismissal of explanations that involve geographical causes for human behaviour.'
Choice A is the correct answer.

Solution 3
The passage gives the example of the Inuit peoples to illustrate the role of geographic factors and the example of Aboriginal Australians to illustrate the role of biogeographic factors on human phenomena and characteristics. That is, these examples are offered in the passage to show how physical circumstances can dictate human behavior and cultures. So, option C is the right choice.

Options B and D are easily ruled out. While option A also talks about 'environmental factors', this option is not the right choice as the examples are not given to illustrate how environmental factors influence livelihoods and development as such but how they influence, more generally, human characteristics and cultures.

The question is **" The examples of the Inuit and Aboriginal Australians are offered in the passage to show: "**
Hence, the answer is 'how physical circumstances can dictate human behaviour and cultures.'
Choice C is the correct answer.

Solution 4
All options except B relate to the contents of the passage. The author does not state or imply that scholars who are not geographers make outdated interpretations of past cultural and historical phenomena.

Options A and C true, based on the lines, '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"...'

Option D is true, based on the lines, '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 question is **" The author criticises scholars who are not geographers for all of the following reasons EXCEPT: "**
Hence, the answer is 'their outdated interpretations of past cultural and historical phenomena.'
Choice B is the correct answer.

Solution 5
The 'Indian Ocean world', as described in the passage relates to the interconnected oceanic world of the global south (East Africa, the Arab coasts, and South and East Asia) with long-lasting connections made possible by sea travel in the Indian Ocean. The passage states that the global south was the first center of globalisation ('Historical and archaeological evidence suggests that what we now call globalisation first appeared in the Indian Ocean') and that the world of early international

trade and commerce was not the sole domain of 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..'). So, options A, B and D are true.

Option C is the opposite of what the passage states.

The question is **" All of the following claims contribute to the "remapping" discussed by the passage, EXCEPT: "**
Hence, the answer is 'cosmopolitanism originated in the West and travelled to the East through globalisation.'
Choice C is the correct answer.

Solution 6
The passage does not state or imply that the Indian Ocean world's migration networks connected the global north with the global south. Option C is not true.

Option A is true :'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'

Option B, too, is true. The passage states that the Indian Ocean world references a different set of histories and geographies than the ones most commonly found in fiction in English, which 'assume a background of Christianity and whiteness, and mention places like Paris and New York'. The interconnected portcities of the global south feature a largely Islamic space and a cosmopolitan culture.

Option D is also true. On migration in the Indian Ocean world, the passage states 'Migration is often a matter of force; travel is portrayed as ambivalent rather than adventure, freedoms are kept from women and slavery is rife.'

So, option C is the correct answer choice.

The question is **" Which one of the following statements is not true about migration in the Indian Ocean world? "**
Hence, the answer is 'The Indian Ocean world's migration networks connected the global north with the global south.'
Choice C is the correct answer.

Solution 7
All given relationships are valid except option A. According to the passage, postcolonial novels were usually concerned with national questions and did not involve border crossing.

The question is **" On the basis of the nature of the relationship between the items in each pair below, choose the odd pair out: "**
Hence, the answer is 'Postcolonial novels : Border-crossing'
Choice A is the correct answer.

Solution 8

The passage claims mainstream English-language fiction and Indian Ocean novels are unlike each other and set in different worlds.

Option A, if true, strengthens the passage's claim. All other statements, if true, weaken the passage's claim.

If the depiction of Africa in most Indian Ocean novels is driven by an Orientalist imagination of its cultural crudeness, then the Indian Ocen novels would be no different from mainstream English-language fiction. So, option B, if true, weakens the passage's claim.

The passage states that most mainstream English-language novels have historically been set in American and European metropolitan centres. Option C, if true, weakens the passage's claim.

According to the passage, in the Indian Ocean novels, the depiction of Africa is not romanticised. Option D, too, if true, would weaken the passage's claim.

The question is **" 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: "**
Hence, the answer is 'most mainstream English-language novels have historically privileged the Christian, white, male experience of travel and adventure.'
Choice A is the correct answer.

Solution 9

The passage states that the main point of Sahlin's essay was to provide a 'conceptual challenge to contemporary economic life and bourgeois individualism'. The essay 'served a philosophical and political project, a thought experiment and stimulus to the imagination of possibilities' that showed that radical alternatives to the readers' lives really exist. From this we infer that Sahlins' main goal in writing his essay was to hold a mirror to the capitalist acquisitive society and to give examples of other communities that have chosen successfully to be non-materialistic. Option C is the correct choice.

Option A is incorrect. The passage does not say that foragers had an 'egalitarian' society. Nor does the essay, according to the passage, state that we have 'progressively degenerated' into materialism.

Option B implies that, according to Sahlins' essay, economic progress had egalitarian origins. This is incorrect.

The passage states that the title of Sahlins' essay is a 'nod toward' Galbraith's work. That is, Sahlin is in agreement with Galbraith. So, option D is also incorrect.

The question is " We can infer that Sahlins's main goal in writing his essay was to: "
Hence, the answer is 'hold a mirror to an acquisitive society, with examples of other communities that have chosen successfully to be non-materialistic.'
Choice C is the correct answer.

Solution 10

Note the context in which the author talks about the Hadza: '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.' So, option A is the correct choice.

The question is **'' The author mentions Tanzania's Hadza community to illustrate: ''**
Hence, the answer is 'that forager communities' lifestyles derived not from ignorance about alternatives, but from their own choice.'
Choice A is the correct answer.

Solution 11
Note the lines, '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.' The author criticises Sahlins' cursory treatment of the effects of racism and colonialism on societies. Option D is the correct choice.

The question is **'' The author of the passage criticises Sahlins's essay for its: ''**
Hence, the answer is 'cursory treatment of the effects of racism and colonialism on societies.'
Choice D is the correct answer.

Solution 12
While mentioning Galbraith's "The Affluent Society" , the passage states that the title of Sahlins' essay is a 'nod toward' Galbraith's famously skeptical portrait of America's postwar prosperity and inequality. That is, Sahlin is in agreement with Galbraith. His views complemented Galbraith's criticism of consumerism and inequality of contemporary society. Option D is the correct choice.

The question is **'' The author of the passage mentions Galbraith's ''The Affluent Society'' to: ''**
Hence, the answer is 'show how Sahlins's views complemented Galbraith's criticism of the consumerism and inequality of contemporary society.'
Choice D is the correct answer.

Solution 13
All options except C are correct. The passage starts by saying residents of Lozère 'recite complaints familiar to many rural corners of Europe'- a lack of local schools, jobs, or phone and internet connections. It goes on to talk of an additional concern: livestock losses due to the return of wolves.

The question is **'' The inhabitants of Lozère have to grapple with all of the following problems, EXCEPT: ''**
Hence, the answer is 'decline in the number of hunting licences.'
Choice C is the correct answer.

Solution 14
The passage states that the granting of a protected status to wolves in Europe, an increase in woodlands and forest cover in France and a decline in the rural population of Lozère have contributed to a growing wolf population in Lozère. The Luparii, according to the passage 'completed their job in the 1930s, when the last wolf disappeared from the mainland'. The shutting down of the royal office of the Luparii is hence not a factor contributing to the growing wolf population in Lozère.

