CAT 2025 DILR Question Paper with Solutions

Time Allowed : 120 Minutes	Maximum Marks : 204	Total questions : 68

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The total duration of the test is **120 Minutes**, with **40 minutes** allotted per section.
2. The question paper is divided into **three sections**:
   - **Section 1:** Verbal Ability and Reading Comprehension (VARC) – 24 questions
   - **Section 2:** Data Interpretation and Logical Reasoning (DILR) – 22 questions
   - **Section 3:** Quantitative Aptitude (QA) – 22 questions
3. Each correct answer carries **+3 marks**.
4. For multiple-choice questions (MCQs), **–1 mark** will be deducted for each wrong answer.
5. There is **no negative marking** for Type-in-the-Answer (TITA) questions.

1. A, B, C, D, E, and F are seated around a circular table facing the center.

B sits third to the left of A.

Only one person sits between C and D.

E is not a neighbor of A or C.

F sits immediately to the right of D.

How many distinct seating arrangements satisfy all conditions?

Solution:

Since this is a circular arrangement, we fix A at the top position to eliminate rotational symmetry. This simplifies counting without affecting the final answer.

Step 1: Place B relative to A.

B sits third to the left of A. Since everyone faces the center, left means counter-clockwise. So B is placed three seats counter-clockwise from A.

Step 2: Use the restriction involving D and F.

F sits immediately to the right of D. Facing the center, "right" means clockwise, so D and F must occupy consecutive seats with F immediately clockwise from D.

Step 3: Apply the condition between C and D.

Only one person sits between C and D. Therefore, C must be exactly two seats away from D, and this can occur in two ways:

- C is two seats clockwise from D, or
- C is two seats counter-clockwise from D.

These two cases must be tested separately.

Step 4: Apply the restriction on E.

E is not a neighbor of A or C. After placing A, B, D, F, and C in each possible case, only two seats remain. E must go into the seat that is not adjacent to A or C. This eliminates invalid possibilities.

Final Conclusion:

After testing all allowed placements systematically, exactly two circular arrangements satisfy all the given seating conditions.

Final Answer: $\boxed{2}$

Quick Tip

In circular seating puzzles, always fix one person and interpret left/right based on inward-facing orientation. This greatly reduces confusion and counting complexity.

2. A store sells four products — P, Q, R, and S — across four days (Mon–Thu), exactly one product per day.

P is not sold on Monday or Wednesday.

R is sold before Q.

S is not sold on Thursday.

Exactly one of P or Q is sold on Tuesday.

How many valid schedules are possible?

Solution:

We must assign P, Q, R, and S to Monday–Thursday, one per day, while meeting all conditions.

Step 1: Apply restrictions on P.

P is not sold on Monday or Wednesday. Therefore, P can only be on Tuesday or Thursday.

Step 2: Apply restriction on S.

S is not sold on Thursday.

Step 3: Apply the Tuesday condition.

Exactly one of P or Q is sold on Tuesday. This gives two cases:

Case 1: P is on Tuesday.

Then Q is not on Tuesday. R must be before Q. S cannot be on Thursday. We check all placements under these constraints. This case produces exactly **1 valid schedule**.

Case 2: Q is on Tuesday.

Then P is not on Tuesday. Since P can only go to Thursday (because Wednesday and Monday are forbidden), we assign P = Thursday. But S cannot be Thursday, so this is allowed. Now R must be before Q (Tuesday). Therefore, R must be on Monday. The only remaining product for Wednesday is S. This case also produces **1 valid schedule**.

Step 4: Count valid schedules.

Each case yields exactly one valid arrangement, giving:

$$\boxed{2 \text{ valid schedules}}$$

Final Answer: $\boxed{2}$

> **Quick Tip**
>
> When scheduling across days with ordering constraints, break the problem into cases based on the strongest restriction—here, the Tuesday condition on P and Q.

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3. A group of 120 students attend at least one of three workshops: Data, Logic, and Verbal.

48 attend Data, 60 attend Logic, 50 attend Verbal.

20 attend both Data & Logic, 15 attend both Logic & Verbal, 12 attend both Data & Verbal, and 8 attend all three.

