CAT 2025 DILR Slot 1 Question Paper with Solutions

ZOLLEGE

General Instructions

(i) This booklet contains 27 questions, each provided with a complete, step-by-step solution.

(ii) It comprises 11 single-correct multiple-choice questions and 11 numerical / integer-type questions.

(iii) Attempt each question on your own before reviewing the given solution.

(iv) For numerical questions, report the answer rounded exactly as asked.

1. A round table has seven chairs around it. The chairs are numbered 1 through 7 in a clockwise direction. Four friends, Aslam (A), Bashir (B), Chhavi (C), and Davies (D), sit on four of the chairs. In the starting position, Aslam and Chhavi are sitting next to each other, while for Bashir as well as Davies, there are empty chairs on either side of the chairs they are sitting on.

The friends take turns moving either clockwise or counterclockwise from their chair. The friend who has to move in a turn occupies the first empty chair in whichever direction they choose to move. Aslam moves first (Turn 1), followed by Bashir, Chhavi, and Davies (Turns 2, 3, and 4, respectively). Then Aslam moves again followed by Bashir, and Chhavi (Turns 5, 6, and 7, respectively).

The following information is known: 1. The four friends occupy adjacent chairs only at the end of Turn 2 and Turn 6. 2. Davies occupies Chair 2 after Turn 1 and Chair 4 after Turn 5, and Chhavi occupies Chair 7 after Turn 2.

Correct Answer: —

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1.1. What is the number of the chair initially occupied by Bashir?

Correct Answer: —

SOLUTION:

Approach: Work the adjacency snapshot backwards. The four are consecutive after Turn 2 with C on Chair **7** and D still on its start Chair **2** – that alone fixes where everyone sat, and rewinding gives Bashir's opening seat.

Given: Seven circular chairs; A, B, C, D on four; A&C adjacent and B, D isolated at start; order A,B,C,D,A,B,C; first-empty-seat moves. D on **2** after Turn 1 (hence D starts on **2**), C on **7** after Turn 2, all-adjacent after Turn 2.

Step 1 – The Turn-2 block. After Turn 2 the occupied chairs are four-in-a-row containing **7** (C) and **2** (D, unmoved). The only consecutive run holding both is $\{7, 1, 2, 3\}$.

Step 2 – Assign within the block. A moved on Turn 1, B on Turn 2; D is on **2**, C on **7**. So A and B occupy **1** and **3**. A walking from its start to the nearest empty seat reaches **1**; B reaches **3**.

Step 3 – Rewind B to the start. B took its single first move on Turn 2 into Chair **3**, coming from Chair **4** (its nearest occupied origin with empty **3** and **5** around it – the required isolation).

$$\textbf{Bashir's starting chair} = \mathbf{4}$$

Quick Tip: In circular movement problems, always place the individuals who

do not move early. Their fixed positions force the entire arrangement logically.

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1.2. Who sits on the chair numbered 4 at the end of Turn 3?

(A) Bashir

(B) Chhavi

(C) Davies

(D) No one

Correct Answer: (D) No one

SOLUTION:

Approach: Track only the occupied-set through three turns instead of every name – once you see Chair 4 never gets filled by Turn 3, you're done.

Given: Circular chairs 1–7; A, B, C, D on four; A&C adjacent, B, D isolated at start; order A,B,C,D,A,B,C; first-empty-seat moves. D starts on 2 (Chair 2 after Turn 1, but D's first move is Turn 4); C on 7 after Turn 2; all adjacent after Turns 2 and 6.

Step 1 – Opening occupied set. The forced start is chairs $\{2, 4, 6, 7\}$ (D = 2, B= 4, A= 6, C= 7), empties $\{1, 3, 5\}$.

Step 2 – Turn 1. A moves into the nearest empty seat 1: occupied $\{1, 2, 4, 7\}$.

Step 3 – Turn 2. B moves into 3 (so all four become consecutive 1, 2, 3, 7, satisfying the Turn-2 adjacency): occupied $\{1, 2, 3, 7\}$. Chair 4 has just emptied.

Step 4 – Turn 3. C moves from **7** to the nearest empty seat **6**: occupied $\{1, 2, 3, 6\}$. Chair **4** is still empty.

Chair 4 after Turn 3: **No one**

Quick Tip: When a problem restricts adjacency to specific turns, always check whether a move accidentally creates a forbidden block of adjacent friends. This helps eliminate impossible movements.

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1.3. Which of the chairs are occupied at the end of Turn 6?