The question is **" Which one of the following has NOT contributed to the growing wolf population in Lozère? "**
Hence, the answer is 'The shutting down of the royal office of the Luparii.'
Choice B is the correct answer.

Solution 15

The views of farmers and environmentalists are divergent and competing, with the former being concerned about the growing wolf population and the latter being delighted by it. Tourists side with environmentalists as they enjoy visiting wolf parks. Option D is the correct choice.

The question is **" The author presents a possible economic solution to an existing issue facing Lozère that takes into account the divergent and competing interests of: "**
Hence, the answer is 'farmers and environmentalists.'
Choice D is the correct answer.

Solution 16

According to the author, tourists are happy with a growing wolf population as they enjoy visiting wolf parks. If wolf attacks on tourists in Lozère are on the rise, then it would weaken the author's claims. Option A is the correct choice.

None of the other options, if true, weaken the author's claims. Note that if the residents of Lozère were concerned with unemployment, they would not complain about the growing wolf population, as wolf parks, according to the author, generate income and jobs in rural areas.

The question is **" Which one of the following statements, if true, would weaken the author's claims? "**
Hence, the answer is 'Wolf attacks on tourists in Lozère are on the rise.'
Choice A is the correct answer.

Solution 17

Option 2 is the best choice. The given sentence says the philosophical cut at one's core beliefs, values, and way of life 'is difficult enough', suggesting there is more to add to this. The sentence following option 2 begins with 'what's worse...' fitting in well with the given sentence. Also note the the first part of the given sentence, 'this philosophical cut at one's core beliefs, values, and way of life', is explained by the lines before option 2.

The answer is 'Option 2'
Choice C is the correct answer.

Solution 18

Option 3 is the best choice to fit in the given sentence. The given sentence talks of a 'discovery'. The sentence before option 3 mentions the discovery: researchers found ancestral source that contributed to the Japanese gene pool. The given sentence also talks about 'archeological similarities' between the Paleolithic peoples of China, Japan, and the Americas. The sentence following option 3 relates to this. So, option 3 is the correct choice.

The answer is 'Option 3'
Choice D is the correct answer.

Solution 19
All given sentences except 3 relate to the lack of systematic rules for the naming of numbers in English. Option 3 is about how children take a while to learn these words, which is a slightly different idea. So, option 3 is the odd one out.

The answer is '3'

Solution 20
If we were to arrange the given sentences in a paragraph, sentence 5 is the best choice to begin the paragraph as it states the main idea. Sentence 5 talks about 'the ability to perceive and interpret other people's behaviour in terms of their mental states'. Sentence 4 follows 5 as it expands on how 'this capacity' develops. Sentence 1 follows 4, explaining how this capacity is useful and 3 concludes the paragraph commenting on when the stated capacity evolved.

Option 2 is the odd one out, as it talks about the importance of mentalizing on the development of one's cognitive abilities. This is not related to the other sentences.

The answer is '2'

Solution 21
Sentence 4 is the best one to start the paragraph, as it is the most general one and also because it talks of the 'advent of AI'.

41 is a strong link: 4 states that with the advent of AI, the impact of biased decisions is 'spread over a much wider scale'. 1 explains why this is so.

23 is also a strong link. 2 explains that the foundation of bias is not in algorithms, but in the data. 3 adds to 2, stating that AI biases are easier to fix than human-generated biases.

So, 4123 is the correct order.

The answer is '4123'

Solution 22
41 is a strong link. Both of these are questions related to why some crimes are destined for perpetual re-examination while others aren't. 4 goes before 1 as it is more general.

The answers to the question in 1 is given in 2. The "unusual elements" that make a particular case so attractive to a certain kind of audience may be a particularly savage or unfathomable level of depravity, something to do with the precise amount of mystery involved.

3 concludes the paragraph stating that unsolved or unsolvable cases offer something that "ordinary" murder does not.

4123 is the correct choice.

Solution 23

The key ideas of the paragraph are that (a) manipulating information for attaining power, that is, disinformation, is not new; it was used even in ancient Rome by Octavian and (b) technology has made fabricating content and amplifying falsehoods easier.

Option C states both key ideas and is the best of the given summaries.

Option A is incorrect as it states that disinformation is 'mediated by' technology today. This is not what the paragraph states.

Option B is unrelated to the main idea of the paragraph.

Option D focuses on Octavian whereas the paragraph only gives his example to illustrate how information has been manipulated since ancient times. C is a better summary than D.

The answer is 'Use of misinformation for attaining power, a practice that is as old as the Octavian era, is currently fueled by technology.'
Choice C is the correct answer.

Solution 24

The paragraph given states that colonialism is not a modern phenomenon but one that changed decisively in the sixteenth century due to technological developments in navigation, which enabled Europeans to establish settlements and exert political domination over the rest of the world.

Option D is the best of the given summaries.

Option A talks specifically about 'British' settlements, whereas the paragraph refers more generally to European settlements.

Option B refers specifically to 'European colonialism' and does not touch upon the idea that colonialism as such is not a modern phenomenon or one restricted to Europe.

Option C is incorrect as it states that colonialism was conceptualized in the 16th century.

The answer is 'Technological advancements in navigation in the 16th century, transformed colonialism, enabling Europeans to establish settlements and exert political dominance over distant regions.'
Choice D is the correct answer.

Quantitative Ability

Solution 1
$(x^2+12)=4$
This means, $x^2+12=x^4$
Let $k = x^2$
$k + 12 = k^2$
$k^2 - k - 12 = 0$

$k^2 - 4k + 3k - 12 = 0$

$k(k - 4) + 3(k - 4) = 0$

$k = 4$ or $k = -3$

But since $k = x^2$, k is always non-negative.

$\therefore k = 4$

$\therefore x^2 = 4$

Since x is the base of the log function, it can should always be positive.

$\therefore x = 2$

$3x = 1$

$x^3 = 1$

$x^3 = y^1$

$y = x^3 = 2^3 = 8$

$\therefore x + y = 2 + 8 = 10$

The question is " 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 "

Hence, the answer is '10'

Choice D is the correct answer.

Solution 2

$x^2+(x-2y-1)^2=-4y(x+y)$

$x^2+(2y)^2+2 \cdot x \cdot 2y+(x-2y-1)^2=0$

$(x+2y)^2+(x-2y-1)^2=0$

Since x & y are real numbers, $(x+2y)\,\&\,(x-2y-1)$ are both real.

A square of a real number is always non-negative.

For this reason, for the equation: $(x+2y)^2+(x-2y-1)^2=0$ to be true, both $(x+2y)\,\&\,(x-2y-1)$ must be equal to 0.

$x-2y-1=0$

$x-2y=1$

We solve the linear equations $(x+2y=0)\,\&\,(x-2y-1=0)$ to get the exact values of x & y, but that is not required to solve the question at hand.

The question is " If x and y are real numbers such that $x^2+(x-2y-1)^2=-4y(x+y)$, then the value x−2y is "

Hence, the answer is '1'

Choice B is the correct answer.