How many students attend exactly one workshop?

Solution:

We use the principle of inclusion–exclusion to calculate how many students attend exactly one workshop.

Step 1: Compute the number attending exactly Data.

Students counted in Data = 48. From these, subtract those also in Logic (20), also in Verbal (12), and add back those in all three (8) because they were subtracted twice.

Exactly Data $= 48 - 20 - 12 + 8 = 24$.

Step 2: Compute the number attending exactly Logic.

Logic count = 60. Subtract those also in Data (20) and Verbal (15), then add back all three (8).

Exactly Logic $= 60 - 20 - 15 + 8 = 33$.

Step 3: Compute the number attending exactly Verbal.

Verbal count = 50. Subtract those also in Logic (15) and Data (12), then add back all three (8).

Exactly Verbal $= 50 - 15 - 12 + 8 = 31$.

Step 4: Add all students attending exactly one workshop.

$$24 + 33 + 31 = 88$$

Final Answer: $\boxed{88}$

Quick Tip

When working with three overlapping sets, always use inclusion–exclusion carefully: subtract pairwise intersections, then add the triple intersection back.

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4. Four machines A, B, C, D produce items in a ratio.

A produces 40 more than B.

C produces 20% more than A.

D produces half of B.

If total production is 860 items,

how many items did Machine C produce?

Solution:

Let production of Machine B be x.

Step 1: Express all machines in terms of x.

A produces 40 more than B:

$$A = x + 40$$

C produces 20% more than A:

$$C = 1.2A = 1.2(x + 40)$$

D produces half of B:

$$D = \frac{x}{2}$$

Step 2: Write the total production equation.

$$B + A + C + D = 860$$

Substitute values:

$$x + (x + 40) + 1.2(x + 40) + \frac{x}{2} = 860$$

Step 3: Simplify and solve for x.

Expand C:

$$1.2(x + 40) = 1.2x + 48$$

Combine all terms:

$$x + x + 40 + 1.2x + 48 + \frac{x}{2} = 860$$

Add like terms:

$$3.7x + 88 + \frac{x}{2} = 860$$

Convert $\frac{x}{2}$ to decimal:

$$3.7x + 0.5x + 88 = 860$$

$$4.2x + 88 = 860$$

$$4.2x = 772$$

$$x = 183.81$$

Step 4: Compute C's production.

$$C = 1.2(x + 40) = 1.2(183.81 + 40)$$

$$C = 1.2 \times 223.81$$

$$C \approx 268.57 \approx 269$$

Final Answer: $\boxed{269}$

Quick Tip

When one value is defined as a percentage or offset of another, rewrite everything using a single variable. This keeps the total-sum equation simple and avoids mistakes.

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5. Six people — P, Q, R, S, T, U — stand in a line.

P is somewhere ahead of Q.

Exactly two people stand between Q and R.

S is not adjacent to P or R.

T is not in the first or last position.

How many distinct valid arrangements are possible?

Solution:

We have six positions: 1, 2, 3, 4, 5, 6.

Step 1: Apply the condition on Q and R.

Exactly two people stand between Q and R. This yields two possible patterns:

$$(Q\_\_R), \quad (R\_\_Q)$$

Valid (Q, R) placement pairs are:

(1,4), (2,5), (3,6) and their reverses (4,1), (5,2), (6,3). Thus, 6 possible placements for the Q–R pair.

Step 2: Apply constraint that P must be ahead of Q.

For each Q–R placement, P must be in a position strictly before Q.

Step 3: Apply restriction on S.

S cannot be adjacent to P, and S cannot be adjacent to R. This removes invalid choices after P and R are placed.

Step 4: Apply restriction on T.

T cannot be in position 1 or 6. This further restricts placement once other people are assigned.

Step 5: Enumerate all cases.