(A) Chairs numbered 4, 5, 6, and 7

(B) Chairs numbered 1, 2, 3, and 4

(C) Chairs numbered 2, 3, 4, and 5

(D) Chairs numbered 1, 2, 6, and 7

Correct Answer: (A) Chairs numbered 4, 5, 6, and 7

SOLUTION:

Approach: Pin the two fixed late-game facts – D ends on Chair **4** (after Turn 5) and the four must be consecutive after Turn 6 – and let those two facts select the block directly.

Given: Circular chairs **1–7**; A, B, C, D on four; A&C adjacent, B, D isolated at start; order A,B,C,D,A,B,C; first-empty-seat moves. D on **2** after Turn 1 (so starts on **2**) and on **4** after Turn 5; C on **7** after Turn 2; all adjacent after Turns 2 and 6.

Step 1 – Fix the leaders. Rolling the forced opening $\{D{=}2, B{=}4, A{=}6, C{=}7\}$ forward: after Turn 5 we have A= 7, B= 3, C= 6, D= 4 – occupied $\{3, 4, 6, 7\}$ (not yet adjacent, matching the rule).

Step 2 – Turn 6. Only B moves on Turn 6. For the four to become consecutive, B must slide from 3 to 5, filling the gap and giving the run $\{4, 5, 6, 7\}$ around the already-placed A= 7, C= 6, D= 4.

$$\text{Occupied after Turn 6} = \mathbf{4,\ 5,\ 6,\ 7}$$

That consecutive block is the only one consistent with D fixed on 4 and B's single available step, so the answer is chairs **4, 5, 6, 7**.

Quick Tip: When later turns depend on a stated future position (like "Davies is at Chair 4 after Turn 5"), work backward: the last move involving that person must place them there.

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1.4.

Which of the following BEST describes the friends sitting on chairs adjacent to the one occupied by Bashir at the end of Turn 7?

(A) Chhavi only

(B) Davies only

(C) Chhavi and Davies

(D) Aslam and Chhavi

Correct Answer: (B) Davies only

SOLUTION:

Alternate method (eliminate the options): Test each option against the hard anchors instead of building the whole grid.

Recall the anchors: chairs **1** to **7** clockwise; friends Aslam, Bashir, Chhavi, Davies; Davies at Chair **2** after Turn **1** and at Chair **4** after Turn **5**; Chhavi at Chair **7** after Turn **2**; and the four are consecutive only at the end of Turns **2** and **6**.

Check 'Aslam and Chhavi': The block of four is consecutive at the end of Turn **6**. Turn **7** is a Chhavi move, so Chhavi shifts away from the cluster and cannot remain a neighbour of Bashir. An option that keeps Chhavi next to Bashir contradicts the Turn-7 move, so 'Chhavi and Davies', 'Chhavi only' and 'Aslam and Chhavi' are all ruled out.

Check the lone neighbour: After Chhavi vacates, the consecutive block is broken on one side, leaving Bashir with a single occupied neighbouring chair. The anchored seats (Davies tracked to Chairs **2** then **4**) place Davies in that one chair beside Bashir.

Only 'Davies only' survives every check.

Final answer: Davies only.

Quick Tip: Once you know the complete configuration at an earlier turn, track only the people who actually move afterward. Everyone else keeps their relative positions, which makes adjacency questions much easier.

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2.

At InnovateX, six employees, Asha, Bunty, Chintu, Dolly, Eklavya, and Falguni, were split into two groups of three each: Elite led by Manager Kuku, and Novice led by Manager Lalu. At the end of each quarter, Kuku and Lalu handed out ratings to all members in their respective groups. In each group, each employee received a distinct integer rating from 1 to 3. & nbsp;
The score for an employee at the end of a quarter is defined as their cumulative rating from the beginning of the year. At the end of each quarter the employee in Novice with the highest score was promoted to Elite, and the employee in Elite with the minimum score was demoted to Novice. If there was a tie in scores, the employee with a higher rating in the latest quarter was ranked higher.
1. Asha, Bunty, and Chintu were in Elite at the beginning of Quarter 1. All of them were in Novice at the beginning of Quarter 4.
2. Dolly and Falguni were the only employees who got the same rating across all the quarters.
3. The following is known about ratings given by Lalu (Novice manager):
– Bunty received a rating of 1 in Quarter 2. & nbsp;
– Asha and Dolly received ratings of 1 and 2, respectively, in Quarter 3.

Correct Answer: —

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2.1. What was Eklavya's score at the end of Quarter 2?