Solution 3

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

$$(5x+9) + (5x-9) + 2\sqrt{25x^2 - 9^2}$$

$$= 9(2+\sqrt{2})^2$$

$$10x + 2\sqrt{25x^2 - 9^2} = 9(4+2+4\sqrt{2})$$

$$5x + \sqrt{25x^2 - 9^2} = 9(3+2\sqrt{2})$$

$$\sqrt{25x^2 - 9^2} = 9(3+2\sqrt{2}) - 5x$$

$$25x^2 - 9^2 = 9^2(3+2\sqrt{2})^2 + 25x^2 - 2 \cdot 5x$$

$$\cdot 9(3+2\sqrt{2})$$

$$9 = (3+2\sqrt{2})(10x - 9(3+2\sqrt{2}))$$

$$9 = (3+2\sqrt{2})(10x + 9 - 9(4+2\sqrt{2}))$$

$$10x + 9 = 9\left(\frac{1}{3+2\sqrt{2}} + 4 + 2\sqrt{2}\right)$$

$$= 9\left(\frac{1 + 12 + 6\sqrt{2} + 8\sqrt{2} + 8}{3+2\sqrt{2}}\right)$$

$$10x + 9 = 9\left(\frac{21 + 14\sqrt{2}}{3+2\sqrt{2}}\right) = 9 \cdot 7$$

$$\therefore \sqrt{10x+9} = 3\sqrt{7}$$

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

Choice D is the correct answer.

Solution 4

The prime factorizations of 168 and 1134 are as follows:

$168 = 2^3 \times 3 \times 7$

$1134 = 2 \times 3^4 \times 7$

Clearly, the smallest positive integral value of n, such that 168 is a factor of 1134^n is 3.

$1134^n = 1134^3 = 2^3 \times 3^{12} \times 7^3$

Clearly, the smallest positive integral value of m, such that 1134^3 is a factor of 168^m is 12.

Therefore, m + n = 12 + 3 = 15

The question is " 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 "

Hence, the answer is '15'

Choice C is the correct answer.

Solution 5

$$2|x| \left(x^2 + 1\right) = 5x^2$$

Let |x| = k

$$2k \left(k^2 + 1\right) = 5k^2$$

Either k = 0; or 2(k^2 + 1) = 5k

$2k^2 - 5k + 2 = 0$

$2k^2 - 4k - k + 2 = 0$

2k(k − 2) −1(k − 2) = 0

(2k − 1)(k − 2) = 0

k = 0.5 or k = 2

Therefore, k which is |x|, can take the values 0, 0.5 or 2

So, x can take the values 0, -0.5, 0.5, -2, 2

Since we are looking for integral solutions, x can only take the values 0, 0.5 or 2

Therefore, there are only 3 integral solutions to $2|x| \left(x^2 + 1\right) = 5x^2$.

The question is " **The number of integer solutions of equation** $2|x| \left(x^2 + 1\right) = 5x^2$ is "

Hence, the answer is '3'

Solution 6

α and β are the distinct roots of the equation $2x^2 - 6x + k = 0$.

Therefore,

$\alpha + \beta = \frac{-(-6)}{2} = 3$

$\alpha \cdot \beta = \frac{k}{2}$

We know that $(\alpha + \beta)$ and (α, β) are the roots of the equation: $x^2 + px + p = 0$

$(\alpha + \beta) + (\alpha \cdot \beta) = 3 + \frac{k}{2} = \frac{-(p)}{1} = -p$

$(\alpha + \beta) \cdot (\alpha \cdot \beta) = 3\frac{k}{2} = \frac{p}{1} = p$

$k = \frac{2}{3}p$

$3 + \frac{k}{2} = 3 + \frac{p}{3} = -p$

$\frac{-4p}{3} = 3$

$p = -\frac{9}{4}$

$k = \frac{2}{3}p = -\frac{3}{2}$

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

The answer is '6'

Solution 7

$x^3 + (2r + 1)x^2 + (4r - 1)x + 2 = 0$

Since -2 is one of the roots, the cubic equation can be factored as...

$(x + 2)\left(x^2 + (2x - 1)x + 1\right) = 0$

Since the other two roots are real, $\left(x^2 + (2x - 1)x + 1\right) = 0$ has two real roots.

That is the discriminant of $\left(x^2 + (2x - 1)x + 1\right) = 0$ is non-negative.

$(2r - 1)^2 \geq 4$

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

Therefore the minimum possible non-negative integral value of r is 2.

The question is " **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** "

Hence, the answer is '2'

Solution 8

The distance travelled before the trip (x in km.) is a palindrome.

Let the average speed of Brishti be s kmph.

The total distance covered by Brishti after the trip is 26862 km.

The distance covered by Brishti during the trip is 8×s = 8s km.

x = 26862 − 8s

For x to be a palindrome, of the given options, s can only be 100.

Therefore, the average speed of Brishti during the trip is 100 kmph.

The answer is '100'

Choice B is the correct answer.

Solution 9

The hour hand completes one full rotation in 12 hours, rotating in the clockwise direction.

08:48 is the time elapsed after 8.8 hours(and not 8.48 hours) from 12-o-clock. This means the angle covered by the hour hand is

$$\frac{8.8}{12} \times 360 = 264°$$

At 8:48, the minutes' hand would have covered $\frac{48}{60} \times 360 = 288°$

The difference is 24 degrees. Since the minutes' hand is ahead of the hours' hand at 8:48, We need a further separation of 12 degrees.

Every minute the separation between them increases by $\left(\frac{1}{60} \quad \frac{1}{720} \right) \times 360 = \frac{11}{2}$ degrees.

Therefore the time in minutes to achieve a difference of 12 degrees is, $\frac{12}{\frac{11}{2}} = \frac{24}{11}$ degrees.

The question is " **The minor angle between the hours hand and minutes hand of a clock was observed at** $8 : 48\mathrm{am}$. **The minimum duration, in minutes, after 8.48 am when this angle increases by** 50% is "

Choice B is the correct answer.

Solution 10

Let the marks of each girl in the class be g and the marks of each boy be b.

Since, the average marks of 4 girls and 6 boys is 24...

4g + 6b = 24 × 10 = 240

A girl scores more than or equal to the score of a boy but never more than double the score.

Therefore, g = kb, where 1 ≤ k ≤ 2

4(kb) + 6b = 240

b(4k + 6) = 240

b(2k + 3) = 120

$b = \dfrac{120}{2k+3}$

Finally we need 2g + 6b = b(2k + 6) to be an integer.

$120 \times \left(\dfrac{2k+6}{2k+3}\right)$ needs to be an integer.

$120 \times \left(1 + \dfrac{3}{2k+3}\right)$ needs to be an integer.

$\therefore 120 \times \left(\dfrac{3}{2k+3}\right)$ needs to be an integer.

$\left(\dfrac{360}{2k+3}\right)$ needs to be an integer.

Let $\dfrac{360}{2k+3} = n$, where n is an integer.

