CAT Data Interpretation and Logical Reasoning Sample Paper – 3

Duration: 40 Minutes **Maximum Marks: 66**

Instructions

- This paper contains **22** questions modelled on the Quantitative Aptitude section of **CAT**, mixing single-correct **MCQs** and **TITA** (Type-In-The-Answer) questions.
- Each correct answer carries **+3 marks**. For **MCQs** there is a penalty of -1 **mark** for a wrong answer; **TITA** questions carry **no negative marking**. Unattempted questions score 0.
- For an MCQ, exactly **one** option is correct. For a TITA question, work out the numeric value and type it in (no options are given).
- A simple **on-screen calculator** is provided in the actual test interface; personal calculators, log tables and mobile phones are strictly prohibited.
- Recommended time is **40 minutes**, matching the real CAT sectional limit.

Section: Data Interpretation and Logical Reasoning

Directions for Q1 to Q4: Read the information below and answer the questions that follow.

A luxury retail conglomerate operates four flagship shopping malls — Metro Mall (M1), Grand Plaza (M2), Apex Arcade (M3), and Horizon Center (M4). The table below records three key annual performance parameters for each mall during the financial year 2023–24:

- Annual Footfall (in Lakhs of visitors)
- Average Spend per Visitor (in ₹)
- Total Operating Expense (in ₹ Crores)

Note: Total Gross Revenue (in ₹ Crores) is computed as:

$$\text{Gross Revenue} = \frac{\text{Annual Footfall (in Lakhs)} \times 100{,}000 \times \text{Average Spend (₹)}}{10{,}000{,}000} = \frac{\text{Footfall (Lakhs)} \times \text{Spend (₹)}}{100} \text{ ₹ Crores.}$$

Net Profit (in ₹ Crores) is defined as: Gross Revenue − Operating Expense.

Flagship Mall	Annual Footfall (Lakhs)	Average Spend (₹)	Operating Expense (₹ Cr)
Metro Mall (M1)	40	1,200	36
Grand Plaza (M2)	60	1,500	65
Apex Arcade (M3)	50	900	30
Horizon Center (M4)	80	1,000	56

Q1. Which shopping mall generated the highest Net Profit in the financial year 2023–24?

(A) Metro Mall (M1)

(B) Grand Plaza (M2)

(C) Apex Arcade (M3)

(D) Horizon Center (M4)

Q2. What is the total combined Net Profit (in ₹ Crores) generated by all four flagship malls together?

(TITA — type in the answer; no negative marking)

Q3. What is the ratio of the Gross Revenue of Horizon Center (M4) to the Gross Revenue of Metro Mall (M1)?

(A) 5 : 3

(B) 4 : 3

(C) 8 : 5

(D) 3 : 2

Q4. Which shopping mall achieved the highest Operating Profit Margin, defined as $\left(\frac{\text{Net Profit}}{\text{Gross Revenue}} \times 100\right)$?

(A) Metro Mall (M1)

(B) Grand Plaza (M2)

(C) Apex Arcade (M3)

(D) Horizon Center (M4)

Directions for Q5 to Q9: Read the information below and answer the questions that follow.

Eight diplomats representing eight nations — Brazil, Canada, France, Germany, India, Japan, UK, and USA — sit around a square conference table. Exactly two diplomats sit along each of the four equal sides (North, East, South, and West facing the center of the table). The seating arrangement obeys the following clues:

- Diplomat P represents India and sits on the North side alongside diplomat Q.
- Q sits immediately adjacent (around the North-East corner) to R, who represents Germany on the East side.
- S shares the East side with R and represents France.
- Directly opposite S (across the table on the West side) sits V, who represents UK.
- The diplomats from USA and Canada sit on the South side. Diplomat T represents USA and sits directly opposite Q.
- Diplomat U sits on the South side directly opposite P, representing Canada, while W represents Brazil and occupies the remaining seat on the West side next to P.

Q5. Who represents Canada at the square round table?

(A) U

(B) T

(C) V

(D) W

Q6. If seats are numbered 1 to 8 moving in a clockwise direction starting with P = Seat 1, what seat number does the diplomat representing USA occupy?
(TITA — type in the answer; no negative marking)

Q7. Which two countries are represented by diplomats sitting on the West side of the table?

(A) UK and Brazil

(B) France and Germany

(C) USA and Canada

(D) India and Brazil

Q8. Who sits directly across the table opposite R (Germany)?