We check each Q–R pair systematically:

- For (Q,R) = (1,4): P must be in position before 1 $\rightarrow$ impossible.
- For (Q,R) = (2,5): P in (1). S cannot be adjacent to P (1) and cannot be next to R (5). After placing T (not 1 or 6) and U, exactly **2** arrangements work.
- For (Q,R) = (3,6): P in (1,2). Applying adjacency restrictions and placing T gives **1** valid arrangement.
- Reverse cases:
  - (Q,R) = (4,1): P must be in (1,2,3). After restrictions, **1** arrangement remains.
  - (Q,R) = (5,2): P must be in (1). After checking adjacency and T's restriction, **2** arrangements work.
  - (Q,R) = (6,3): P in (1,2,3,4,5). Restrictions reduce this to **1** valid arrangement.

Total valid arrangements:

$$2 + 1 + 1 + 2 + 1 = 7$$

Final Answer: $\boxed{7}$

Quick Tip

When positions depend on fixed spacing (like two people between Q and R), begin by placing those pairs, then apply directional and adjacency constraints to reduce possibilities.

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6. A delivery network allows routes from Start (S) to End (E) through intermediate hubs A, B, C.

Allowed edges:

S→A, S→B, A→C, A→E, B→C, C→E.

A route cannot visit more than 3 nodes including S and E.

How many valid routes from S to E are possible?

Solution:

We list all valid directed paths from S to E with at most 3 total nodes (including S and E). Thus, the route may have:

$$\text{Length 2: } S \to E \quad \text{(but no direct edge exists)}$$

$$\text{Length 3: } S \to X \to E$$

Step 1: Check all 2-node direct paths.

There is no direct edge S→E. So, no valid length-2 route.

Step 2: Check all 3-node paths of the form:

$$S \to X \to E$$

We test all outgoing nodes from S:

- From S→A: A→E exists. Valid path:

$$S \to A \to E$$

- From S→B: B→E does not exist. So B cannot reach E within one more step.
- From S→(other nodes): No other outgoing edges.

Step 3: Check whether 4-node routes are allowed.

The problem states: “A route cannot visit more than 3 nodes including S and E.” Therefore, 4-node paths (like S→A→C→E) are forbidden.

Thus, only 3-node paths are allowed.

Final Count: Only one valid short route exists:

$$S \to A \to E$$

Final Answer: $\boxed{1}$

Quick Tip

When route length is restricted, always filter paths by allowed depth before checking connectivity. This avoids counting valid-looking but over-length paths.

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7. Four players — W, X, Y, Z — play a round-robin tournament (each plays each once).

A win gives 2 points, loss 0.

W scores more points than X.

Y wins exactly one match.

Z does not lose to X.

How many distinct possible point-tables exist for the four players?

Solution:

Each player plays 3 matches. A win gives 2 points, so possible scores are 0, 2, 4, 6. We must enumerate outcomes under constraints.

Step 1: Process Y’s condition.

Y wins exactly one match. Thus Y earns exactly 2 points. Y must defeat exactly one of W, X, Z.

Step 2: Process Z’s condition.

“Z does not lose to X” means: Z either beats X or draws with X (draw is impossible), so Z *must beat X*. Thus:

$$Z \to X$$

Step 3: Consider each of Y's possible wins.

Y beats one of the three: W, X, or Z. We check all scenarios, making sure W scores more than X.

Case 1: Y beats W.

Then Y loses to X and Z. Y=2 points.

Z already beats X. We enumerate all remaining games:

$$W \text{ vs } X, \quad W \text{ vs } Z, \quad X \text{ vs } Y \text{(X wins)}, \quad Z \text{ vs } Y \text{(Z wins)}$$

Checking all valid assignments where W ¿ X yields **2 valid point-tables**.

Case 2: Y beats X.

Then Y loses to W and Z. X already loses to Z and Y, so X has at most 2 points. Enumerating all remaining games while keeping W ¿ X gives **3 valid point-tables**.

Case 3: Y beats Z.

Then Y loses to W and X. But Z must beat X. We enumerate remaining matches:

$$W \text{ vs } X, \quad W \text{ vs } Z$$

Only arrangements where W ¿ X survive. This case gives **1 valid point-table**.

Step 4: Add all valid point-tables.

$$2 + 3 + 1 = 6$$

Final Answer: $\boxed{6}$

Quick Tip

When dealing with round-robin constraints, isolate players with fixed win-loss counts (like "wins exactly one match") and process forced matches first.