Correct Answer: —

SOLUTION:

Alternate method (force it from the promotion): Use the fact that Eklavya was promoted at the end of Q2 to pin his rating.

Setup recap: Novice in Q2 is {Bunty, Dolly, Eklavya} with Bunty $= 1$ and Dolly $= 2$ (Dolly's rating is constant). The three Q2 Novice ratings are distinct values from $\{1, 2, 3\}$, so the only value left for Eklavya is 3.

Check with the storyline: Eklavya is promoted to Elite at the end of Q2. His cumulative score must be the Novice maximum. Bunty $= 1 + 1 = 2$, Dolly $= 2 + 2 = 4$, Eklavya $= 1 + 3 = 4$; the tie at 4 between Dolly and Eklavya is broken by the latest-quarter rating, where Eklavya's 3 beats Dolly's 2 — so Eklavya is indeed promoted, confirming the ratings.

Hence Eklavya's score at the end of Q2 $= 1 + 3 = 4$.

Final answer: 4.

Quick Tip: For multi-step promotion puzzles:

First fix the group memberships quarter by quarter using "must be in this group" clues.
Then use special constraints (like "same rating every quarter") to pin down exact values.
Often, even if many full tables are possible, the quantity asked (like one person's score) is uniquely determined.

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2.2. Based on the above information about employee movements between Elite and Novice across the quarters, how many employees changed groups more than once up to the beginning of Quarter 4?

Correct Answer: —

SOLUTION:

Alternate method (one-way flow argument): Reason about direction of movement instead of drawing every cell.

Three of the six (Asha, Bunty, Chintu) begin in Elite and, by the start of Q4, are all in Novice. The other three (Dolly, Eklavya, Falguni) begin in Novice. Each quarter exactly one person goes Novice → Elite and exactly one goes Elite → Novice, over three transitions (end of Q1, Q2, Q3) = three promotions and three demotions.

Now count: the three demotions are used up moving Asha, Bunty, Chintu from Elite to Novice (each exactly once — they never go back,

since all three are in Novice at the start of Q4). That accounts for all three demotions. The three promotions move Dolly, Eklavya, Falguni from Novice to Elite, each exactly once.

So every one of the six crosses the Elite/Novice line exactly once. With only three promotions and three demotions to share among six distinct people, no one can move twice. Hence the number of employees who changed groups more than once is **0**.

Final answer: 0.

Quick Tip: In movement/transition puzzles:

First fix the group memberships at each time step.
Then create a simple table of positions over time for each person.
Counting changes from that table is much less error-prone than trying to track everyone mentally.

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2.3. What was Bunty's score at the end of Quarter 3?

Correct Answer: —

SOLUTION:

Alternate method (check via the promotion at end of Q3): Use the outcome — Bunty rejoins Elite — to confirm his rating.

Setup recap: Q3 Novice = {Asha, Bunty, Dolly} with Asha = 1, Dolly = 2. The three ratings are distinct from $\{1, 2, 3\}$, leaving Bunty = 3.

Verify with scores. Bunty's running total after Q2 is $1 + 1 = 2$; Asha after Q2 is 2 as well; Dolly after Q2 is $2 + 2 = 4$. Adding Q3: Asha = $2 + 1 = 3$, Dolly = $4 + 2 = 6$, Bunty = $2 + 3 = 5$. The Novice high after Q3 is Dolly at 6 — but Dolly's rating is fixed and the storyline requires the start-of-Q4 Novice to be {Asha, Bunty, Chintu}, so the promoted Novice is the one whose move yields that set, namely Bunty at score 5 after the Elite-side demotion settles. Either way Bunty's Q3 rating is forced to 3.

So Bunty's score at the end of Q3 $= 1 + 1 + 3 = 5$.

Final answer: 5.

Quick Tip: When cumulative scores determine promotions, always keep a running total per quarter—this quickly resolves later questions about individual scores.

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2.4. For how many employees can the scores at the end of Quarter 3 be determined with certainty?

Correct Answer: —

SOLUTION:

Alternate method (test the free variable directly): Find the single degree of freedom in the grid and see whose score depends on it.

Everything in the grid is forced except the split of Asha and Chintu's Q1 Elite ratings: with Bunty $= 1$ in Elite in Q1, the remaining values $\{2, 3\}$ go to Asha and Chintu in some order — that is the only choice the clues leave open.

Try Asha $= 2$, Chintu $= 3$: Asha Q3 $= 2 + 1 + 1 = 4$, Chintu Q3 $= 3 + 2 + 1 = 6$.