$\dfrac{360}{n} - 3 = 2k$

Since, 1 ≤ k ≤ 2

2 ≤ 2k ≤ 4

$2 \leq \dfrac{360}{n} - 3 \leq 4$

$5 \leq \dfrac{360}{n} \leq 7$

$\dfrac{5}{360} \leq \dfrac{1}{n} \leq \dfrac{7}{360}$

$\dfrac{360}{7} \leq n \leq \dfrac{360}{5}$

51.42 ≤ n ≤ 72

52 ≤ n ≤ 72

Therefore, n can take 21 values, 52 to 72 both inclusive.

For all these values k takes a distinct value from 1 to 2 and 2g + 6b takes a distinct integral value.

The answer is '21'

Choice B is the correct answer.

Solution 11

Every time 20% of the mixture is replace with a pure adulterant (here cocoa), the concentration of the mixture becomes 80% of the initial concentration.

Similarly when a proportion p of a mixture is replaced with pure adulterant, the concentration of the mixture becomes (1 - p) times the previous concentration. (0 ≤ p ≤ 1)

Initially there was pure coffee, so the strength of the mixture is 100% or 1 (in terms of proportion)

Let a proportion p of the mixture be replaced each time... Since after repeating the process twice, we have the concentration of coffee as

$\frac{16}{16+9} = \frac{16}{25}$ at the end of the two replacements.

∴ $(1 - p)^2 = \frac{16}{25}$

$1 - p = \frac{4}{5}$

$p = \frac{1}{5}$

Or, 20% of the mixture is replaced each time.

The ratio of cocoa powder in the mixture P and Q will then be $\frac{\frac{1}{5}}{\frac{9}{25}} = \frac{5}{9}$.

Therefore, the ratio is 5 : 9

The answer is '5 : 9'

Choice C is the correct answer

Solution 12

Every time 20% of the mixture is replace with a pure adulterant (here cocoa), the concentration of the mixture becomes 80% of the initial concentration.

Similarly when a proportion p of a mixture is replaced with pure adulterant, the concentration of the mixture becomes (1 - p) times the previous concentration. (0 ≤ p ≤ 1)

Initially there was pure coffee, so the strength of the mixture is 100% or 1 (in terms of proportion)

Let a proportion p of the mixture be replaced each time... Since after repeating the process twice, we have the concentration of coffee as

$\frac{16}{16+9} = \frac{16}{25}$ at the end of the two replacements.

∴ $(1 - p)^2 = \frac{16}{25}$

$1 - p = \frac{4}{5}$

$p = \frac{1}{5}$

Or, 20% of the mixture is replaced each time.

The ratio of cocoa powder in the mixture P and Q will then be $\frac{\frac{1}{5}}{\frac{9}{25}} = \frac{5}{9}$.

Therefore, the ratio is 5 : 9

The answer is '5 : 9'

Choice A is the correct answer

Solution 13

Let A be the cost price of object A and B be the cost price of object B.

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.

Therefore, $1.2 \times A = 0.9 \times B$

$4A = 3B$

$B = \frac{4}{3} A$

To sell object B at a profit of 10%, the selling price of B must be 1.1 B or $\frac{11}{10}$ B

Object A is sold at the same price as object B, that is, $\frac{11}{10}$ B = $\frac{11}{10} \times \frac{4}{3}$ A = 1.466 A
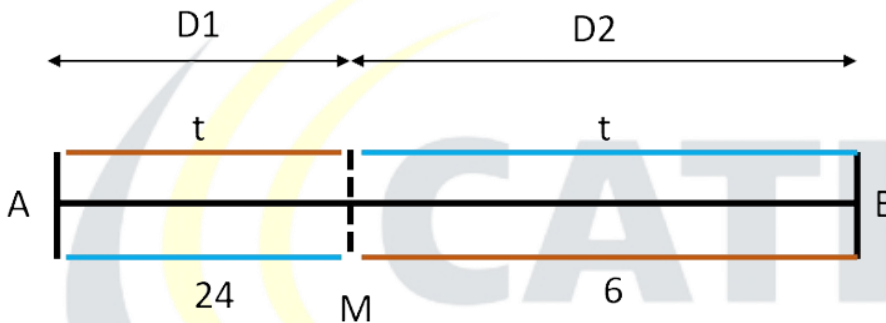
The profit obtained on object A in such a trade will be 46.66% or nearly 47%.

The answer is '47%'

Choice B is the correct answer

Solution 14

Let the distance between city A and the meeting point M be D1 and the distance between city B and the meeting point M be D2

Arvind covers D1 in t hours and D2 in 6 hours.

Speed of Arvind = $\frac{D1}{t} = \frac{D2}{6}$

$\frac{D1}{D2} = \frac{t}{6}$

Surbhi covers D1 in 24 hours and D2 in t hours.

Speed of Surbhi = $\frac{D1}{24} = \frac{D2}{t}$

$\frac{D1}{D2} = \frac{24}{t}$

$\frac{D1}{D2} = \frac{t}{6} = \frac{24}{t}$

$t^2 = 6 \times 24 = 12^2$

$t = 12$

Total time taken by Arvind to travel from city A to city B = (t + 6) = 18 hours.

Speed of Arvind = 54 kmph

Distance between city A to city B = 54×18 = 972 km.

The answer is '972'

The answer is 972

Solution 15

"The amount of job that Amal, Sunil and Kamal can individually do in a day, are in harmonic progression." This implies that the amount of time taken individually by Amal, Sunil and Kamal to finish a job are in A.P.

"Kamal takes twice as much time as Amal to do the same amount of job." Since the amount of time taken individually by Amal, Sunil and Kamal to finish a job are in A.P, this simply means that Sunil Should take 1.5 times the time as Amal to do the same amount of job.

So, to do the same amount of job individually, the times taken by Amal, Sunil and Kamal will be in the ratio, 1 : 1.5 : 2 or 2 : 3 : 4

Amal, Sunil and Kamal worked for 4, 9 and 16 days respectively to finish the job.

Sunil does in 3 days what Amal does in 2 days.

Therefore, Sunil does in 6 days what Amal does in 4 days.

Sunil does in 3 days what Kamal does in 4 days.

Therefore, Sunil does in 12 days what Kamal does in 16 days.

his own, Sunil would require, 6 + 9 + 12 = 27 days.

The answer is '27'

Solution 16

"Anil invests Rs. 22000 for 6 years in a certain scheme with 4% interest per annum, compounded half-yearly."

Total Amount of Anil's investment after 6 years $= 22000 \times \left(1 + \frac{2}{100}\right)^{12} = 22000 \times 1.02^{12}$

Let Sunil Invest a Principal of P.

"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."

