Actual CAT 2023 Slot I (Answer Keys)

Section : Verbal Ability

QNo:- 1 ,Correct Answer:- C

Explanation:- It is not possible to derive Option C directly from the passage. Although the passage does mention the impact of both geographical factors, such as biogeography, and non-geographical factors like culture and history on human phenomena, the use of words like 'most' and 'some' cannot be justified based on the information provided in the passage. Therefore, Option C is the appropriate choice.
Option 1- This statement is directly supported by the passage. The passage mentions that some geographic explanations advanced a century ago were racist, causing all geographic explanations to become tainted by racist associations in the minds of many scholars other than geographers.
Option 2- There is a discussion that the crops and domestic animals that make Australia a food and wool exporter are non-native species brought by overseas colonists.
Option 4- The passage mentions that the development of warm fur clothes among the Inuit living north of the Arctic Circle was not because one influential Inuit leader persuaded others in 1783 to adopt warm fur clothes for no good environmental reason. Instead, it attributes the development to straightforward geographic factors.

QNo:- 2 ,Correct Answer:- B

Explanation:- The passage does not directly condemn non-geographer scholars for possessing outdated interpretations of historical and cultural events. The primary critiques focus on their overemphasis on individual choices, labelling of geographic explanations as deterministic, and refusal to acknowledge the impact of geographic factors, including biogeographic factors, on social and cultural phenomena.

QNo:- 3 ,Correct Answer:- C

Explanation:- The passage does not imply that individuals who are not geographers reject explanations that attribute human behavior to geographical factors. Instead, it suggests that those who are not geographers often respond to such explanations by denouncing the concept of "geographic determinism." The reasons for this reaction include a belief in the central role of humans, a lack of technical knowledge of geography due to disciplinary training, and negative impressions of past geographic analyses that were considered politically offensive.

QNo:- 4 ,Correct Answer:- A

Explanation:- Option 1 accurately reflects the idea presented in the passage. The passage

discusses the development of warm fur clothes among the Inuit and the absence of indigenous farming in Aboriginal Australia as outcomes influenced by physical circumstances, such as geographic and biogeographic factors.
While option 2 is partially correct so eliminated. Yet a very close choice.
For option 3 the passage does not explicitly convey the idea that traditional societies, specifically the Inuit and Aboriginal Australians, were self-sufficient and adaptive despite geographical isolation.

QNo:- 5 ,Correct Answer:- A

Explanation:- The passage does not mention the shutting down of the royal office of the Luparii as a contributing factor to the growing wolf population. Instead, it emphasizes factors such as the protected status of wolves in Europe, the decline of hunting as a sport, the efforts of NGOs to track and count the animals, and the increase in woodlands and forest cover in Lozère.
Rest all options are mentioned in the context so can be eliminated.

QNo:- 6 ,Correct Answer:- D

Explanation:- The passage discusses the decline in the number of hunting licenses and the quieter forests due to a decrease in hunting as a sport. However, it does not specifically state that the inhabitants of Lozère are grappling with this as a problem. On the other hand, the passage mentions issues such as a lack of local schools, jobs, phone and internet connections, and livestock losses due to the return of wolves. That helps us to conclude that 4 is the right choice.

QNo:- 7 ,Correct Answer:- D

Explanation:- The passage does not explicitly mention the divergent and competing interests of specific groups, but it does provide information that implies conflicts between different stakeholders. Based on the information provided, the option that best aligns with the potential conflicts discussed in the passage is the 4^{th} one.
The passage describes how farmers in Lozère are concerned about the return of wolves, as they claim the wolves cause livestock losses. On the other hand, environmentalists may celebrate the return of predators like wolves, considering it a sign of wider ecological health. This suggests a potential conflict of interests between farmers, who are concerned about their livelihoods and livestock, and environmentalists, who may prioritize the ecological balance.

QNo:- 8 ,Correct Answer:- D

Explanation:- The author's claims in the passage seem to revolve around the conflict

between farmers and environmentalists regarding the return of wolves, with farmers expressing concerns about livestock losses. If there were reports of wolf attacks on tourists on the rise, it might suggest a different perspective on the impact of wolves in the area, potentially indicating a more immediate threat to human safety rather than just concerns about livestock. Only option 4 could weaken the emphasis on the environmental benefits mentioned in the passage.
Option 1- This statement is not directly relevant to the author's claims about the conflict between farmers and environmentalists regarding the return of wolves. It doesn't necessarily weaken or strengthen the main arguments in the passage.
Option 2- This statement aligns with the information presented in the passage and supports the author's claims about the return of wolves, which is a central theme in the discussion of conflicts between farmers and environmentalists.
Option 3- This statement is mentioned briefly in the passage, but it doesn't directly relate to the author's claims about the conflict between farmers and environmentalists regarding the return of wolves. While unemployment concerns are mentioned, the primary focus is on the impact of the return of wolves on farmers.

QNo:- 9 ,Correct Answer:- C

Explanation:- The passage emphasizes that mainstream English-language fiction has historically privileged certain perspectives and settings. And the exception is statement 3. It supports the passage's claim by reinforcing the idea that mainstream English-language fiction has a specific focus on the experiences of a particular group rather than weakening it.
For option 1- This statement weakens the passage's claim because it suggests that Indian Ocean novels may also have elements of nostalgia, similar to mainstream English-language fiction.
For option, 2-This statement weakens the passage's claim as it implies that Indian Ocean novels may also fall into the trap of using Orientalist stereotypes, similar to mainstream English-language fiction.
For option 4- This statement weakens the passage's claim because it suggests that there is a diversity in settings even within mainstream English-language novels.
The exception is statement 3. It supports the passage's claim rather than weakening it.

QNo:- 10 ,Correct Answer:- D

Explanation:- The passage discusses the "remapping" achieved by Indian Ocean novels. Let's evaluate each claim:
Option 1- This claim contributes to the remapping by suggesting that the novels explore regional pasts rather than being confined to national concerns.
Option 2- This claim contributes to the remapping by challenging the traditional focus on the global north and highlighting the global south as the first center of globalization.
Option 3- This claim contributes to the remapping by challenging the Eurocentric view of early international trade and commerce.
Option 4- This claim does not contribute to the remapping; in fact, it reinforces a Western-

centric view by suggesting that cosmopolitanism originated in the West and traveled eastward. Therefore, the correct answer is 4.

QNo:- 11 ,Correct Answer:- D

Explanation:- The passage discusses migration in the Indian Ocean world. Out of all options, 4 is the right one. As this statement is not true according to the passage. The passage emphasizes that the Indian Ocean world's migration networks are distinct from the commonly found narratives centered in Europe or the US. Instead, the novels highlight a largely Islamic space and feature characters of color, suggesting a different orientation from the global north.

For option 1- This statement is consistent with the passage, which mentions that port cities far apart were often more easily connected to each other than too much closer inland cities due to the ease of travel by sea.
For Option 2- This statement is consistent with the passage, which highlights that migration in the Indian Ocean world was shaped by the religious and commercial histories of the region.
For option 3- This statement is consistent with the passage, which mentions that migration is often a matter of force, and travel is portrayed as abandonment rather than adventure.

QNo:- 12 ,Correct Answer:- C

Explanation:- The options 1 and 4 are not the right choice. As in option A the pair suggests a historical and thematic connection, as the Indian Ocean world is associated with historical aspects such as slavery. This pair does not seem to be odd. In option 4, this pair also represents a thematic connection, suggesting that postcolonial novels often explore anti-colonial nationalism. This aligns with the passage's discussion of the early postcolonial literature's concern with national questions.
The lone instance of border crossing in the third one—which we can classify as peculiar—occurs in the Indian Ocean novel world rather than the Postcolonial novel world.