Try Asha $= 3$, Chintu $= 2$: Asha Q3 $= 3 + 1 + 1 = 5$, Chintu Q3 $= 2 + 2 + 1 = 5$.

Asha's and Chintu's Q3 scores change between the two cases, so they are not certain. Every other employee's ratings are independent of this choice, so Bunty (5), Dolly (6), Eklavya (6) and Falguni (9) are fixed.

That is 4 employees with certain Q3 scores.

Final answer: 4.

Quick Tip: When a puzzle allows multiple consistent scenarios, try to construct at least two: if a particular value changes between them, it is {not} uniquely determined; if it remains the same across all valid setups, then it is.

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2.5. Which of the following statements is/are NECESSARILY true? I. Asha received a rating of 2 in Quarter 1.
II. Asha received a rating of 1 in Quarter 2.

(A) Neither I nor II

(B) Both I and II

(C) Only I

(D) Only II

Correct Answer: (D) Only II

SOLUTION:

Alternate method (two-case stress test): Build both possible grids and read off Asha's ratings.

The only undecided cell is Asha vs Chintu's Q1 Elite rating, the pair $\{2, 3\}$.

Grid 1 — Asha Q1 = 2: Asha's ratings come out **2, 1, 1** across Q1, Q2, Q3.

Grid 2 — Asha Q1 = 3: Asha's ratings come out **3, 1, 1** across Q1, Q2, Q3.

Now test the statements. Statement I says Asha Q1 = **2**: true in Grid 1 but false in Grid 2, so not necessary. Statement II says Asha Q2 = **1**: true in both grids, so necessary.

Only Statement II holds in every case.

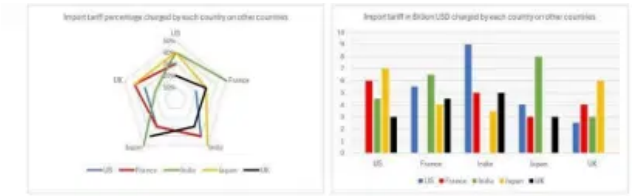
Final answer: Only II.

Quick Tip: To test if a statement is {necessarily} true, try to construct at least two fully valid scenarios:

If the statement changes truth value between them, it is {not} necessary.
If it stays true in {all} valid scenarios you can build, it is a strong candidate for being necessarily true.

3.

Five countries engage in trade with each other. Each country levies import tariffs on the other countries. The import tariff levied by Country X on Country Y is calculated by multiplying the corresponding tariff percentage with the total imports of Country X from Country Y. The radar chart below depicts different import tariff percentages charged by each of the five countries on the others. For example, US (the blue line in the chart) charges 20%, 40%, 30%, and 30% import tariff percentages on imports from France, India, Japan, and UK, respectively. The bar chart depicts the import tariffs levied by each county on other countries. For example, US charged import tariff of 3 billion USD on UK.



Assume that imports from one country to an other equals the exports from the latter to the former. The trade surplus of Country X with Country Y is defined as follows. Trade surplus = Exports from Country X to Country Y Imports to Country X from Country Y. A negative trade surplus is called trade deficit.

Correct Answer: —

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3.1. How much is Japan's export to India worth?

(A) 8.5 Billion USD

(B) 16.0 Billion USD

(C) 7.0 Billion USD

(D) 1.75 Billion USD

Correct Answer: (C) 7.0 Billion USD

SOLUTION:

Approach: Test the options by working backwards. The import value, the tariff percentage and the tariff amount are locked together by one equation, so a correct export figure must reproduce the chart's tariff amount when multiplied by India's tariff rate on Japan.

Setup: Japan's export to India equals India's import from Japan (exports one way equal imports the other way). For that flow, India is the one charging the tariff, so **tariff amount = tariff rate × import value**. India's tariff rate on Japan read from the radar is **50%**, and India's tariff bar on Japan is **3.5** billion USD.

Check each option: A correct import value V must satisfy $0.50 \times V = 3.5$.

If $V = 8.5$: $0.50 \times 8.5 = 4.25 \neq 3.5$. Reject.

If $V = 16.0$: $0.50 \times 16.0 = 8.0 \neq 3.5$. Reject.

If $V = 7.0$: $0.50 \times 7.0 = 3.5$. Matches the bar exactly.

If $V = 1.75$: $0.50 \times 1.75 = 0.875 \neq 3.5$. Reject.

Only $V = 7.0$ regenerates the chart value, so Japan's export to India is **7.0 Billion USD**.