Total Amount of Sunil's investment after 6 years $= P \times \left(1 + \frac{2}{100}\right)^{10} \times 1.1 = P \times 1.02^{10} \times 1.1$

".. the amounts received by both at the end of 6 years are same..."

$$22000 \times 1.02^{12} = P \times 1.02^{10} \times 1.1$$

$$P = \frac{22000 \times 1.02^2}{1.1} = 20808$$

Therefore, Sunil's investment is Rs. 20808

The answer is '20808'
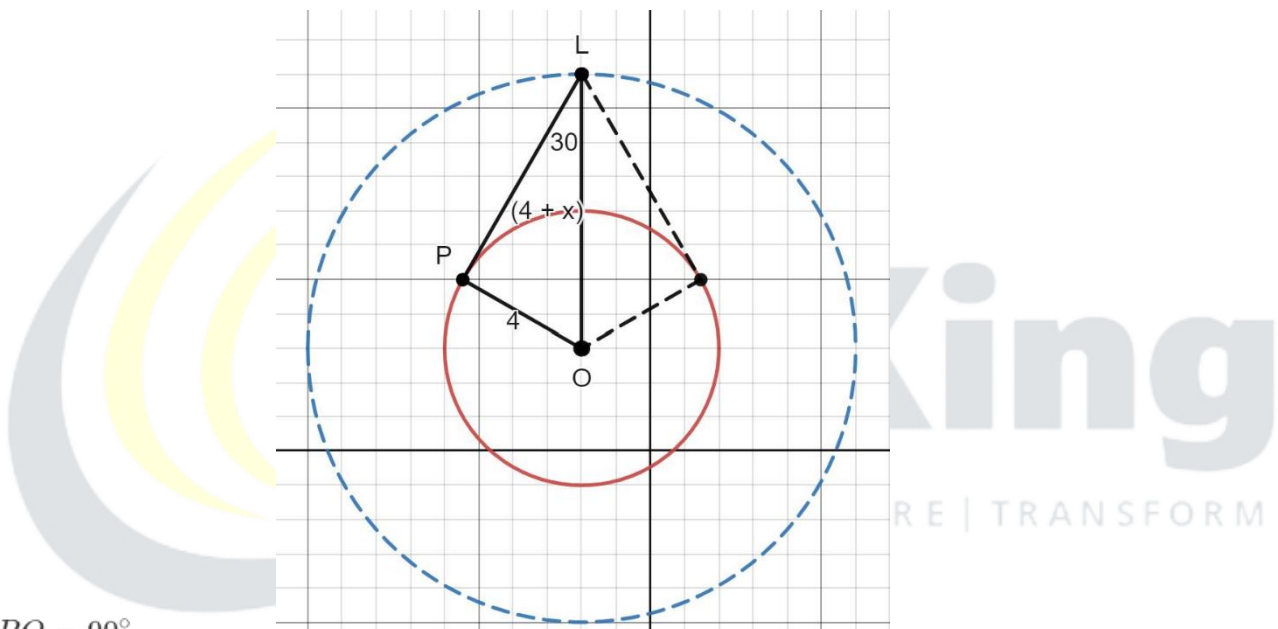
Solution 17

$$x^2 + y^2 + 4x - 6y - 3 = 0$$

$$x^2 + 2 \cdot 2 \cdot x + 2^2 \quad \cdot 2^2 + y^2 \quad 2 \cdot 3 \cdot y + 3^2 \quad 3^2 \quad 3 = 0$$

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

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

This is the equation of a circle with radius 4 units and centered at (-2, 3)

From a point L we drop two tangents on the circle such that the angle between the tangents is 60°.

$\angle LPO = 90°$

$\angle PLO = 30°$

$\sin(30°) = \frac{1}{2} = \frac{PO}{OL} = \frac{4}{4+x}$

$4 + x = 2(4)$

$x = 4$

Therefore the locus of the point L, is a circle centered at (-2, 3) and has a radius of (4 + x = 8) units.

The equation of this locus is thus, $(x + 2)^2 + (y - 3)^2 = 8^2$

When x = 6, we have, $(8)^2 + (y - 3)^2 = 8^2$, that is y = 3

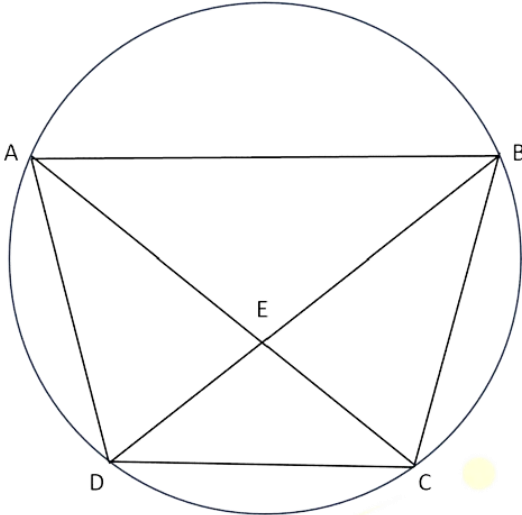The circle, $(x + 2)^2 + (y - 3)^2 = 8^2$, touches the line $x = 6$ at (6, 3).

The answer is '(6,3)'

Choice C is the correct answer

Solution 18

$\angle DAC = \angle DBC$

(Angles subtended by the chord DC on the same side.)

$\angle ADB = \angle ACB$

(Angles subtended by the chord AB on the same side.)

$\angle AED = \angle BEC$

(Vertically Opposite angles.)

Therefore, $\triangle AED \sim \triangle BEC$

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

$\angle ABD = \angle ACD$

(Angles subtended by the chord AD on the same side.)

$\angle BAC = \angle BDC$

(Angles subtended by the chord BC on the same side.)

$\angle AEB = \angle DEC$

(Vertically Opposite angles.)

Therefore, $\triangle AEB \sim \triangle DEC$

$\frac{AE}{ED} = \frac{BE}{EC} = \frac{AB}{DC} = \frac{2}{1}$

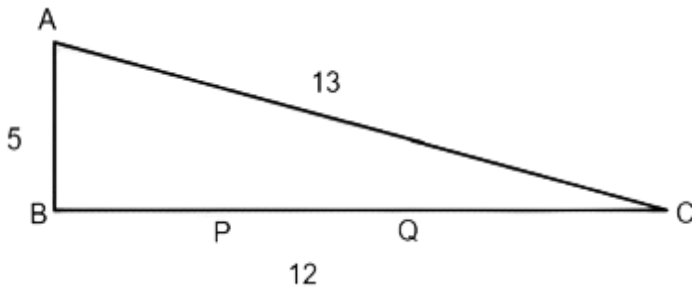$\frac{AE}{ED} \times \frac{ED}{EC} = \frac{2}{1} \times \frac{4}{5} = \frac{8}{5}$

Therefore, AE : EC = 8 : 5

The question is " **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** "

Hence, the answer is '8 : 5'

Choice C is the correct answer

Solution 19

$Ar(\triangle ABC) = \frac{1}{2} 5 \times 12 = 30 \, cm^2$

$Ar(\triangle ABC) = 1.5 \times Ar(\triangle ABP)$

$\frac{30}{1.5} = Ar(\triangle ABP)$

$Ar(\triangle ABP) = 20$

$\frac{1}{2} \times AB \times BP = 20$

$BP = \frac{20 \times 2}{5} = 8$

$Ar(\triangle ABP), Ar(\triangle ABQ), Ar(\triangle ABC)$ are in A.P

$Ar(\triangle ABQ) = \frac{Ar(\triangle ABP) + Ar(\triangle ABC)}{2} = \frac{20+30}{2} = 25$

$\frac{1}{2} \times 5 \times BQ = 25$

$BQ = \frac{50}{5} = 10$

$PQ = BQ \quad BP$

$PQ = 10 - 8 = 2 \, cm$

The answer is '2'

Solution 20

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

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

$\dfrac{2(\sqrt{x}+\sqrt{2})(\sqrt{x}+\sqrt{y})}{(\sqrt{y}+\sqrt{2})} = 2\sqrt{x}+\sqrt{2}+\sqrt{y}$

$\dfrac{2[x+\sqrt{x}(\sqrt{y}+\sqrt{z})+\sqrt{z}\sqrt{y}]}{\sqrt{y}+\sqrt{z}} = 2\sqrt{x}+\sqrt{z}+\sqrt{y}$

$\dfrac{2[x+\sqrt{z}\sqrt{y}]}{\sqrt{y}+\sqrt{z}} = \sqrt{z}+\sqrt{y}$

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

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

$2x = z + y$

$x = \dfrac{z+y}{2}$

x is the Arithmetic Mean of z & y, therefore, z, x, y form an A.P.