QNo:- 13 ,Correct Answer:- D

Explanation:- In the passage, the author mentions Galbraith’s “The Affluent Society” in the context of Marshall Sahlins's essay, "The Original Affluent Society." The purpose is to highlight how Sahlins's views complement Galbraith’s criticism of consumerism and inequality in contemporary society. So, option 4 is the right choice.
The passage notes that Sahlins's essay challenges contemporary economic life and bourgeois individualism. By referencing Galbraith’s work, the author emphasizes that Sahlins's perspective aligns with the critical stance towards postwar prosperity and inequality presented by Galbraith. Sahlins's essay, with its title nodding toward Galbraith’s work, brings a critical perspective to the contemporary world, showing that alternative ways of living exist.

It contrasts the capitalist pursuit of wealth through material production with the idea that foraging societies achieve affluence not by acquiring more but by desiring less. In summary, the mention of Galbraith's "The Affluent Society" serves to illustrate how Sahlins's views resonate with and complement Galbraith's critique of consumerism and inequality in the modern world.
While,
Option 1 is incorrect. The passage does not suggest that Galbraith's theories refute Sahlins's thesis. Instead, it emphasizes how their views complement each other in criticizing contemporary society.
Option 2 is incorrect. The passage does not suggest that Galbraith's views directly influenced Sahlins's analysis of prehistoric societies. The mention is about how their perspectives align in critiquing contemporary society.
Option 3 is also incorrect. While the passage discusses the contrast between contemporary growth paths and foragers' ways of living, it does not specifically highlight a pacifist content in foragers' lives.

QNo:- 14 ,Correct Answer:- D

Explanation:- The passage mentions the contemporary Hadza of Tanzania to demonstrate that forager communities, like the Hadza, were aware of alternatives (such as those of surrounding farmers) but actively chose to reject them. This serves as an illustration that foragers make real choices about their ways of living, emphasizing the principle of collective self-determination in societies. So it makes 4th right one.

QNo:- 15 ,Correct Answer:- C

Explanation:- The passage mentions that, when viewed in today's context, not every aspect of Sahlins's essay has aged well. One of the criticisms is that the essay does not thematize the effects of racism, colonialism, and dispossession as heavily as might be expected today. Therefore, the critique is about the essay's treatment of these important issues, suggesting it is cursory or insufficient. This makes the 3rd as the right choice.
For Option 1,it is not a criticism mentioned in the passage. The passage acknowledges that the point of the essay is not so much the empirical validity of the data but its conceptual challenge to contemporary economic life and bourgeois individualism.
Option 2 is not explicitly mentioned as a criticism in the passage. The passage acknowledges that not every aspect of the essay has aged well but does not specifically criticize it for having outdated values.
Option 4 also is not mentioned as a criticism in the passage. The passage does mention Sahlins rebuking evolutionary anthropologists for treating present-day foragers as "left behind" by progress, but it does not frame this as a criticism of Sahlins.

QNo:- 16 ,Correct Answer:- B

Explanation:- The passage suggests that Sahlins's essay, "The Original Affluent Society," aimed to challenge contemporary economic life and bourgeois individualism. It held a critical perspective on the capitalist world's pursuit of wealth through material production and presented foraging societies as examples of an alternative path. The essay contrasts the desire for more material goods in the capitalist world with the foraging societies' pursuit of affluence through wanting less. This aligns with the idea of holding a mirror to an acquisitive society and presenting alternative ways of living.

QNo:- 17 ,Correct Answer:- A

Explanation:- The sentence "This philosophical cut at one's core beliefs, values, and way of life is difficult enough." would best fit at Option B because it logically follows the statement in Option A. Option A discusses how reading philosophy can make the values one has organized their life around appear provincial, wrong, or even evil. Following this, the sentence in Option B, "This philosophical cut at one's core beliefs, values, and way of life is difficult enough," provides an explanation and emphasizes the challenging nature of the experience described in Option A. It helps to convey the emotional and intellectual difficulty that arises when one's fundamental beliefs are scrutinized by philosophical inquiry.

QNo:- 18 ,Correct Answer:- C

Explanation:- The paragraph discusses the genetic link between Native Americans and Japanese people, the migration during the deglaciation period from northern coastal China to Japan, and the surprise that this ancestral source also contributed to the Japanese gene pool. After presenting these findings, the sentence "The discovery helps to explain archaeological similarities between the Paleolithic peoples of China, Japan, and the Americas" logically connects the genetic information to archaeological similarities.
Option 3, which discusses the shared similarities in crafting projectile points, provides a context for introducing the archaeological aspect. Placing the sentence about archaeological similarities after this context makes more sense as it elaborates on the shared cultural aspects mentioned in Option 3.

QNo:- 19 ,Correct Answer:- 3

Explanation:- The theme of the provided sentences except the 3rd one revolves around the irregularities and complexities in the naming of numbers in the English language. It discusses the lack of a systematic rule, the specific patterns for teens and multiples of ten, and highlights the potential confusion that can arise, particularly for learners or those unfamiliar with the language's numerical conventions. The sentences collectively address the intricacies and variations in how numbers are named in English. While Sentence 3 shifts the focus to the learning process of children and their understanding of the differences between numbers like "fourteen" and "forty."

QNo:- 20 ,Correct Answer:- 2

Explanation:- The theme of the provided sentences revolves around the concept of "theory of mind" or "mentalizing," which is the ability to understand and interpret the thoughts, feelings, and intentions of others. The sentences discuss the significance of this cognitive ability for various aspects of human development, including natural language acquisition, social interaction, reflexive thought, moral judgment, and cognitive abilities. The progression of this capacity from early beginnings to adulthood is also highlighted, and there is speculation about its evolutionary origin. Overall, the theme centers on the importance and development of the ability to understand the minds of others in human cognition and behavior.
Here Sentence 2 differs from the rest because it provides alternative terms for the concept discussed in the other sentences. While the other sentences consistently use the term "theory of mind," Sentence 2 introduces synonyms such as 'mentalizing' or 'mindreading' to describe the same cognitive ability. This sentence essentially offers different labels for the concept without introducing new information or aspects of the theme discussed in the surrounding sentences.

QNo:- 21 ,Correct Answer:- 4123

Explanation:- Sentence 4 serves as a general introduction, raising the question about the enduring interest in certain crimes. Then 1 follows logically from the introductory question, delving into the specifics of what makes a case attractive to a particular audience. Then the 2nd sentence provides reasons or factors that contribute to the attractiveness of certain cases, linking back to the question raised in Sentence 1.3rd further explores the nature of the cases in question, emphasizing the appeal of unsolved or mysterious cases.

QNo:- 22 ,Correct Answer:- 4123

Explanation:- 4123 is the sequence that forms a coherent flow, where each sentence logically follows the previous one, building a comprehensive discussion on the impact and sources of bias in AI.
Sentence 4 sets the stage by highlighting the contrast between the localized impact of human-made biased decisions and the broader impact introduced by AI.
Then sentence 1 builds upon the idea introduced in Sentence 4, emphasizing how algorithms, especially those hosted on the internet, can have a widespread impact affecting larger groups of people.
Sentence 2 delves into the distinction between "algorithmic bias" and the actual source of bias, emphasizing that biases are rooted in the data rather than the algorithms themselves.
Sentence 3 concludes by addressing the relative ease of fixing AI biases compared to human-generated biases, emphasizing the practical aspect of addressing biases in AI.

QNo:- 23 ,Correct Answer:- D

Explanation:- The passage discusses colonialism as a historical phenomenon, highlighting its evolution and the factors that led to its transformation in the sixteenth century. It emphasizes the role of technological developments in navigation during that period, which enabled the connection of more remote parts of the world. The emergence of the modern European colonial project is attributed to the newfound ability to move large numbers of people across oceans and maintain political control despite geographical dispersion. The term colonialism is defined in the passage as encompassing European settlement, violent dispossession, and political domination over various regions globally, including the Americas, Australia, and parts of Africa and Asia. Overall, the passage provides a historical context for colonialism, underlining its earlier forms and the significant changes that occurred during the sixteenth century due to advancements in navigation technology. So option 4^{th} is the correct one.