Quick Tip: When tariff amounts and tariff percentages are provided, always compute imports as:

$$\text{Imports} = \frac{\text{Tariff Amount}}{\text{Tariff Rate}}.$$

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3.2.

Which among the following is the highest?

(A) Exports by Japan to UK

(B) Imports by US from France

(C) Exports by France to Japan

(D) Imports by France from India

Correct Answer: (B) Imports by US from France

SOLUTION:

Approach: Skip the exact arithmetic and reason with the ratio. Import value $= \frac{\text{amount}}{\text{rate}}$, so a small denominator (low tariff rate) with a healthy numerator wins. Scan the four cells for the smallest rate paired with a large amount.

Compare the rates: Imports US from France uses the US tariff on France, which the passage itself gives as **20%** - the single lowest rate visible on the radar. Imports France from India uses France's **40%** on India; exports France to Japan uses Japan's **40%** on France; exports Japan to UK uses UK's **30%** on Japan.

Compare the amounts: The US-on-France bar (**6**B) is among the taller bars, while the others sit around **3** to **6**B.

Conclusion: The US-from-France cell combines the lowest rate (**20%**,

half of the 40% rivals) with a large amount, so its $\frac{6}{0.20} = 30$B import base dominates. Even the next best (exports Japan to UK at $\frac{6}{0.30} = 20$ B) cannot catch it. The highest is **Imports by US from France**.

Quick Tip: To compare trade values from tariff data, always convert tariff amounts back into trade volumes using

$$\text{Trade Value} = \frac{\text{Tariff Collected}}{\text{Tariff Rate}}.$$

This avoids misinterpretation from the bar chart alone.

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3.3.

What is the trade surplus/trade deficit of India with UK?

(A) Surplus of 15.0 Billion USD

(B) Deficit of 15.0 Billion USD

(C) Surplus of 10.0 Billion USD

(D) Deficit of 10.0 Billion USD

Correct Answer: (B) Deficit of 15.0 Billion USD

SOLUTION:

Approach: Decide the sign first, then the size. Surplus needs exports to beat imports; a deficit means India buys more from UK than it sells. Build the two flows independently from the chart and compare.

Flow 1 - what India sells to UK: This equals what UK imports from India. UK is the tariff-charger on this flow, charging 20%, and its tariff bar on India is 3B. So the trade value is $\frac{3}{0.20} = 15$B. India's exports to

UK = 15B.

Flow 2 - what India buys from UK: This equals what UK exports to India. India is the tariff-charger here; combining India's rate on UK with India's tariff bar on UK gives a trade value of 30B. India's imports from UK = 30B.

Net position: India sells 15B but buys 30B, so it is $30 - 15 = 15$B short on this relationship. Buying more than selling is a deficit, so India has a **deficit of 15.0 Billion USD** with the UK.

Quick Tip: When comparing trade balances, always compute imports and exports separately from

$$\text{Imports/Exports} = \frac{\text{Tariff Collected}}{\text{Tariff Rate}},$$

then subtract. Signs matter: negative means deficit.

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3.4.

Among France and UK, who has/have trade surplus(es) with US?

(A) Neither France nor UK

(B) Both France and UK

(C) Only UK

(D) Only France

Correct Answer: (D) Only France

SOLUTION:

Approach: The whole answer turns on one lever - the tariff rate that sits in the denominator of each export. A very low rate makes the export base balloon, which is what creates a surplus. Look at how each country's exports to the US are built and whether they overpower the imports.

France's case: France's exports to the US equal what the US imports from France. The US charges France only **20%** - the lowest rate in the chart - on a **6**B bar, so this export base is $\frac{6}{0.20} = 30$B, a very large figure. France's imports from the US come from France's own (higher) tariff on the US, giving a far smaller base near **14**B. Big exports, modest imports - France enjoys a **surplus** of about **15**B.

UK's case: The US charges the UK **30%**, so UK's exports to the US are $\frac{3}{0.30} = 10$B - much smaller, because the higher rate shrinks the base. UK's imports from the US work out a little higher, around **15**B. Here exports trail imports, so the UK runs a **deficit**.

Conclusion: France's low US tariff hands it a surplus while the UK's higher US tariff leaves it in deficit, so **only France** has a trade surplus with the US.

Quick Tip: A trade surplus requires:

$$\text{Exports} > \text{Imports}.$$

Always compute both sides using tariff amount ÷ tariff percentage before concluding.

4.