It goes without saying that y, x, z also forms an A.P.

The answer is 'y, x and z are in arithmetic progression'

Choice C is the correct answer

Solution 21

Single digit numbers with non-repeating digits = 9

(The unit's digit is non-zero)

Two digit numbers with non-repeating digits = 9 × 9

(The tenth's digit is non-zero and the unit digit can be any digit except the tenth's digit.)

Three digit numbers with non-repeating digits = 9 × 9 × 8

(The hundred's digit is non-zero and the tenth's digit can be any digit except the hundred's digit and the unit digit can be any digit except the tenth's digit.)

So, totally there are (9 + 9 × 9 + 9 × 9 × 8) = 738 natural numbers up to 1000 with non-repeating digits.

The question is " **The number of all natural numbers up to 1000 with non-repeating digits is** "

Hence, the answer is '738'

Choice D is the correct answer

Solution 22

1 Million = 10^6

Population on...

Day 1: 2

Day 2: $2^2 + 3$

Day 3: $2^3 + 3 \cdot 2 + 3$

Day 4: $2^4 + 3 \cdot 2^2 + 3 \cdot 2 + 3$

Day n: $2^n + 3 \left(2^{n-2} + 2^{n-3} + \cdots + 1 \right)$

$= 2^n + 3 \left(2^{n-1} - 1 \right)$

$= 2^{n-1}(2+3) - 3$

$= 2^{n-1}(4+1) - 3$

$= 2^{n+1} + 2^{n-1} - 3$

$10^6 = 2^6 \cdot 5^6$

$10^6 > 2^6 \cdot 4^6$

$10^6 > 2^6 \cdot 2^{12}$

$10^6 > 2^{18}$

Putting n = 18 in $2^{n+1} + 2^{n-1} - 3$, we get 655357, which is less than 10^6

On the 19th day the population will be more than double the population on the ...

The answer is '19'

Logical Reasoning & Data Interpretation (LRDI)

i. Now, we know there is only 1 candidate from OQ, which means that the number of non-candidate voters in OQ will be 4.
We also know that the non-candidates in a particular department voted as a block, and we also know that the least number of non-candidate voters in a particular department can be 1 (BH, 3-2 faculty). Now, we also know that R got 5 votes from non-candidates.
Now we can write 5 as
i)5
ii)4+1
iii)3+2
Considering case (i) 4+1. This is only possible when there is 1 candidate from OQ, and there are 2 candidates from BH. This implies that the number of candidates in FA and MQ is 1. Now, if we

consider FA and MQ and put only 1 candidate there, it implies that there are 15 non-candidate voters between them. Now we know this is not possible since the maximum number of non-candidate voters a candidate can get is 13. (Please note that non-candidates of a particular department vote as a block).

On similar grounds, we can eliminate Case (iii) as it also implies there is only 1 candidate in FA and MQ.

Now, considering Case (i), we know that 5+0 will happen only one when there are 5 non-candidates in a single department. This is only possible in MS (Out of 7, there will be 2 candidates and 5 non-candidates).

So we can conclude that MS has 2 candidates and that they voted Prof. R.......(i)

We also know that Prof P got 2 votes from Non-candidates. This is only possible when BH has 1 candidate.

So, we can conclude that the number of professors in FA, MS, OQ, BH is 0,2,1,1

	FA	MS	OQ	BH
Total number of voters	9	7	5	3
Number of candidates	0	2	1	1
Number of non-candidates	9	5	4	2

Thus, we get the following table:

	P	Q	R	S
Total Votes	3	14	6	1
Candidate Vote	1(S)	1(R)	1(P)	1(Q)
Votes from non candidates	2	13	5	0
	BH	FA+OQ	MS	

Now, if we consider Department MS, we know that there are 2 candidates from MS and R can't be one of them as the people in that department voted for him..... (3 rd condition).

So the possible combinations of candidates in MS are (P,Q), (Q,S), (P,S).

Now we also know that no one can vote for a candidate in their own department, so we can eliminate (P,S) and (Q,S) as we know that S voted for P and Q voted for S).

So we can infer that P and Q are from MS.

	FA	MS	OQ	BH
Case 1	0	P, Q	R	S
Case 2	0	P, Q	S	R

1. Now, among the given options, Only Option B is true. Therefore, Option B is the correct answer.

2. Now, we can see that the number of votes that Prof Qureshi received from a single department can be 9 or 5 (if R is from OQ) or 4 (if R is not from OQ).

So, among the options, only Option C can be true. Therefore, Option C is the correct answer.

3. We have been told Prof Samuel belongs to B&H. So we have to consider only Case 1. In Case 1 we can see that Prof Prakash belongs to MS and Prof Ramaswamy belongs to OQ....

Therefore, both the statements are true. So, the correct answer is Option A.3.

4. From the 2 cases, we can see that the candidate from OQ can either be Prof Ramaswamy or Prof Samuel. Therefore, the correct answer is Option D.

5. Since Prof Qureshi belongs to MS, non-candidates from MS can't vote for him. We can see that the non-candidates from FA voted for him. So, only statement B is true. Therefore, the correct answer is Option A.

ii. Given that 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 ratings given by R1, R2, R3 R4, R5 are 5*means = 17, 11, 19, 14, and 17 respectively.
Similarly the sum of ratings received by U, V, W, X and Y are 5*means = 11, 19, 17, 18, and 13 respectively.
Also capturing the absolute data given in the partial information (a) and (b) and representing as a table, we get:

	R1	R2	R3	R4	R5	Total
U	1					11
V					5	19
W	5	1	5			17
X		5	5			18
Y		1	1			13
Total	17	11	19	14	17	

Now,
Consider U
Given median = 2, mode = 2 and range = 3
=> His ratings should be of the form 1, a, 2, b, 4 => 1 + 2 + 4 + a + b = 11 => a + b = 4. For mode = 2 => a = b = 2
=> U's ratings are 1, 2, 2, 2, 4.
Consider V
Given median = 4, mode = 4 and range = 3
=> His ratings should be of the form 2, a, 4, b, 5 => 2 + 4 + 5 + a + b = 19 => a + b = 8 => For mode = 4 => a = b = 4
=> V's ratings are 2, 4, 4, 4, 5.
Consider W
Given median = 4, mode = 5 and range = 4
=> His ratings should be of the form 1, a, 4, 5, 5 => 1 + a + 4 + 5 + 5 = 17 => a = 2 => W's ratings are 1, 2, 4, 5, 5.
Consider X
Given median = 4, mode = 5 and range = 4

=> His ratings should be of the form 1, a, 4, 5, 5 => a+ 1 + 4 + 5 + 5 = 18 => a = 3 => X's ratings are 1, 3, 4, 5, 5

Consider Y

Given median = 3, mode = 1 & 4, Range = 3 => His ratings are 1, 1, 3, 4, 4.