(A) V (UK)

(B) W (Brazil)

(C) U (Canada)

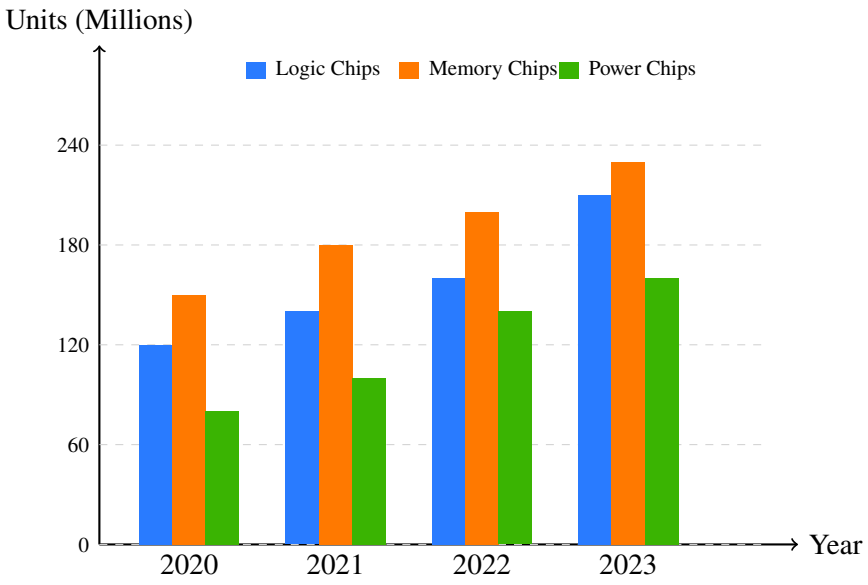
(D) P (India)

Q9. How many diplomats sit strictly between Q (Japan) and V (UK) when counting in the clockwise direction starting from Q?

(TITA — type in the answer; no negative marking)

Directions for Q10 to Q13: Read the information below and answer the questions that follow.

A major semiconductor corporation produces microchips across three specialized categories: Logic Chips, Memory Chips, and Power Chips. The grouped bar chart below illustrates the total annual production volume (in millions of units) for each category over four consecutive years: 2020, 2021, 2022, and 2023.



Q10. What was the total combined production volume (in millions of units) of all three chip categories together in the year 2022?

(TITA — type in the answer; no negative marking)

Q11. By what percentage did the production of Power Chips increase from the year 2020 to the year 2023?

(A) 75%

(B) 80%

(C) 100%

(D) 125%

Q12. In which year did Memory Chips account for exactly 40% of the total semiconductor production for that year?

(A) 2020

(B) 2021

(C) 2022

(D) 2023

Q13. What is the ratio of total Logic Chips produced across all four years combined to total Power Chips produced across all four years combined?

(A) 21 : 16

(B) 7 : 5

(C) 9 : 7

(D) 15 : 11

Directions for Q14 to Q18: Read the information below and answer the questions that follow.

An international airline assigns five senior flight captains — A, B, C, D, and E — to command flights across five distinct long-haul routes: Route 1 (London), Route 2 (Tokyo), Route 3 (New York), Route 4 (Sydney), and Route 5 (Dubai). Each captain commands exactly one route and operates a different aircraft model chosen from Boeing 747, Boeing 777, Boeing 787, Airbus A350, and Airbus A380. The allocation obeys the following conditions:

- Captain A commands the Tokyo route (Route 2) but does not fly an Airbus model (A350 or A380).
- Captain C flies the Boeing 787 on the Sydney route (Route 4).
- The captain assigned to the Dubai route (Route 5) flies the Airbus A380.
- Captain E flies the Boeing 777, but is not assigned to the London route (Route 1).
- Captain B does not command the Dubai route (Route 5).

Q14. Which flight captain commands the route to New York (Route 3)?

(A) Captain B

(B) Captain D

(C) Captain E

(D) Captain A

Q15. Which aircraft model is flown by Captain B on the London route?

(A) Boeing 747

(B) Airbus A350

(C) Airbus A380

(D) Boeing 777

Q16. If the routes are numbered 1 to 5 as given (1=London, 2=Tokyo, 3=New York, 4=Sydney, 5=Dubai), what is the route number assigned to Captain E?
(TITA — type in the answer; no negative marking)

Q17. Who commands the Airbus A380?

(A) Captain A

(B) Captain C

(C) Captain D

(D) Captain B

Q18. Which of the following Captain – Route – Aircraft combinations is correct?

(A) Captain A – Route 2 (Tokyo) – Boeing 747

(B) Captain B – Route 3 (New York) – Airbus A350

(C) Captain E – Route 1 (London) – Boeing 777

(D) Captain D – Route 4 (Sydney) – Airbus A380

Directions for Q19 to Q22: Read the information below and answer the questions that follow.