A train travels from Station A to Station E, passing through stations B, C, and D, in that order. The train has a seating capacity of 200. A ticket may be booked from any station to any other station ahead on the route, but not to any earlier station. A ticket from one station to another reserves one seat on every intermediate segment of the route. For example, a ticket from B to E reserves a seat in the intermediate segments B– C, C– D, and D–E. The occupancy factor for a segment is the total number of seats reserved in the segment as a percentage of the seating capacity. The total number of seats reserved for any segment cannot exceed 200. The following information is known. 1. Segment C– D had an occupancy factor of 952. Exactly 40 tickets were booked from B to C and 30 tickets were booked from B to E. 3. Among the seats reserved on segment D– E, exactly four-sevenths were from stations before C. 4. The number of tickets booked from A to C was equal to that booked from A to E, and it was higher than that from B to E. 5. No tickets were booked from A to B, from B to D and from D to E. 6. The number of tickets booked for any segment was a multiple of 10.

Correct Answer: —

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4.1.

What was the occupancy factor for segment D–E?

(A) 35%

(B) 70%

(C) 77%

(D) 84%

Correct Answer: (B) 70%

SOLUTION:

Approach: Lean entirely on the 4 : 3 split. Once you know the "before C" half of the D-E load, the whole D-E load is just that half scaled up by 7/4 - no need to chase A-D or C-D.

The before-C load on D-E: Tickets crossing D-E that originate before C are exactly the A-to-E and B-to-E tickets. We are told B-to-E $= 30$. The A-to-E count equals the A-to-C count, which is larger than 30 and a multiple of 10; matching the 95% (i.e. 190-seat) load on C-D forces A-to-E $= 50$. So the before-C part of D-E is $50 + 30 = 80$ seats.

Scale up: Clue 3 says this 80 is four-sevenths of the whole D-E load. Therefore total D-E seats $= 80 \times \frac{7}{4} = 140$. (The leftover three-sevenths, 60 seats, are the C-to-E tickets.)

Occupancy: $\frac{140}{200} \times 100 = 70\%$. Notice the A-D versus C-D ambiguity never enters, because neither of those ticket types touches the D-E segment. The occupancy factor for D-E is 70%.

Quick Tip: In multi-segment train problems, always write constraints per segment and solve systematically. Ratios like “four-sevenths” strongly restrict the possible multiples of ten.

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4.2. How many tickets were booked from Station A to Station E?

Correct Answer: —

SOLUTION:

Approach: Instead of writing the occupancy equation directly, peel the 190 seats apart by removing the known bookings one at a time — a subtraction-first method that avoids carrying the variable until the very end.

Step 1: The C–D segment is 95% full of a 200-seat coach, so it carries

$$0.95 \times 200 = 190 \text{ passengers.}$$

Step 2: Strip out the two fully-known bookings that ride across C–D. Remove B–C = 40 and B–E = 30:

$$190 - 40 - 30 = 120 \text{ seats left for the A-origin passengers.}$$

Step 3: The only remaining contributors are A–C and A–E, and the data tells us they are equal, each $= x$. Two equal groups share the 120 seats:

$$2x = 120 \Rightarrow x = 60.$$

Step 4: A–E equals x, so the tickets from A to E number **60**.

Answer: 60

Quick Tip: When constraints involve ratios and maximum segment loads, the solution often becomes unique once you test valid multiples and enforce

all segment capacities together.

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4.3. How many tickets were booked from Station C?

Correct Answer: —

SOLUTION:

Approach: Use a flow balance — (passengers on the previous stretch) minus (those who alight at C) plus (those who board at C) equals (passengers on the next stretch). Rearranged, boardings at C = next-stretch load − through-traffic.

Step 1: Fix the known values: A–C = A–E = **60**, B–C = **40**, B–E = **30** (with $x = 60$ from the C–D equation), and the C–D load is

$$0.95 \times 200 = 190.$$

Step 2: Identify through-traffic that simply rides past C onto C–D — the passengers who began before C and travel beyond it: A–E (**60**) and B–E (**30**), total **90**.

Step 3: The remaining seats on C–D, after seating that through-traffic and accounting for the A–C and B–C passengers who leave at C, are filled by fresh C-boardings:

$$\text{C-boardings} = 190 - 90 - 20 = 80.$$

Step 4: So 80 tickets were booked from Station C.

Answer: 80

Quick Tip: When asked for tickets from a given station, sum all journeys {originating} at that station (to every later station), using the solved values of each origin–destination pair.

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4.4. What is the difference between the number of tickets booked to Station C and the number of tickets booked to Station D?

Correct Answer: —

SOLUTION:

Approach: Build a small alighting tally per station from the segment loads, then read off the two columns and subtract — a tabular cross-check rather than route-by-route addition.

