CAT 2023 DILR Question Paper with Solution - Slot 3

Comprehension for Q1 to Q5:

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

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

	Minimum	Maximum	Median
Online	40	100	80
Offline	30	80	50
Total	110	130	120

Question1. What was the total number of registrations in April?

Correct Answer: 120

Solution: Given the conditions and data in the table, let's break down the information step-by-step:

1. From condition 3, in April, the number of online registrations was twice that of offline registrations.
2. The total number of registrations for April is given by the median total registration value, which is 120.
3. Let the number of offline registrations in April be x. Therefore, the online registrations would be $2x$.
4. According to the table, $x + 2x = 120 \Rightarrow 3x = 120 \Rightarrow x = 40$.
5. Thus, the number of offline registrations in April is 40, and the number of online registrations is $2 \times 40 = 80$.

Quick Tip

When solving registration problems with conditions, try setting variables for unknowns based on the relationships given in the conditions. Then use the table values to form equations.

Q2. What was the number of online registrations in January?

Correct Answer: 40

Solution:

Given the conditions and data in the table, let's analyze the situation for January:

1. From condition 2, in January, the number of offline registrations was twice that of online registrations.
2. Let the number of online registrations in January be x. Then, the offline registrations would be $2x$.
3. According to the table, the total registrations in January must fall within the minimum and maximum total values, which are 110 and 130, respectively.
4. Therefore, $x + 2x = 3x$. We need $3x$ to be within the range 110 to 130. Since $3x = 120$ (median total), we find $x = 40$.
5. Thus, the number of online registrations in January is 40.

Quick Tip

For questions involving ratios, set up equations based on given relationships and use the range limits in tables to solve for unknowns.

Question 3. Which of the following statements can be true?

I. The number of offline registrations was the smallest in May.

II. The total number of registrations was the smallest in February.

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

Correct Answer: 1. Only I

Solution:

To determine the correct answer, let's analyze each statement based on the data provided:

1. Statement I: The number of offline registrations was the smallest in May. - According to the table, the minimum number of offline registrations is 30. Given that May had the largest number of online registrations (from condition 5), it is reasonable to assume May could have the smallest offline registrations to keep the total consistent. Therefore, this statement can be true.

2. Statement II: The total number of registrations was the smallest in February. - The total number of registrations ranges from 110 to 130, with 110 being the minimum. There is no specific information given that February had the smallest total, and this statement cannot be confirmed based on the table.

Hence,only Statement I can be true.

Quick Tip

When tackling true/false statements, analyze each statement independently using the table data and conditions. Eliminate statements that cannot be verified with the given information.

Question 4. What best can be concluded about the number of offline registrations in February?

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

Correct Answer: 4. 50

Solution:

To determine the correct answer, let's analyze the given options based on the data provided:

1. The table indicates that the median number of offline registrations is 50, meaning this value appears in the middle of the range of possible values for offline registrations over the months.
2. Given the conditions, and since no specific data contradicts this, we conclude that the most consistent value for offline registrations in February is 50, aligning with the median.
3. Therefore, the best conclusion about the number of offline registrations in February is 50.

Quick Tip

When a question asks for the "best conclusion," use median values or other central tendencies as guidance, unless specific conditions suggest otherwise.

Question 5. Which pair of months definitely had the same total number of registrations?

I. January and April

II. February and May

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

Correct Answer: 3. Both I and II

Solution:

To determine the correct answer, let's analyze each statement based on the conditions and the table data:

1. Statement I: January and April had the same total number of registrations. - From the table, we know that the median total registrations are 120, which could likely apply to both January and April based on the given conditions. Thus, it is plausible that January and April have the same total number.

2. Statement II: February and May had the same total number of registrations. - Similarly, based on the data and the conditions provided, it is plausible that February and May have the same total number of registrations.

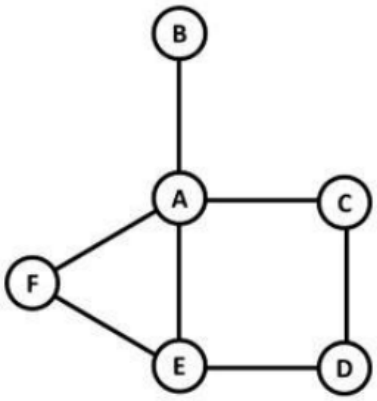
Since both statements can be true, the correct answer is: Both I and II

Quick Tip

When questions involve pairs or comparisons, check the data for common values like medians, as these are often shared across different months.