QNo:- 24 ,Correct Answer:- A

Explanation:- The passage discusses the historical aspect of manipulating information, emphasizing that this practice predates the establishment of modern journalism and rules of integrity. It provides an example from ancient Rome, where political enemies used a smear campaign against Antony with slogans written on coins, illustrating the early use of fake news for political purposes.
The passage then transitions to the 21st century, highlighting the unprecedented scale of information weaponization. It points out that powerful new technology simplifies the fabrication of content, and social networks play a significant role in amplifying falsehoods propagated by states, populist politicians, and dishonest corporate entities. The platforms are described as fertile ground for various manipulative practices, including computational propaganda, trolling, and the deployment of troll armies. Overall, the passage addresses the historical roots of information manipulation and its contemporary manifestations with advanced technology and social media platforms. So the correct choice is option 1.

Section : DI & Reasoning

QNo:- 25 ,Correct Answer:- C

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

Since the questions are dubious, we can say there would be at least two cases.
Given Only one candidate is from OQ and there are 5 faculties from OQ ⇒ there are 4 non-candidates from OQ.
Also, P voted for R, Q for S, R for Q and S for P. Given that all non-candidates faculty members from same department voted for the same candidate. So, all 4 non-candidates from OQ can vote for candidates either Q or R.
Now P has got only 2 votes from non-candidates. From condition 4, these 2 votes can be from BH only that implies there is one candidate from BH.
R has got 5 votes which can be only from MS because of condition 4 that implies there are 2 candidates from MS.
Further, it can be determined that there is no candidates from FA. Q has got 13 non-candidates' votes. They would be from remaining departments: FA (9) & OQ (4)
Now let us try to find which candidate is from which department.
From condition (3), R cannot be from MS. And Similarly we can determine for other candidates.

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

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

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

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

P & Q are from same department.

QNo:- 26 ,Correct Answer:- B

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

Since the questions are dubious, we can say there would be at least two cases.
Given Only one candidate is from OQ and there are 5 faculties from OQ ⇒ there are 4 non-candidates from OQ.
Also, P voted for R, Q for S, R for Q and S for P. Given that all non-candidates faculty members from same department voted for the same candidate. So, all 4 non-candidates from OQ can vote for candidates either Q or R.
Now P has got only 2 votes from non-candidates. From condition 4, these 2 votes can be from BH only that implies there is one candidate from BH.
R has got 5 votes which can be only from MS because of condition 4 that implies there are 2 candidates from MS.
Further, it can be determined that there is no candidates from FA. Q has got 13 non-candidates' votes. They would be from remaining departments: FA (9) & OQ (4)
Now let us try to find which candidate is from which department.
From condition (3), R cannot be from MS. And Similarly we can determine for other candidates.

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

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

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

Subject	**No. of members**	**No. of candidates**	**Other (Voted)**	**Candidates in dept.**

FA	9	0	9 (Q)	×
MS	7	2	5 (R)	P, Q
OQ	5	1	4 (Q)	R/S
BH	3	1	2 (P)	S/R

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

QNo:- 27 ,Correct Answer:- D

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

Since the questions are dubious, we can say there would be at least two cases.
Given Only one candidate is from OQ and there are 5 faculties from OQ ⇒ there are 4 non-candidates from OQ.
Also, P voted for R, Q for S, R for Q and S for P. Given that all non-candidates faculty members from same department voted for the same candidate. So, all 4 non-candidates from OQ can vote for candidates either Q or R.
Now P has got only 2 votes from non-candidates. From condition 4, these 2 votes can be from BH only that implies there is one candidate from BH.
R has got 5 votes which can be only from MS because of condition 4 that implies there are 2 candidates from MS.
Further, it can be determined that there is no candidates from FA. Q has got 13 non-candidates' votes. They would be from remaining departments: FA (9) & OQ (4)
Now let us try to find which candidate is from which department.
From condition (3), R cannot be from MS. And Similarly we can determine for other candidates.

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

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

BH	3	1	2 (P)	R/Q/S

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

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

Both statements are true.

QNo:- 28 ,Correct Answer:- D

Explanation:- After reading the set, we can write following conditions.
1. There can be either 0 or 1 or 2 candidates form any department.
2. A candidate cannot vote for himself or herself.
3. Faculty members can not vote for candidate from their own department.
4. Non-candidates form same department voted for same candidate.
5. There are 9, 7, 5, 3 faculty members in FA, MS, OQ ,and BH.
6. P, Q, R, S received 3, 14, 6 and 1 votes.
7. There is exactly 1 candidate form OQ.
Since the questions are dubious, we can say there would be at least two cases.
Given Only one candidate is from OQ and there are 5 faculties from OQ ⇒ there are 4 non-candidates from OQ.
Also, P voted for R, Q for S, R for Q and S for P. Given that all non-candidates faculty members from same department voted for the same candidate. So, all 4 non-candidates from OQ can vote for candidates either Q or R.
Now P has got only 2 votes from non-candidates. From condition 4, these 2 votes can be from BH only that implies there is one candidate from BH.
R has got 5 votes which can be only from MS because of condition 4 that implies there are 2 candidates from MS.
Further, it can be determined that there is no candidates from FA. Q has got 13 non-candidates' votes. They would be from remaining departments: FA (9) & OQ (4)
Now let us try to find which candidate is from which department.
From condition (3), R cannot be from MS. And Similarly we can determine for other candidates.

	Voted by candidates	Voted by Members
P(3)	S	2 (BH)

Q (14)	R	13 (FA(9)+OQ(4)
R (6)	P	5 (MS)
S (1)	Q	zero

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

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

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

It was either Prof. Ramaswamy or Prof. Samuel.

QNo:- 29 ,Correct Answer:- B

Explanation:- After reading the set, we can write following conditions.
1. There can be either 0 or 1 or 2 candidates form any department.
2. A candidate cannot vote for himself or herself.
3. Faculty members can not vote for candidate from their own department.
4. Non-candidates form same department voted for same candidate.
5. There are 9, 7, 5, 3 faculty members in FA, MS, OQ ,and BH.
6. P, Q, R, S received 3, 14, 6 and 1 votes.
7. There is exactly 1 candidate form OQ.
Since the questions are dubious, we can say there would be at least two cases.
Given Only one candidate is from OQ and there are 5 faculties from OQ ⇒ there are 4 non-candidates from OQ.
Also, P voted for R, Q for S, R for Q and S for P. Given that all non-candidates faculty members from same department voted for the same candidate. So, all 4 non-candidates from OQ can vote for candidates either Q or R.
Now P has got only 2 votes from non-candidates. From condition 4, these 2 votes can be from BH only that implies there is one candidate from BH.
R has got 5 votes which can be only from MS because of condition 4 that implies there are 2

candidates from MS.
Further, it can be determined that there is no candidates from FA. Q has got 13 non-candidates' votes. They would be from remaining departments: FA (9) & OQ (4)
Now let us try to find which candidate is from which department.
From condition (3), R cannot be from MS. And Similarly we can determine for other candidates.

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

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

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

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

Only statement (B) is true.