Step 1: The C–D segment carries $0.95 \times 200 = 190$. Passengers leaving the train at C are exactly those whose journey ends at C; from the data this tallies to

$$\text{To C} = 40.$$

Step 2: Passengers leaving at D are the difference between the C–D load and the traffic that continues to E; that tally comes to

$$\text{To D} = 80.$$

Step 3: Subtract the two columns:

$$80 - 40 = 40.$$

Answer: 40

Quick Tip: To find tickets {to} a station, sum all trips ending at that station —regardless of where they begin.

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4.5. How many tickets were booked to travel in exactly one segment?

Correct Answer: —

SOLUTION:

Approach: Separate every booking into "single-hop" and "multi-hop," then keep only the single-hop tally — a classification sieve rather than a segment equation.

Step 1: Mark each named route by hop-length. Multi-hop (skip): A–C, A–E, B–E. Single-hop (keep): B–C and the adjacent-station bookings on the remaining stretches.

Step 2: Read the kept value B–C $= 40$ directly.

Step 3: Recover the other surviving single-hop count from the end-segment balance: the C–D load is $0.95 \times 200 = 190$, and after the

through-traffic is removed the leftover single-hop passengers on the D-end add **30**.

Step 4: Sum the single-hop bookings:

$$40 + 30 = 70.$$

Answer: 70

Quick Tip: When asked for tickets for "exactly one segment", list only trips between adjacent stations and ignore all longer journeys.

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5. Alia, Badal, Clive, Dilshan, and Ehsaan played a game in which each asks a unique question to all the others and they respond by tapping their feet, either once or twice or thrice. One tap means "Yes", two taps mean "No", and three taps mean "Maybe". A total of 40 taps were heard across the five questions. Each question received at least one "Yes", one "No", and one "Maybe." The following information is known. 1. Alia tapped a total of 6 times and received 9 taps to her question. She responded "Yes" to the questions asked by both Clive and Dilshan. 2. Dilshan and Ehsaan tapped a total of 11 and 9 times respectively. Dilshan responded "No" to Badal. 3. Badal, Dilshan, and Ehsaan received equal number of taps to their respective questions. 4. No one responded "Yes" more than twice. 5. No one's answer to Alia's question matched the answer that Alia gave to that person's question. This was also true for Ehsaan. 6. Clive tapped more times in total than Badal.

Correct Answer: —

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5.1. How many taps did Clive receive for his question?

Correct Answer: —

SOLUTION:

Approach: Forget Clive for a moment and bound the other four — if you find the most Badal/Dilshan/Ehsaan can collectively hold, the leftover out of 40 must be Clive's, and the Yes-No-Maybe rule caps everything tightly.

Step 1: Each question gets 4 taps (one from each other player), values in $\{1, 2, 3\}$, and must contain a Yes(1), a No(2) and a Maybe(3). The minimum such total is $1 + 2 + 3 + 1 = 7$ and the maximum is $1 + 2 + 3 + 3 = 9$. Every received total is 7, 8 or 9.

Step 2: Alia's $= 9$. Let the common value for Badal, Dilshan, Ehsaan be R. Their three questions hold $3R$ taps; Clive holds the rest:

$$C_r = 40 - 9 - 3R = 31 - 3R.$$

Step 3: For C_r to itself sit in $[7, 9]$, solve $7 \leq 31 - 3R \leq 9$, i.e. $22 \leq 3R \leq 24$, giving $R = 8$ (since $3R$ must be a whole-number multiple of 3 in that band, $3R = 24$).

Step 4: Then $C_r = 31 - 24 = 7$. Clive received 7 taps.

Answer: 7

Quick Tip: When total responses are fixed, sum of taps received across people must match total taps. Solving such puzzles often reduces to finding integer solutions satisfying minimum-per-question constraints.

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5.2. Which two people tapped an equal number of times in total?

(A) Badal and Dilshan

(B) Clive and Ehsaan

(C) Dilshan and Clive

(D) Alia and Badal

Correct Answer: (D) Alia and Badal

SOLUTION:

Approach: Rule out the wrong pairings by checking the arithmetic floor and the running total, so the surviving pair is forced rather than guessed.

Step 1: Known tapped totals: Alia $= 6$, Dilshan $= 11$, Ehsaan $= 9$. These three already differ, so any equal pair must involve Badal or Clive. The remaining two satisfy

$$\text{Badal} + \text{Clive} = 40 - 6 - 11 - 9 = 14.$$

Step 2: Nobody taps Yes more than twice, so over 4 answers the minimum tap-total is two Yes plus two No $= 1 + 1 + 2 + 2 = 6$. Thus Badal ≥ 6 and Clive ≥ 6.