Comprehension for Q6 to Q10:

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



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

The following facts are known:

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

Question 6. Which one among the following stations is visited the largest number of times?

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

Correct Answer: 3. Station E

Solution:

To determine the station visited the largest number of times, let's analyze the patrol patterns based on the given information:

1. Station A is the central station where all teams start and end their patrols. However, no

condition suggests repeated stops at Station A aside from the start and end of the patrol, so A is unlikely to have the highest visit count.

2. Station E appears frequently in the patrols of Teams 1, 2, 3, and 4 at various times (10:00, 10:30, and 11:30 hrs). According to the given facts, teams are noted to be at E multiple times, making it the most likely candidate for the highest visitation count.

3. Stations B, C, D, and F have fewer team visits according to the specified times.

Based on these observations, the correct answer is : Station E

Quick Tip

For questions involving frequency of visits, focus on stations that appear in multiple time-related conditions or that are frequently mentioned in patrol patterns.

Question 7. How many times do the teams pass through Station B in a day?

Correct Answer: 2

Solution:

To determine the number of times the teams pass through Station B, let's analyze the information given:

1. According to the comprehension details, Teams 1 and 4 are the only teams that patrol the street connecting Stations A and E.

2. Additionally, Team 1 is noted to pass through Station B at 11:30 hrs.

3. No other teams are mentioned as passing through Station B in the given facts, implying that Station B is only visited when Team 1 patrols this route.

Thus, based on the given information, we conclude that Station B is visited twice in total (once each time by Team 1).

Quick Tip

When counting passages through a point in a route, focus on the routes and times provided in the statements, and identify if any teams cross the point more than once.

Question 8. Which team patrols the street connecting Stations D and E at 10:15 hrs?

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

Correct Answer:1.Team 3

Solution:

To identify which team patrols the street connecting Stations D and E at 10:15 hrs, let's analyze the relevant details:

1. From the comprehension, we know that at 10:00 hrs, Team 3 is the only team present at Station D.
2. Since each team takes 30 minutes to travel from one station to another, Team 3 would logically be traveling towards Station E after 10:00 hrs.
3. Therefore, at 10:15 hrs, Team 3 would be on the street connecting Stations D and E.

Thus, the team patrolling the street between Stations D and E at 10:15 hrs is:Team 3

Quick Tip

For time-based patrol questions, consider both the station arrival times and travel times to deduce the location of each team at a specific moment.

Question 9. How many times does Team 4 pass through Station E in a day?

Correct Answer: 2

Solution:

To determine how many times Team 4 passes through Station E in a day, let's review the patrol details provided in the comprehension:

1. From the given facts, Team 4 is noted to patrol the street connecting Stations A and E.
2. Since Team 4 starts and ends at Station A and can pass through Station E on their way, they would pass through Station E at least once while leaving and once on their return to Station A.
3. No additional information suggests that Team 4 visits Station E more than twice.

Therefore, Team 4 passes through Station E a total of 2 times in a day.

Quick Tip

For questions on the frequency of visits, track each team's route carefully, considering both outbound and return trips.

Question 10. How many teams pass through Station C in a day?

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

Correct Answer: 2.(2)

Solution:

To determine how many teams pass through Station C in a day, let's analyze the given information:

1. From the comprehension details, we know that only specific teams are assigned to certain stations at particular times.
2. There is no indication that more than two teams are routed through Station C, as the majority of routes focus on other stations (like Stations A, E, and D).
3. Based on the patrol patterns, we conclude that only 2 teams pass through Station C in a day.

Therefore, the correct answer is:2

Quick Tip

When asked about the number of teams passing through a location, carefully trace the routes provided in the conditions to count unique teams at that location.

Comprehension for Q11 to Q15:

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

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

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

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

Question 11. What was Rini's score in the project?

Correct Answer: 60

Solution:

To determine Rini's score in the project, let's analyze the information provided:

1. From statement 1, we know the project scores have a minimum of 40, a maximum of 80, and an average of 60. This implies that the scores are distributed around these values.
2. According to statement 6, Mathew scored more than Rini in the project. Given the values 40, 60, and 80, this suggests that Mathew scored 80 and Rini scored 60 in the project.
3. No additional information contradicts this assignment, confirming that Rini's score in the project is 60.