QNo:- 30 ,Correct Answer:- 0

Explanation:- To solve this set, following definitions we need to know:

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

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

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

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

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

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

	B_1	B_2	B_3	B_4	B_5	Total
U	1	2	2	2	4	11
V	2	4	4	4	5	19
W	1	2	4	5	5	17
X	1	3	4	5	5	18
Y	1	1	3	4	4	13

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

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

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

So, now we can make a new table:

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

Ans is 0

QNo:- 31 ,Correct Answer:- 0

Explanation:- To solve this set, following definitions we need to know:

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

Median = middle value after arranging the data in either ascending or descending order.
Mode = the number which is appearing highest number of times
Range = Maximum number – Minimum number
By using Mean formula; we can calculate total of all ratings given by all restaurants to each worker.
For Ullas, U = 2.2 × 5 = 11
V = 3.8 × 5 = 19
W = 3.4 × 5 = 17
X = 3.6 × 5 = 18
Y = 2.6 × 5 = 13
For Ullas, median rating is 2 i.e. middle most rating is 2. So, two lowest ratings are £ 2. Also, mode is 2. It means there should be atleast two 2's in ratings. Range = 3. That means Max rating – Min. rating = 3. R_1 awarded rating of 1 to U. Means maximum rating can be 4 only. So far we have deducted 4 ratings of U and they are are 1, 4, 2, 2. Since total is 11. So, all ratings are 1, 2, 2, 2, 4.
For V, total is 19. If we give 5 rating every time we will get total of 20. It means ratings are 2, 4, 4, 4, 5. (Because range is 3.)

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

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

	B_1	B_2	B_3	B_4	B_5	Total
U	1	2	2	2	4	11
V	2	4	4	4	5	19
W	1	2	4	5	5	17

X	1	3	4	5	5	18
Y	1	1	3	4	4	13

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

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

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

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

Ans is 0

QNo:- 32 ,Correct Answer:- 3

Explanation:- To solve this set, following definitions we need to know:

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

Median = middle value after arranging the data in either ascending or descending order.
Mode = the number which is appearing highest number of times
Range = Maximum number – Minimum number
By using Mean formula; we can calculate total of all ratings given by all restaurants to each worker.
For Ullas, U = 2.2 × 5 = 11
V = 3.8 × 5 = 19
W = 3.4 × 5 = 17
X = 3.6 × 5 = 18

$Y = 2.6 \times 5 = 13$

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

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

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

	B_1	B_2	B_3	B_4	B_5	Total
U	1	2	2	2	4	11
V	2	4	4	4	5	19
W	1	2	4	5	5	17
X	1	3	4	5	5	18
Y	1	1	3	4	4	13

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

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

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

	R_1	R_2	R_3	R_4	R_5
U	1	2	4	2	2

V	4	2	4	4	5
W	5	1	5	4	2
X	3	5	5	1	4
Y	4	1	1	3	4

Ans is 3

QNo:- 33 ,Correct Answer:- 4

Explanation:- To solve this set, following definitions we need to know:

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

Median = middle value after arranging the data in either ascending or descending order.
Mode = the number which is appearing highest number of times
Range = Maximum number – Minimum number
By using Mean formula; we can calculate total of all ratings given by all restaurants to each worker.
For Ullas, U = 2.2 × 5 = 11
V = 3.8 × 5 = 19
W = 3.4 × 5 = 17
X = 3.6 × 5 = 18
Y = 2.6 × 5 = 13
For Ullas, median rating is 2 i.e. middle most rating is 2. So, two lowest ratings are £ 2. Also, mode is 2. It means there should be atleast two 2's in ratings. Range = 3. That means Max rating – Min. rating = 3. R_1 awarded rating of 1 to U. Means maximum rating can be 4 only. So far we have deducted 4 ratings of U and they are are 1, 4, 2, 2. Since total is 11. So, all ratings are 1, 2, 2, 2, 4.
For V, total is 19. If we give 5 rating every time we will get total of 20. It means ratings are 2, 4, 4, 4, 5. (Because range is 3.)

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

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

	B_1	**B_2**	**B_3**	**B_4**	**B_5**	**Total**
U	1	2	2	2	4	11
V	2	4	4	4	5	19
W	1	2	4	5	5	17
X	1	3	4	5	5	18
Y	1	1	3	4	4	13

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

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

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

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

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

QNo:- 34 ,Correct Answer:- D

Explanation:- To solve this set, following definitions we need to know:

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

Median = middle value after arranging the data in either ascending or descending order.
Mode = the number which is appearing highest number of times
Range = Maximum number – Minimum number
By using Mean formula; we can calculate total of all ratings given by all restaurants to each worker.
For Ullas, U = 2.2 × 5 = 11
V = 3.8 × 5 = 19
W = 3.4 × 5 = 17
X = 3.6 × 5 = 18
Y = 2.6 × 5 = 13
For Ullas, median rating is 2 i.e. middle most rating is 2. So, two lowest ratings are £ 2. Also,

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

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

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

	B_1	B_2	B_3	B_4	B_5	Total
U	1	2	2	2	4	11
V	2	4	4	4	5	19
W	1	2	4	5	5	17
X	1	3	4	5	5	18
Y	1	1	3	4	4	13

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

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

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

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

X	3	5	5	1	4
Y	4	1	1	3	4

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

QNo:- 35 ,Correct Answer:- 0

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

$$\text{So, US applications in each slot} = \frac{100}{20} = 5$$

It is given that I, V and N were scheduled for Schengen visa processing in that order. Their slot was 9:15 AM. It means the number of shengen applicants in each slot is at least 3.

Similarly, it is given that M and O were scheduled in the 9:30AM slot in others category. So, the number of applicants in other category in each slot is at least 2.
Since the number of applicants in each slots is 10. So, it can be inferred that number of Schengen and others applicants is 3 and 2 respectively. Hence the number of UK applicants is 0 in each slot.

Total number of counters = 10
US counters = 4
UK counters = 2
Schengen counters = 2
Others counters = 2

Given that US and UK application requires 10 mins of processing time.
Vijay was called at 9:25 A.M. (5^{th} in line).
It is possible if processing time for Schengen visa is 12.5 mins. On a particular day, I, V and N were scheduled for Schengen visa processing in given order. They had 9:15 AM slot but entered at 9:20 A.M. when they entered VPO, exactly 6 out of 10 counters were either processing applications or had finished processing ones and ready to start processing the next. Hence at 9:20 A.M. there are exactly 4 free counters. Out of these 4 free counters, 2 would be UK and 2 would be others.
So, for US (Processing time is 10 mins) slots counter-wise are,
C_1 : 9:10, 9:20, 9:30, 9:40, 9:55, 10:10, 10:20

C_2 : 9:10, 9:25, 9:35, 9:45, 9:55, 10:10
C_3 : 9:10, 9:25, 9:40, 9:50, 10:00, 10:10
C_4 : 9:10, 9:25, 9:40, 9:55, 10:05, 10:15

For Schengen visa (12.5 mins) slots are
C1 : 9:12.30, 9:25. 9:37.30
C2 : 9:12.30, 9:32.30, 9:45

For others (5 mins) slots are
C1 → 9:05, 9:20, 9:35
C2 → 9:05, 9:20, 9:35

0 is the answer.

QNo:- 36 ,Correct Answer:- 200

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

$$\text{So, US applications in each slot} = \frac{100}{20} = 5$$

It is given that I, V and N were scheduled for Schengen visa processing in that order. Their slot was 9:15 AM. It means the number of shengen applicants in each slot is at least 3.

Similarly, it is given that M and O were scheduled in the 9:30AM slot in others category. So, the number of applicants in other category in each slot is at least 2.
Since the number of applicants in each slots is 10. So, it can be inferred that number of Schengen and others applicants is 3 and 2 respectively. Hence the number of UK applicants is 0 in each slot.