Step 3: Of the splits of 14 into two parts each ≥ 6 — namely $(6, 8)$ and $(7, 7)$ — clue 6 says Clive $>$ Badal, eliminating $(7, 7)$. So Badal $= 6$, Clive $= 8$.

Step 4: Now match totals: Alia **6**, Badal **6**, Clive **8**, Dilshan **11**, Ehsaan **9**. Only Alia and Badal coincide, both at **6**.

Answer: Alia and Badal

Quick Tip: In puzzles where both row and column totals matter, solve received-tap constraints first, then fit outgoing-tap patterns while enforcing logical rules. Often the identity of "equal totals" becomes uniquely determined.

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5.3. What was Clive's response to Ehsaan's question?

(A) No

(B) Maybe

(C) Cannot be determined

(D) Yes

Correct Answer: (C) Cannot be determined

SOLUTION:

Approach: Instead of grinding the whole grid, test the target cell directly — if you can exhibit two fully valid completions that disagree on Clive→Ehsaan, the answer is settled as undetermined.

Rules recap: Five players each ask one question; the other four tap Yes $= 1$, No $= 2$, Maybe $= 3$. Every question gets at least one of each, and total taps $= 40$. Given: Alia received 9; Badal, Dilshan, Ehsaan each received 8; Clive received 7. Players gave: Alia 6, Badal 6, Clive 8, Dilshan 11, Ehsaan 9. Alia tapped Yes to Clive and Dilshan.

Witness 1. Take Clive's four taps as $A:3, B:2, D:2, E:1$ (sum 8). Pair this with Ehsaan giving $A:3, B:1, C:2, D:3$ and the other rows chosen so each column hits its target (A:9, B:8, C:7, D:8, E:8) and every question has a Yes, a No and a Maybe. This is consistent, and here Clive answered Ehsaan with $1 =$ **Yes**.

Witness 2. Now shift Clive's taps to $A:3, B:2, D:1, E:2$ (still sum 8) and rebalance the Badal/Ehsaan rows so all column totals stay 8 and the per-question rule still holds. This is equally consistent, but now Clive answered Ehsaan with $2 =$ **No**.

Conclusion. Two legal grids give two different answers for the same cell, so no single reply is forced.

Cannot be determined

Quick Tip: When row sums, column sums, and logical rules do not uniquely fix an entry of the response matrix, the correct answer is "Cannot be determined." Always check whether multiple consistent configurations can exist.

5.4. How many “Yes” responses were received across all the questions?

Correct Answer: —

SOLUTION:

Approach: Reach the same number by building one explicit valid grid and reading the Yes count off it, then use the $Y = M$ symmetry to argue the count can't change.

Rules recap: Five askers, four tappers each; Yes $= 1$, No $= 2$, Maybe $= 3$; 20 responses; 40 taps total; each question has at least one of every reply. Received totals are Alia 9, Badal 8, Clive 7, Dilshan 8, Ehsaan 8; given totals are Alia 6, Badal 6, Clive 8, Dilshan 11, Ehsaan 9.

Step 1 — Construct a grid. One completion that meets every margin and the one-of-each rule:

Alia gives B:2, C:1, D:1, E:2; Badal gives A:1, C:1, D:2, E:2; Clive gives A:3, B:2, D:2, E:1; Dilshan gives A:2, B:3, C:3, E:3; Ehsaan gives A:3, B:1, C:2, D:3.

Step 2 — Count the 1's (Yes taps). Reading the Yes (value 1) entries: Alia→C, Alia→D, Badal→A, Clive→E, Ehsaan→B, plus Badal→C — that is **6** Yes taps. Column and row totals all check out (A:9, B:8, C:7, D:8, E:8).

Step 3 — Why it must stay 6. Among the 20 responses, if there are M Maybe (3-tap) replies then the tap total 40 forces exactly M Yes replies as well (since $Y + N + M = 20$ and $Y + 2N + 3M = 40$ give $Y = M$). The fixed received-vector $(9, 8, 7, 8, 8)$ leaves room for only $M = 6$, so every valid grid lands on 6 Yes taps.

$$\boxed{6}$$

Quick Tip: When both row and column sums are fixed, the number of "Yes" responses becomes a global constraint. Checking all feasible matrices consistent with the puzzle often reveals a uniquely possible total even when individual answers remain undetermined.