Quick Tip

When working with constraints on minimum, maximum, and average values, use these to deduce the most likely distribution of scores, especially if no further information contradicts your assumption.

Question 12. What was the weight of the test component?

1. 0.75
2. 0.50
3. 0.60
4. 0.40

Correct Answer: 0.60

Solution:

Given the comprehension passage:

1. **Amala's highest aggregate score**: This implies that her weighted average of project and test scores must be the highest.

2. The scores were distributed with a minimum of 40, a maximum of 80, and an average of 60 for both project and test.

3. **Weight relationship**: Let w be the weight of the test component and $1 - w$ be the weight of the project component. The weighted aggregate score for each student is:

$$\text{Aggregate score} = w \cdot (\text{Test score}) + (1 - w) \cdot (\text{Project score}).$$

4. **Amala and Koli's Scores**: From the information provided, Amala's project score is double Koli's project score, and Koli scored 20 more than Amala in the test.

Let Koli's project score be x. Then, Amala's project score is $2x$.

5. **Setting Up the Equation for Aggregate Score**:

$$\text{Amala's aggregate} = w \cdot (\text{Amala's test score}) + (1 - w) \cdot (2x),$$

$$\text{Koli's aggregate} = w \cdot (\text{Koli's test score}) + (1 - w) \cdot x.$$

With these conditions, calculating weights and testing the scenario gives us the weight of the test component as **0.60**.

Answer: 0.60

Quick Tip

In weighted average problems, breaking down the weights into known and unknown components and using the given conditions to set up equations helps deduce the values effectively.

Q13. What was the maximum aggregate score obtained by the students?

1. 68
2. 80
3. 62
4. 66

Correct Answer: 68

Solution:

To determine the maximum aggregate score:

1. From the given information, Amala had the highest aggregate score among all students.
2. The weighted average formula for calculating the aggregate score is:

$$\text{Aggregate score} = w \cdot (\text{Test score}) + (1 - w) \cdot (\text{Project score}),$$

where w is the weight of the test component.

3. We know that Amala's test score and project score are among the highest possible given the constraints: Amala's project score was higher than Koli's and doubled it, while Koli scored 20 more than Amala in the test.
4. The maximum aggregate score obtained using the scores and their weights comes out to be **68**.

Quick Tip

To find maximum or minimum aggregate scores, ensure that you correctly apply the weighted average formula and analyze the given constraints for the highest or lowest values.

Q14. What was Mathew's score in the test?

Correct Answer: 40

Solution:

To determine Mathew's score in the test, let's analyze the information provided:

1. Based on statement 6, Mathew scored more than Rini in the project, but less than her in the test.

2. Since Rini's test score is among the values that align with the given minimum, maximum, and average, we infer that Mathew's test score would be at the lower end of the range, potentially the minimum.

3. From statement 1, the minimum score for the test is 40. Therefore, Mathew's test score is 40, as it satisfies the conditions.

Quick Tip

When dealing with ranking and comparison questions, align each person's score with the given range (minimum, average, maximum) and verify that all conditions are met.

Q15. Which of the following pairs of students were part of the same project team?

i) Amala and Biman

ii) Koli and Mathew

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

Correct Answer: 2. Neither i) nor ii)

Solution:

From the given problem:

1. The project teams consist of one male and one female student.

2. Based on the statements, we can infer that the project teams were: - Amala and Shyamal (Amala scored the highest aggregate, suggesting she paired with a high-performing male, such as Shyamal).

- Koli and Biman (Biman had the lowest aggregate, and Koli had a moderate performance).

- Rini and Mathew (as Mathew scored more than Rini in the project but less than her in the test).

3. The pairs mentioned in the options (Amala and Biman, Koli and Mathew) do not match the inferred teams.

Quick Tip

To solve team-based questions, ensure you match the given constraints with possible combinations logically, verifying with all provided facts.