Total number of counters = 10
US counters = 4
UK counters = 2
Schengen counters = 2
Others counters = 2

Given that US and UK application requires 10 mins of processing time.
Vijay was called at 9:25 A.M. (5^{th} in line).
It is possible if processing time for Schengen visa is 12.5 mins. On a particular day, I, V and N were scheduled for Schengen visa processing in given order. They had 9:15 AM slot but entered at 9:20 A.M. when they entered VPO, exactly 6 out of 10 counters were either processing applications or had finished processing ones and ready to start processing the

next. Hence at 9:20 A.M. there are exactly 4 free counters. Out of these 4 free counters, 2 would be UK and 2 would be others.
So, for US (Processing time is 10 mins) slots counter-wise are,
C_1 : 9:10, 9:20, 9:30, 9:40, 9:55, 10:10, 10:20
C_2 : 9:10, 9:25, 9:35, 9:45, 9:55, 10:10
C_3 : 9:10, 9:25, 9:40, 9:50, 10:00, 10:10
C_4 : 9:10, 9:25, 9:40, 9:55, 10:05, 10:15

For Schengen visa (12.5 mins) slots are
C1 : 9:12.30, 9:25. 9:37.30
C2 : 9:12.30, 9:32.30, 9:45

For others (5 mins) slots are
C1 → 9:05, 9:20, 9:35
C2 → 9:05, 9:20, 9:35

For the others, the time taken to process are application is 5 mins. Time taken to process 40 applications is 40 × 5 = 200 mins.

QNo:- 37 ,Correct Answer:- A

Explanation:- Given slots are twenty 15 minutes slots starting at 9AM and ending at 2PM. Then applicants are scheduled in each slot.
Total number of applicants = 10 × 20 = 200
No. of US applications = 50% of Total
= 50% of 200 = 100
Since the number of US applications was the same in all slots.
So, US applications in each slot $= \frac{100}{20} = 5$
It is given that I, V and N were scheduled for Schengen visa processing in that order. Their slot was 9:15 AM. It means the number of shengen applicants in each slot is at least 3.

Similarly, it is given that M and O were scheduled in the 9:30AM slot in others category. So, the number of applicants in other category in each slot is at least 2.
Since the number of applicants in each slots is 10. So, it can be inferred that number of Schengen and others applicants is 3 and 2 respectively. Hence the number of UK applicants is 0 in each slot.

Total number of counters = 10
US counters = 4
UK counters = 2
Schengen counters = 2
Others counters = 2

Given that US and UK application requires 10 mins of processing time.

Vijay was called at 9:25 A.M. (5^{th} in line).
It is possible if processing time for Schengen visa is 12.5 mins. On a particular day, I, V and N were scheduled for Schengen visa processing in given order. They had 9:15 AM slot but entered at 9:20 A.M. when they entered VPO, exactly 6 out of 10 counters were either processing applications or had finished processing ones and ready to start processing the next. Hence at 9:20 A.M. there are exactly 4 free counters. Out of these 4 free counters, 2 would be UK and 2 would be others.
So, for US (Processing time is 10 mins) slots counter-wise are,
C_1 : 9:10, 9:20, 9:30, 9:40, 9:55, 10:10, 10:20
C_2 : 9:10, 9:25, 9:35, 9:45, 9:55, 10:10
C_3 : 9:10, 9:25, 9:40, 9:50, 10:00, 10:10
C_4 : 9:10, 9:25, 9:40, 9:55, 10:05, 10:15

For Schengen visa (12.5 mins) slots are
C1 : 9:12.30, 9:25. 9:37.30
C2 : 9:12.30, 9:32.30, 9:45

For others (5 mins) slots are
C1 → 9:05, 9:20, 9:35
C2 → 9:05, 9:20, 9:35

Nandini's application is 6th in Schengen application. So, her process will end at 9:45 AM True

QNo:- 38 ,Correct Answer:- B

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

$$\text{So, US applications in each slot} = \frac{100}{20} = 5$$

It is given that I, V and N were scheduled for Schengen visa processing in that order. Their slot was 9:15 AM. It means the number of shengen applicants in each slot is at least 3.

Similarly, it is given that M and O were scheduled in the 9:30AM slot in others category. So, the number of applicants in other category in each slot is at least 2.
Since the number of applicants in each slots is 10. So, it can be inferred that number of Schengen and others applicants is 3 and 2 respectively. Hence the number of UK applicants is 0 in each slot.

Total number of counters = 10
US counters = 4
UK counters = 2

Schengen counters = 2
Others counters = 2

Given that US and UK application requires 10 mins of processing time.
Vijay was called at 9:25 A.M. (5^{th} in line).
It is possible if processing time for Schengen visa is 12.5 mins. On a particular day, I, V and N were scheduled for Schengen visa processing in given order. They had 9:15 AM slot but entered at 9:20 A.M. when they entered VPO, exactly 6 out of 10 counters were either processing applications or had finished processing ones and ready to start processing the next. Hence at 9:20 A.M. there are exactly 4 free counters. Out of these 4 free counters, 2 would be UK and 2 would be others.
So, for US (Processing time is 10 mins) slots counter-wise are,
C_1 : 9:10, 9:20, 9:30, 9:40, 9:55, 10:10, 10:20
C_2 : 9:10, 9:25, 9:35, 9:45, 9:55, 10:10
C_3 : 9:10, 9:25, 9:40, 9:50, 10:00, 10:10
C_4 : 9:10, 9:25, 9:40, 9:55, 10:05, 10:15

For Schengen visa (12.5 mins) slots are
C1 : 9:12.30, 9:25. 9:37.30
C2 : 9:12.30, 9:32.30, 9:45

For others (5 mins) slots are
C1 → 9:05, 9:20, 9:35
C2 → 9:05, 9:20, 9:35

Option 3) the process for O was completed before 9:45 A.M. True
Option 2) The application process for Mahira started after Nandini's. For Mahira, starting time is 9:30 A.M.
So, for Nandini, starting time is 9:32.30. False.
So, option 2 is answer.

QNo:- 39 ,Correct Answer:- B

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

$$\text{So, US applications in each slot} = \frac{100}{20} = 5$$

It is given that I, V and N were scheduled for Schengen visa processing in that order. Their slot was 9:15 AM. It means the number of shengen applicants in each slot is at least 3.

Similarly, it is given that M and O were scheduled in the 9:30AM slot in others category. So,

the number of applicants in other category in each slot is at least 2.
Since the number of applicants in each slots is 10. So, it can be inferred that number of Schengen and others applicants is 3 and 2 respectively. Hence the number of UK applicants is 0 in each slot.

Total number of counters = 10
US counters = 4
UK counters = 2
Schengen counters = 2
Others counters = 2

Given that US and UK application requires 10 mins of processing time.
Vijay was called at 9:25 A.M. (5^{th} in line).
It is possible if processing time for Schengen visa is 12.5 mins. On a particular day, I, V and N were scheduled for Schengen visa processing in given order. They had 9:15 AM slot but entered at 9:20 A.M. when they entered VPO, exactly 6 out of 10 counters were either processing applications or had finished processing ones and ready to start processing the next. Hence at 9:20 A.M. there are exactly 4 free counters. Out of these 4 free counters, 2 would be UK and 2 would be others.
So, for US (Processing time is 10 mins) slots counter-wise are,
C_1 : 9:10, 9:20, 9:30, 9:40, 9:55, 10:10, 10:20
C_2 : 9:10, 9:25, 9:35, 9:45, 9:55, 10:10
C_3 : 9:10, 9:25, 9:40, 9:50, 10:00, 10:10
C_4 : 9:10, 9:25, 9:40, 9:55, 10:05, 10:15

For Schengen visa (12.5 mins) slots are
C1 : 9:12.30, 9:25. 9:37.30
C2 : 9:12.30, 9:32.30, 9:45

For others (5 mins) slots are
C1 → 9:05, 9:20, 9:35
C2 → 9:05, 9:20, 9:35

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

QNo:- 40 ,Correct Answer:- 3

Explanation:-

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

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

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

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

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

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

Block XX

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

√ = occupied
× = Unoccupied

For Block YY:
Both E_1 and E_2 are vacant.
By condition 4, either price of E_1 or E_2 is 15 Lacs.
Two cases arise:-

Case 1: If E_1 is of 15 Lacs.
Road adjacency value = 0.