Capturing this data in the table, we get:

	R1	R2	R3	R4	R5	Total	Entries
U	1					11	2,2,2,4
V					5	19	2,4,4,4
W	5	1	5			17	2,4
X		5	5			18	1,3,4
Y		1	1			13	3,4,4
Total	17	11	19	14	17		

Now, consider column R3 => The two missing entries should add up to 19 - 1 - 5 - 5 = 8, (only possibility is 4 + 4) => We can fill the row "U" and 4 in the row "V".

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V			4		5	19	2,4,4
W	5	1	5			17	2,4
X		5	5			18	1,3,4
Y		1	1			13	3,4,4
Total	17	11	19	14	17		

Consider column R1, the missing elements should add up to 17 - 5 - 4 - 1 = 7 (3 + 4 or 4 + 3) ----(1)
Consider R5, the missing elements should add up to 10 => 2 + 4 + 4 or 4 + 3 + 3 (not possible) as (1) requires a 3....

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V	4	2	4	4	5	19	
W	5	1	5	4	2	17	
X		5	5		4	18	1,3
Y		1	1		4	13	3,4
Total	17	11	19	14	17		

Now, we can fill column R1 as 3 + 4 and the remaining in column R4 and we can get the complete table.

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V	4	2	4	4	5	19	
W	5	1	5	4	2	17	
X	3	5	5	1	4	18	
Y	4	1	1	3	4	13	
Total	17	11	19	14	17		

6.=> All ratings can be determined uniquely => 0.

7. R2 gave ratings of 1, 1, 2, 2, 5 => He gave 4 to 0 workers => 0 is the answer.

8. => From the table, we can see that R1 gave a rating of 3 to Xavier

9. => Ratings give by R3 are 1, 4, 4, 5, 5 => Median = 4.

10. => R2 median rating is 2 => given to 2 workers
=> R5 median rating is 4 => given to 2 workers
=> R4 median rating is 3 => given to only 1 worker.
=> R3 median rating is 4 => given to 2 workers.
So Option D is the Correct Answer

iii. It is given that 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.
Hence, the total number of applicants = (20*10) = 200. It is also known that 50% of the applications were US applications, and the number of US applications was the same in all the slots. The same was true for the other three categories.
Hence, the number of total number of US applicants = (200*50%) = 100, and the number of US applicants in each slot = (100/20) = 5

It is also known that Ira, Vijay, and Nandini were scheduled for Schengen visa processing in that order. They had a 9:15 am slot. Since the number of Schengen applicants was the same in all the slots, it implies the number of Schengen applicants in each slot is at least 3.
Similarly, it is given that Mahira and Osman were scheduled in the 9:30 am slot on that day for visa processing in the Others category, which implies the number of other category applicants in each slot is at least 2. Since the number of total applicants in each slot is 10, this implies the number of Schengen and other applicants in each slot is 3, and 2, respectively. Hence, the number of UK applicants is 0 in each slot.
It is also known that the number of total counters is 10, among which four are dedicated to US applications, and two each for UK applications, Schengen applications, and Others applications. It is given that each US and UK application requires 10 minutes of processing time, and Vijay was called to a counter at 9:25 am. (Who is 5th in the queue). It can only be possible when the processing time of Schengen applications is 12.5 minutes.

US (10 min)				Schengen (12.5 min)		Others (5 min process)	
End Time				End Time		End Time	
C1	C2	C3	C4	C1	C2	C1	C2
9.10	9.10	9.10	9.10	9.12.30	9.12.30	9.05	9.05
9.20	9.25	9.25	9.25	9.25	9.32.30	9.20	9.20
9.30	9.35	9.40	9.40	9.37.30	9.45	9.35	9.35
9.40	9.45	9.50	9.55				
9.55	9.55	10.00	10.05				
10.10	10.10	10.10	10.15				
10.20							

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. Hence, at 9.20 am, there are exactly four free counters. Out of these 4, 2 is the UK counter, and the other two are other counters. (Since the US counters and Schengen Counters were either processing applications or had finished processing one and were ready to start processing the next.)

11. From the table, we can say that the total number of UK applicants in each slot is zero, Hence, the total number of applicants is zero.

12. For the other applicants, the time taken to process one application is at most 5 minutes, which implies the total time taken to process 40 applications is at most $(40*5) = 200$ minutes.

13. Nandini's position was sixth in the queue in the Schengen Applications. From the table, we can see that her process will end at 9.45 am.
The correct option is D.

14. Let's check the options.

Option A: The application process of Osman was completed before 9:45 am. => True (Since he is 5th in the queue, his process will end at 9.35 am)
Option B: The application process of Mahira started after Nandini's. => The application process for Mahira starts at 9.30 am, and the application process for Nandini starts at 9.32.30 am => False.
The correct option is D.

15. From the table, we can see that the first slot takes 20 minutes to complete, and after that remaining 19 slots take 15 minutes each to complete the US application process.
Hence, the total time taken = $20+15*19 = 305$ minutes = 5 hrs 5 minutes. Hence, the time will be (9 am + 5hrs 5 minutes) = 2.05 pm
The correct option is D

iv)
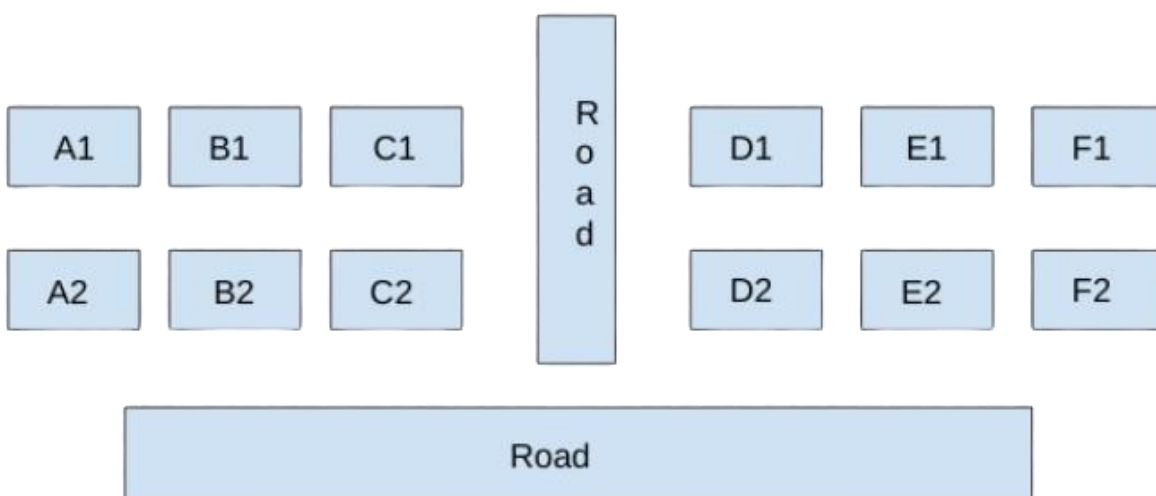
It is given that some of the houses are occupied. The remaining ones are vacant and are the only ones available for sale.