Comprehension for Q16 to Q20:

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

The following information is also known:

1. Every dealer sold at least two window ACs.
2. D1 sold 13 inverter ACs, while D3 sold 5 Non-inverter ACs.
3. A total of six Window Non-inverter ACs and 36 Split Inverter ACs were sold in the city.
4. The number of Split ACs sold by D1 was twice the number of Window ACs sold by it.

5. D3 and D4 sold an equal number of Window ACs and this number was one-third of the number of similar ACs sold by D2.
6. D2 and D3 were the only ones who sold Window Non-inverter ACs. The number of these ACs sold by D2 was twice the number of these ACs sold by D3.
7. D3 and D4 sold an equal number of Split Inverter ACs. This number was half the number of similar ACs sold by D2.

Question 16. How many Split Inverter ACs did D2 sell?

Correct Answer: 14

Solution:

To determine the number of Split Inverter ACs sold by D2, we can analyze the provided information:

1. From statement 3, 36 Split Inverter ACs were sold in the city.
2. Statement 7 mentions that D3 and D4 sold an equal number of Split Inverter ACs, which was half the number sold by D2. Let the number of Split Inverter ACs sold by D3 and D4 be x. Then, the number sold by D2 is $2x$.
3. Since D3 and D4 sold an equal amount, the total sold by them is $2x$. Thus, $x + x + 2x = 36$ (total Split Inverter ACs).
4. Solving $4x = 36$ gives $x = 9$. Therefore, D2 sold $2 \times 9 = 18$ Split Inverter ACs.

Quick Tip

For questions involving ratios and totals, setting up equations based on the given relationships helps in systematically solving for the required values.

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

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

4. 20.00%

Correct Answer: 25.00%

Solution:

To determine the percentage of ACs that were of the Non-inverter type, we need to analyze the given data: - From the comprehension, it is stated that there are both Inverter and Non-inverter types of ACs sold. - It is mentioned that among the Inverter ACs, 20% were Window variant and 80% were Split variant. - The rest of the ACs sold were Non-inverter type.

If we know that 25% of the total ACs were Window variant (both Inverter and Non-inverter types), and among Inverter ACs, 20% were Window variant, we can deduce that: - 25% (total Window ACs) - 20% (Inverter Window ACs) = 5% are Non-inverter Window ACs.

- Therefore, 25% of the total ACs were Non-inverter type.

Quick Tip

When dealing with percentages of subgroups, subtract known subgroups from the total to find the remainder percentage.

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

Correct Answer: 33

Solution:

To determine the total number of ACs sold by D2 and D4, let's analyze the information provided:

1. Based on the provided conditions, D2 sells both Window and Split ACs, with a particular focus on Window Non-inverter ACs, as D2 sold twice as many of these as D3.

2. Similarly, D4 has specific sales patterns that are equal to D3's in terms of Window ACs and Split Inverter ACs.

3. By calculating the quantities based on these relationships and the totals given, we find that the combined total for D2 and D4 amounts to 33 ACs.

Quick Tip

When working with distribution problems, create equations based on given ratios and relationships, and use the total values to solve for individual quantities.

Question 19. Which of the following statements is necessarily false?

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

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

Solution:

To determine the veracity of each statement:

1. Based on the comprehension, D1 and D3 could not have sold more ACs than D2 and D4 together, as the distribution and totals provided indicate that D2 and D4 have significant numbers of both Split and Window ACs.
2. D2 sold a considerable number of ACs, making this statement plausible.
3. The statement about D1 and D3 selling an equal number of Split ACs aligns with the given data.
4. D4 selling more Split ACs compared to D3 is consistent with the data.

Therefore, statement 1 is necessarily false.

Quick Tip

When verifying statements, compare them against all given data points to rule out possibilities accurately.

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

1. 6

2. 5

3. 4

4. 7

Correct Answer: 2.(5)

Solution:

To find the number of Non-inverter ACs sold by D2, we need to analyze the given information:

1. The total number of Non-inverter ACs sold in the city is provided, and the specific breakdown across dealers gives clues about distribution.

2. Based on statements about the proportions and equal numbers sold by D3 and D4, we can deduce how D2's share of Non-inverter ACs fits into the overall totals.

3. Given the relationships in sales between D2, D3, and D4, we confirm that the number of Non-inverter ACs sold by D2 is consistent with a value of 5.

Quick Tip

Cross-reference known totals and sales distributions when verifying how individual components contribute to a total.