If this house has no parking space then
$10 + 5 \times 0 + 3b = 15$
$\Rightarrow 3b = 5$ Never possible.
If E_1 has parking space,
$12 + 5 \times 0 + 3b = 15$
$\Rightarrow 3b = 3 \Rightarrow b = 1$.
Means E_1 has one occupied neighboring house. E_2 is already vacant. So, It can be either D_1 or F_1. So, there would be 2 possibilities

√	×	×				×	×	√
D_1	E_1	F_1		or		D_1	E_1	F_1
×	×	√				√	×	×
D_2	E_2	F_2				D_2	E_2	F_2

Case 2:
If E_2 is of 15 Lacs.
We already know a = 1.
If E_2 has parking space:
$12+ 5 \times 1 + 3b = 15 \Rightarrow 3b = -2$ (Not possible)
If E_2 has no parking space:
$10 + 5 \times 1 + 3b = 15 \Rightarrow b = 0$
Means D_2, E_1 and F_2 are vacant.
That implies D1 & F_1 are occupied by condition that column D and column F has at least one occupied house. But it is a contradiction to condition 1.
So, this is an invalid case.

Answer is 3.

QNo:- 41 ,Correct Answer:- A

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

Explanation:-

Road

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

5. One out of E_1 or E_2 is of worth 15 lacs.

6. There is only are house with parking space in block yy.

Let a = road adjacency value

Let b = neighbor count.

Where a = 0/1/2

Where b = 0/1/2/3

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

Case 1: - A house has parking space:

Quoted price = 12 + 5a + 3b = 24

⇒ 5a + 3b = 12

The only possible solution is a = 0, b = 4.

But b can't be 4 as maximum no. of neighbors can be 3.

Case 2:- House has not parking space.

Quoted price = 10 + 5a + 3b = 24

⇒ 5a + 3b = 14

⇒ a = 1, b = 3

It means the house has 1 roads adjacent and 3 neighbours i.e. occupied houses.

The only possibility is B_2

So, we can determine B_2 is vacant and worth 24 lacs. Also A_2, B_1 and C_2 are unoccupied.

From condition (1), we can say A_1 & C_1 are unoccupied.

Block XX

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

√ = occupied

× = Unoccupied

For Block YY:

Both E_1 and E_2 are vacant.

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

Two cases arise:-

Case 1: If E_1 is of 15 Lacs.

Road adjacency value = 0.

If this house has no parking space then

10 + 5 × 0 + 3b = 15

⇒ 3b = 5 Never possible.

If E_1 has parking space,

12 + 5 × 0 + 3b = 15

⇒ 3b = 3 ⇒ b = 1.

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

F_1. So, there would be 2 possibilities

√	×	×				×	×	√
D_1	E_1	F_1		or		D_1	E_1	F_1
×	×	√				√	×	×
D_2	E_2	F_2				D_2	E_2	F_2

Case 2:

If E_2 is of 15 Lacs.

We already know a = 1.

If E_2 has parking space:

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

If E_2 has no parking space:

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

Means D_2, E_1 and F_2 are vacant.

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

So, this is an invalid case.

B_1 is definitely occupied.

QNo:- 42 ,Correct Answer:- C

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

Explanation:-

Road

We can determine following by reading the set:

1. Row 1 has two occupied houses one in each block means one out of A_1, B_1, C_1 is occupied.

One out of D_1, E_1, F_1 is occupied

Also, it means 4 are vacant.

2. E_1 and E_2 are vacant.
3. The costeliest house (vacant) in block xx is worth 24 lacs.
4. The cheapest house (vacant) in block yy is worth 15 lacs.
5. One out of E_1 or E_2 is of worth 15 lacs.
6. There is only are house with parking space in block yy.

Let a = road adjacency value

Let b = neighbor count.

Where a = 0/1/2

Where b = 0/1/2/3

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

Case 1: - A house has parking space:

Quoted price = 12 + 5a + 3b = 24

⇒ 5a + 3b = 12

The only possible solution is a = 0, b = 4.

But b can't be 4 as maximum no. of neighbors can be 3.

Case 2:- House has not parking space.

Quoted price = 10 + 5a + 3b = 24

⇒ 5a + 3b = 14

⇒ a = 1, b = 3

It means the house has 1 roads adjacent and 3 neighbours i.e. occupied houses.

The only possibility is B_2

So, we can determine B_2 is vacant and worth 24 lacs. Also A_2, B_1 and C_2 are unoccupied.

From condition (1), we can say A_1 & C_1 are unoccupied.

Block XX

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

√ = occupied

× = Unoccupied

For Block YY:

Both E_1 and E_2 are vacant.

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

Two cases arise:-

Case 1: If E_1 is of 15 Lacs.

Road adjacency value = 0.

If this house has no parking space then

10 + 5 × 0 + 3b = 15

⇒ 3b = 5 Never possible.

If E_1 has parking space,

12 + 5 × 0 + 3b = 15

⇒ 3b = 3 ⇒ b = 1.

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

√	×	×				×	×	√
D_1	E_1	F_1		or		D_1	E_1	F_1
×	×	√				√	×	×
D_2	E_2	F_2				D_2	E_2	F_2

Case 2:

If E_2 is of 15 Lacs.

We already know a = 1.

If E_2 has parking space:

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

If E_2 has no parking space:

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

Means D_2, E_1 and F_2 are vacant.

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

So, this is an invalid case.

Exactly 3.

QNo:- 43 ,Correct Answer:- 21

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

Explanation:-

Road

We can determine following by reading the set:

1. Row 1 has two occupied houses one in each block means one out of A_1, B_1, C_1 is occupied.

One out of D_1, E_1, F_1 is occupied

Also, it means 4 are vacant.

2. E_1 and E_2 are vacant.
3. The costeliest house (vacant) in block xx is worth 24 lacs.
4. The cheapest house (vacant) in block yy is worth 15 lacs.
5. One out of E_1 or E_2 is of worth 15 lacs.
6. There is only are house with parking space in block yy.

Let a = road adjacency value

Let b = neighbor count.

Where a = 0/1/2

Where b = 0/1/2/3

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

Case 1: - A house has parking space:

Quoted price = $12 + 5a + 3b = 24$

$\Rightarrow 5a + 3b = 12$

The only possible solution is a = 0, b = 4.

But b can't be 4 as maximum no. of neighbors can be 3.

Case 2:- House has not parking space.

Quoted price = 10 + 5a + 3b = 24

⇒ 5a + 3b = 14

⇒ a = 1, b = 3

It means the house has 1 roads adjacent and 3 neighbours i.e. occupied houses.

The only possibility is B_2

So, we can determine B_2 is vacant and worth 24 lacs. Also A_2, B_1 and C_2 are unoccupied.

From condition (1), we can say A_1 & C_1 are unoccupied.

Block XX

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

√ = occupied

× = Unoccupied

For Block YY:

Both E_1 and E_2 are vacant.

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

Two cases arise:-

Case 1: If E_1 is of 15 Lacs.

Road adjacency value = 0.

If this house has no parking space then

10 + 5 × 0 + 3b = 15

⇒ 3b = 5 Never possible.

If E_1 has parking space,

12 + 5 × 0 + 3b = 15

⇒ 3b = 3 ⇒ b = 1.

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

√	×	×				×	×	√
D_1	E_1	F_1		or		D_1	E_1	F_1
×	×	√				√	×	×
D_2	E_2	F_2				D_2	E_2	F_2

Case 2:

If E_2 is of 15 Lacs.

We already know a = 1.