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 x (road adjacency value) + 3 x (neighbor count).

It is also known that the maximum quoted price of a house in Block XX is Rs. 24 lakhs

Hence, there can be two cases for the maximum quoted price of a house in block XX.

Case 1: House with parking space:

$\Rightarrow$ 12+5a+3b = 24

$\Rightarrow$ 5a+3b = 12 (a = road adjacency value, b= neighbor count)

The only value for which the equation satisfies is (a = 0, and b=4). But the value of b can't be 4 because the maximum neighbor count can be at most 3.

Hence, case 1 is invalid.

Case 2: House without parking space:

$\Rightarrow$ 10+5a+3b = 24

$\Rightarrow$ 5a+3b = 14

$\Rightarrow$ (a, b) = (1, 3)

Hence, the house must have 3 neighbors and 1 road connected to it. Hence, the only possible case is B2. Therefore, the neighbor houses of B2, which are (B1, A2, and C2) are also occupied.

It is known that Row 1 has two occupied houses, one in each block. Since B1 is already occupied, it implies A1, and C1 are vacant.

Hence, the configuration of block XX is given below: (Where U = Unoccupied/ Vacant, and U = Occupied)
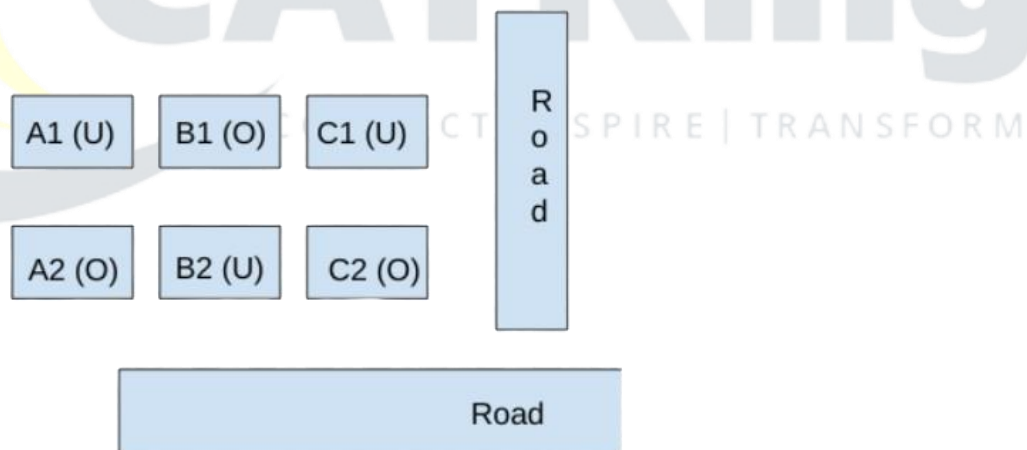
Now for block YY, we know that both houses in Column E are vacant. Each of Column-D and Column-F has at least one occupied house. There is only one house with parking space in Block YY. It is also known that the minimum quoted price of a house in block YY is Rs. 15 lakhs, and one such house is in Column E.

Case 1: The minimum quoted house is E2:

We know that the road adjacency of E2 is 1, hence we can calculate whether the house has parking space or not, and the neighbor count (b)

If the house has parking space, then: 12+5*1+3*b = 15 $\Rightarrow$ 3b = -2 (which is not possible)

Hence, the house has no parking space => $10+5*1+3b = 15$ => $b = 0$ $b = 0$ implies all the neighbor house of E2 is vacant, which are (E1, D2, and F2).

It is known that each of Column-D and Column-F has at least one occupied house, which implies D1, and F1 must be occupied.

But D1 and F1 can't be occupied together since the total number of occupied houses in Row 1 is 2 (one in each block).

Hence, This case is invalid.

Case 2: The minimum quoted house is E1:

We know that the road adjacency of E1 is 0, hence we can calculate whether the house has parking space or not, and the neighbor count (b).

i) If the house has no working space, then: $10+5*0+3b = 15$ => $b = 5/3$ (this is not possible since b has to be an integer value)

Hence, the house has parking space => $12+5*0+3b = 15$ => $b = 1$ => One neighbor house is occupied among D1 and F1.

We already know that E2 is vacant. Among the houses D2, and F2, at least one must be occupied since each of Column-D and Column-F has at least one occupied house.

Therefore, the final diagram is given below:
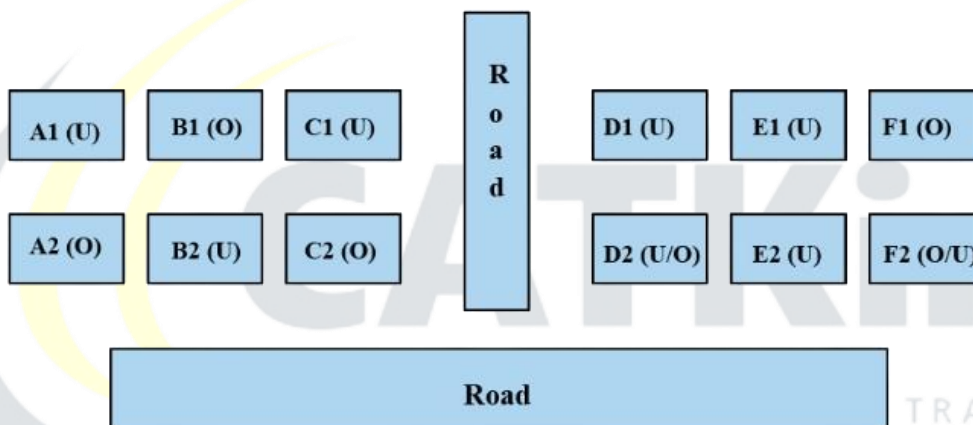
16. From the diagram, we can see that 3 houses are vacant in block XX.

17. From the diagram, we can see that B1 is definitely occupied. The rest opinions are not definitely correct. The correct option is C.

18. From the diagram, we can say that the number of vacant houses in Row 2 in Block XX is 1, and the number of vacant houses in Row 2 in Block YY is either 1 or 2. Hence, the total number of vacant house is either 2 or 3.

The correct option is B.

19. From the diagram, the vacant house with the maximum possible quoted price in column E is E2 when both D2 and F2 are occupied.

The maximum possible quoted price of E2 is $10+5*1+3*2 = 21$ Lacs. (E2 has no parking space because E1 has the parking space and it is given that there is only one house with parking space in Block YY.)

20. From the diagram, we can see that E1 has the parking space (case 2). The correct option is D.