If E_2 has parking space:

12+ 5 × 1 + 3b = 15 ⇒ 3b = - 2 (Not possible)

If E_2 has no parking space:

10 + 5 × 1 + 3b = 15 ⇒ b = 0

Means D_2, E_1 and F_2 are vacant.
That implies D1 & F_1 are occupied by condition that column D and column F has at least one occupied house. But it is a contradiction to condition 1.
So, this is an invalid case.

Maximum possible quoted price = 10 + 5 × 1 + 3 ×2 = 21 Lacs.

QNo:- 44 ,Correct Answer:- C

Explanation:-

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

Road

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

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

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

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

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

From condition (1), we can say A_1 & C_1 are unoccupied.

Block XX

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

√ = occupied
× = Unoccupied

For Block YY:

Both E_1 and E_2 are vacant.

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

Two cases arise:-

Case 1: If E_1 is of 15 Lacs.

Road adjacency value = 0.

If this house has no parking space then

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

$\Rightarrow 3b = 5$ Never possible.

If E_1 has parking space,

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

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

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

√	×	×				×	×	√
D_1	E_1	F_1		or		D_1	E_1	F_1
×	×	√				√	×	×
D_2	E_2	F_2				D_2	E_2	F_2

Case 2:

If E_2 is of 15 Lacs.

We already know a = 1.

If E_2 has parking space:

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

If E_2 has no parking space:

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

Means D_2, E_1 and F_2 are vacant.

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

So, this is an invalid case.

E_1 has parking space.

Section : Quantitative Ability

QNo:- 45 ,Correct Answer:- D

Explanation:- $\text{Log}_x (x^2+12) = 4$

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

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

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

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

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

Here x^2 cannot be negative so rejecting -3.

$x^2 = 4$

$x = 2$ and $x = -2$.

Now again x is in the base here, so it cannot be negative. As such $x = -2$ rejected.

Finally we get, $x = 2$.

Further we are given,

$3 \log_y x = 1$

$\log_y x = 1/3$

$x = y^{1/3}$

$2 = y^{1/3}$

Cube on both side, we get

$8 = y$

Finally, $x + y = 2 + 8 = 10$.

QNo:- 46 ,Correct Answer:- C

Explanation:- Solution: Firstly doing prime factorization

$168 = 2^3 \times 3^1 \times 7^1$

$1134 = 2^1 \times 3^4 \times 7^1$

The least positive integer value of n in 1134^n to make it a factor of 168

$1134^n / 168$

We need atleast 2^3 in numerator, so minimum value of n must be 3.

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

$168 = 2^3 \times 3^1 \times 7^1$

The least positive integer value of m in 168^m to make it a factor of 1134^n

We need atleast 3^{12} in numerator, so minimum value of m must be 12.

Finally $m + n = 12 + 3 = 15$.

QNo:- 47 ,Correct Answer:- C

Explanation:- $x^2 + (x-2y-1)^2 = -4y(x+y)$
$x^2 + 4y(x+y)+ (x-2y-1)^2 = 0$
$x^2 + 4yx+ 4y^2+ (x-2y-1)^2 = 0$
$(x+2y)^2+ (x-2y-1)^2 = 0$
As both of these are square, so they none of them could be negative.
In order to make the sum as zero, they must be individually zero.
As such, $(x – 2y – 1)^2 = 0 \Rightarrow x - 2y-1 = 0 \Rightarrow x-2y = 1$. So, answer is 1.

QNo:- 48 ,Correct Answer:- B

Explanation:-
$$\sqrt{5x+9}+\sqrt{5x-9} = 3(2+\sqrt{2})$$
$$\sqrt{5x+9}+\sqrt{5x-9} = 6+3\sqrt{2}$$
$$\sqrt{5x+9}+\sqrt{5x-9} = \sqrt{36}+\sqrt{18}$$
Here we can observe difference between $\sqrt{5x+9}$ and $\sqrt{5x-9}$ also $\sqrt{36}$ and $\sqrt{18}$ is same.
From here we can equate,
$\sqrt{5x+9} = \sqrt{36}$
so, 5x + 9 = 36
10x + 9 = 63
$\sqrt{10x+9} = \sqrt{63}$
$\sqrt{10x+9} = 3\sqrt{7}$.

QNo:- 49 ,Correct Answer:- 3

Explanation:- $2|x|(x^2 + 1) = 5\ x^2$
Let y = |x|
so $y^2 = x^2$
rewriting the equation
$2y(y^2 + 1)= 5\ y^2$
we can cancel y from both the sides, means x = 0
we are left with
$2(y^2 + 1)= 5\ y$
$2y^2 + 2= 5\ y$
$2y^2 - 5\ y + 2 = 0$
y = ½ and 2.
we need integral value, so leaving 1/2.
We have y =0, 2
means |x| = 0 and 2
so x can have 3 values i.e. 0, 2, -2. So 3 values.

QNo:- 50 ,Correct Answer:- 6

Explanation:- Sum of roots = -b/a
$\alpha + \beta = 3$
and product of roots is = c/a
$\alpha * \beta = K/2$
For the second equation,
Sum of roots, $\alpha + \beta + \alpha * \beta = -P$
$3 + k/2 = -P$
Product of roots, $(\alpha + \beta)* \alpha * \beta = P$
$3* k/2 = P$
Solving these two, we get
$K = -3/2$
$P = -9/4$
Solving $8(K - P) = 8 [-3/2 - (-9/4)] = 6$
The answer will be 6.

QNo:- 51 ,Correct Answer:- 2

Explanation:- $x^3 + (2r + 1)x^2 + (4r + 1)x + 2 = 0$
Here the product of all three roots = d/a = -2
One of the roots is given as -2
So, product of two roots, a*b = 1
so we can conclude b = 1/a
Now sum of all the three roots = -b/a
$a + 1/a -2 = -(2r + 1)$
$a + 1/a = -2r + 1$
we know that, value of a + 1/a lies between -2 and 2.
we can conclude
$-2 \leq a + 1/a \leq 2$
$= -2 \leq -2r + 1 \leq 2$
Adding 1
$-3 \leq -2r \leq 3$
Dividing by 2
$-3 /2 \leq -r \leq 3/2$
multiplying by -1
$3 /2 \leq r \leq -3/2$. So minimum possible non negative integral value will be 2.

QNo:- 52 ,Correct Answer:- A

Explanation:- Using the formula for angle between the hands of clock.
$q = M\ 11/2 – 30\ H$
q = Angle between the two hands.

H = Position of hour hand initially
M = Position of Minute hand lastly.
At 8:48
q = 48 × 11/2 – 30× 8 = 24 degree increasing 24 by 50%, we get = 36 degree.
time between 8 and 9 the hands of a clock make an angle of 36 degree
q = M 11/2 – 30 H
36 = M 11/2 – 30× 8
m = 552/11 = 50 (2/11)
Difference in minutes = 50 (2/11) – 48 = 24/11

QNo:- 53 ,Correct Answer:- A

Explanation:- The ratio of coffee and cocoa in the mixture Q is 16 : 9. Means ratio of final to total coffee = 16:25
By applying the formula for repeated mixture,

$$\frac{16}{9} = 1[1 - \frac{taken\ Out}{total}]^2$$

$$\frac{taken\ Out}{total} = \frac{1}{5}$$

It means, in first go, 1/5 of coffee is replaced be cocoa powder and in second go, 1/5 of mixture was replaced by cocoa powder.
cocoa in mixture P = 1/5
and cocoa in mixture Q is = 9/25
ratio of cocoa in mixture P to that in mixture Q is (1/5) / (9/25) = 5:9

QNo:- 54 ,Correct Answer:- B

Explanation:- Let marks of each girl = g and marks of each boy = m
(4 g + 6 b)/ 10 = 24
4 g + 6 b = 240
2 g + 3 b = 120 – (I)
Given, marks of any girl is at most double the marks of any boy i.e. g = 2 b (max)
but marks of any girl is not less than the marks of any boy i.e. g = b (min)
putting max and min value of g in equation (I) , we get
at g = 2 b, 4 b + 3 b = 120 ⇒ b = 17.14
at g = b, 2 b + 3 b = 120 ⇒ b = 24
we need to solve for 2 g + 6 b
at g = 2 b, 4 b + 6 b ⇒ 10 b ⇒ 10 × 17.14 = 171.4
at g = b, 2 b + 6 b ⇒ 8 b ⇒ 8 × 24 = 192
So value range for 172 till 192, total 21 values

QNo:- 55 ,Correct Answer:- D

Explanation:- Lets go by options,
Option 1,
26862 – 8×80 = 26222 (Not a palindrome)
Option 2,
26862 – 8×90 = 26142 (Not a palindrome)
Option 3,
26862 – 8×110 = 25980 (Not a palindrome)
Option 4,
26862 – 8×100 = 26062 (a palindrome)
Correct answer to the question must be option 4.

QNo:- 56 ,Correct Answer:- C

Explanation:- let CP of first = a and CP of second = b
Profit of 20% on a.
SP of first will be = 1.2 a
Loss of 10% on second.
SP of second will be = 0.9 b
SP of both is same
1.2 a = 0.9 b
or 0.9 b = 1.2 a
to have a profit of 10% on b means 1.1 b
when 0.9 b = 1.2 a
then 1.1 b = 1.466 a
that means a profit of 47% on first object A.

QNo:- 57 ,Correct Answer:- A

Explanation:- Ratio of the salaries of Sita, Gita and Mita is given as 5: 6 : 7
After respective hike of 20% , 25% and 20%, it becomes = 6: 7.5: 8.4.
The second year, after Sita and Mita get salary hikes of 40% and 25%, respectively, we get = 8.4: x: 10.5.
Now given, the salary of Gita becomes equal to the mean salary of the three friends which is = x
(8.4 + x + 10.5) /3 = x
x = 9.45
Salary of Gita increases from 7.5 to 9.45, so percentage increase will be = (9.45 – 7.5)/ 7.5 × 100 = 26%

QNo:- 58 ,Correct Answer:- 972

Explanation:- $S_a/S_b = \sqrt{}$ Tb/Ta

$54/S_b = \sqrt{(\frac{24}{6})}$

$S_b = 27$

Total distance = 54 × 6 + 27 × 24 = 972 km. Correct answer to the question must be 972.

QNo:- 59 ,Correct Answer:- 20808

Explanation:- Let initial investment made by Sunil be 'x'

As compounded half-yearly, time becomes 12 and rate becomes 2% for Anil and time becomes 10 and rate becomes 2% for Sunil.

$22000(1.02)^{12} = x(1.02)^{10} \times 1.1$

x = 20808. Correct answer to the question must be 20808.

QNo:- 60 ,Correct Answer:- 27

Explanation:- Kamal takes twice as much time as Amal to do the same amount of job.

So, if one day work of Amal is '2a' then one day work of Kamal will be 'a'.

Let one day work of Sunil be 'x'

Now, amount of job that Amal, Sunil and Kamal can individually do in a day, are inharmonic progression

So 2/x = 1/2a + 1/ a

x = 4/3a

Means, one day work of Sunil is '4/3a'

Amal and Sunil work for 4 days and 9 days, respectively, Kamal needs to work for 16 days to finish the remaining job

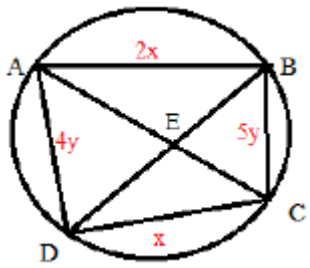
means total work will be = 8 a +12 a + 16 a = 36 a

Time taken by Sunil to finish the job working alone = 36a/ (4/3a) = 27 days.

Correct answer to the question must be 27 days.

QNo:- 61 ,Correct Answer:- B

Explanation:- In triangle AED and triangle BEC



∠DAE = ∠CBE (angle by same arc)

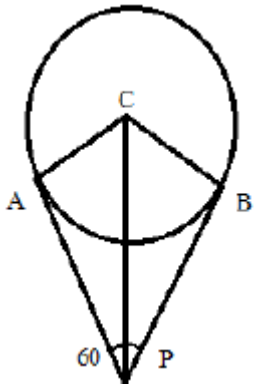
∠ADE = ∠BCE (angle by same arc)

So triangle AED and triangle BEC are similar.

AE/BE = AD/BC = DE/CE =4/5. – (I)
Similarly, triangle AED and triangle BEC will be similar.
AE/ED = AB/DC = BE/CE =2/1 – (II)
from (I) and (II)
AE : CE = 8:5.

QNo:- 62 ,Correct Answer:- D

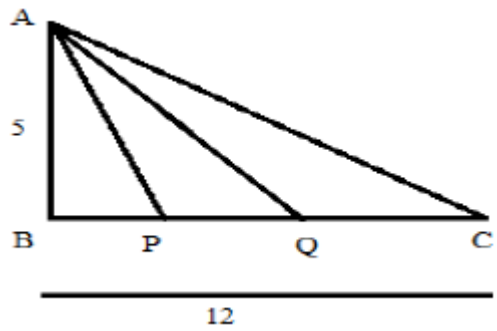
Explanation:- From equation,
$x^2 + y^2 + 4x - 6y - 3 = 0$
We can conclude that centre of circle will be at (-2,3)
$\text{Radius} = \sqrt{16}\ [(-2)^2 + (3)^2 - (-3)]$
$\text{Radius} = \sqrt{16} = 4$
In triangle APC,



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

QNo:- 63 ,Correct Answer:- 2

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



So length of BC = 1.5 BP
BP = 8
BC = 12 (Given)
BP, BQ and BC are in arithmetic progression.
BQ = (8+12) / 2 = 10
PQ = 10 – 8 = 2. Correct answer to the question must be 2.

QNo:- 64 ,Correct Answer:- A

Explanation:- $1/(\sqrt{x}+\sqrt{z})+1/(\sqrt{x}+\sqrt{y})=2/(\sqrt{y}+\sqrt{z})$

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

now going by options, using option 1.
when y, x, z are in arithmetic progression, x-z will be d, x-y will be –d and y-z will be 2d.

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

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

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

it means this is satisfied. Correct answer to the question must be option 1.

QNo:- 65 ,Correct Answer:- A

Explanation:- Considering all single digit number = 9 numbers
Considering 2 digit number = _ × _
First place can be filled in 9 ways because cannot take zero.
Second place can be filled in 9 ways because repetition not allowed.
= 9×9 = 81 numbers
Considering 3 digit number = _ × _ × _
First place can be filled in 9 ways because cannot take zero.
Second place can be filled in 9 ways because repetition not allowed.
Third place can be filled in 8 ways because repetition not allowed.
= 9×9 × 8 = 648 numbers. Total = 9 + 81 + 648 = 738 numbers.

QNo:- 66 ,Correct Answer:- 19

Explanation:- No. of organisms on first day = 2, Second = 2×2+3 = 7, Third = 7 × 2+3 = 17
Forth = 17 × 2 + 3 = 37, Fifth = 37 × 2 + 3 = 77
Sixth = 77× 2 +3 = 157
Seventh = 157× 2 + 3 = 317
When you look carefully you will realize, after 7 steps there is NO much impact of +3 so we can consider that after seventh term it only becomes double.
So considering a GP with first term a =157, r =2 and Tn >10,00,000
n will be 12. So total it must be 7 + 12 =19th term. Correct answer to the question must be 19.