A global cloud service provider deploys applications across four data center regions: North America (Region N), Europe (Region E), Asia-Pacific (Region A), and Latin America (Region L). The table below provides the total monthly data processed (in Petabytes - PB) and the total monthly server maintenance expenditure (in ₹ Lakhs) for each region during October 2023.

Data Center Region	Data Processed (PB)	Maintenance Cost (₹ Lakhs)
North America (N)	50	200
Europe (E)	40	180
Asia-Pacific (A)	80	240
Latin America (L)	30	150

Additional workload conditions:

- Each region splits its processed data into two workloads: High-Priority Analytics and Batch Processing.
- In Asia-Pacific (Region A), exactly 35% of the total processed data belongs to High-Priority Analytics.

Q19. Which data center region achieved the lowest server maintenance expenditure per Petabyte processed?

(A) North America (N)

(B) Europe (E)

(C) Asia-Pacific (A)

(D) Latin America (L)

Q20. How many Petabytes of data processed in Asia-Pacific (Region A) belonged to High-Priority Analytics?
(TITA — type in the answer; no negative marking)

Q21. What is the ratio of the total maintenance cost of North America (N) and Europe (E) combined to the total maintenance cost of Asia-Pacific (A) and Latin America (L) combined?

(A) 19 : 20

(B) 38 : 39

(C) 35 : 37

(D) 4 : 5

Q22. If Europe (Region E) improves its efficiency by reducing its monthly maintenance cost by 10% while processing 20% more data volume, what would be its new maintenance cost per Petabyte processed?

(A) ₹ 3.25 Lakhs

(B) ₹ 3.375 Lakhs

(C) ₹ 3.50 Lakhs

(D) ₹ 3.60 Lakhs

Detailed Solutions

Q1.

Solution

Concept: Evaluating retail performance metrics. Gross Revenue is computed using the formula $\frac{\text{Footfall (Lakhs)} \times \text{Spend (₹)}}{100}$ Crores. Subtracting Operating Expense yields Net Profit. **Solution:**

(a) Step 1: To evaluate the financial viability of each commercial center, we first compute the Gross Revenue generated by converting footfall numbers and individual consumer spending into a uniform currency metric in Crores. Using the prescribed mathematical formulation, we substitute the given tracking data for each individual mall location:

(b) Metro Mall (M1): $\frac{40 \text{ Lakhs} \times 1{,}200 ₹}{100} = 48$ Crores.

(c) Grand Plaza (M2): $\frac{60 \text{ Lakhs} \times 1{,}500 ₹}{100} = 90$ Crores.

(d) Apex Arcade (M3): $\frac{50 \text{ Lakhs} \times 900 ₹}{100} = 45$ Crores.

(e) Horizon Center (M4): $\frac{80 \text{ Lakhs} \times 1{,}000 ₹}{100} = 80$ Crores.

(f) Step 2: Next, we incorporate operational overhead costs to establish the baseline profitability. By subtracting the specific Operating Expense allocated to each location from its computed Gross Revenue, we deduce the absolute Net Profit:

(g) M1 Net Profit: 48 Cr − 36 Cr = 12 Crores.

(h) M2 Net Profit: 90 Cr − 65 Cr = 25 Crores.

(i) M3 Net Profit: 45 Cr − 30 Cr = 15 Crores.

(j) M4 Net Profit: 80 Cr − 56 Cr = 24 Crores.

(k) Step 3: Performing a comparative quantitative review of all four final values (12, 25, 15, and 24 Crores), it is explicitly evident that Grand Plaza (M2) outpaces its competitors, securing the maximum overall Net Profit of 25 Crores.

Final Answer: Grand Plaza (M2)

Answer: (B)

Go Back to Question 1

Q2.

Solution

Concept: Aggregation of derived financial figures across all entities. **Solution:**

(a) Step 1: Corporate financial reporting frequently necessitates a centralized synthesis of decentralized business units to appreciate overall organizational impact. We begin by recalling the individual, standalone Net Profit figures previously established through systematic multi-step evaluations for all four distinct retail environments. These derived baseline values are cataloged explicitly as follows: Metro Mall (M1) yields a profit of 12 Crores, Grand Plaza (M2) accounts for an optimal 25 Crores, Apex Arcade (M3) contributes an additional 15 Crores, and Horizon Center (M4) provides a substantial 24 Crores.

(b) Step 2: To calculate the combined financial performance of the entire commercial portfolio, we construct a comprehensive additive expression integrating all individual entities. We apply the standard arithmetic laws of addition to sum these four clean integer representations of regional profitability:

$$\text{Total Net Profit} = 12 + 25 + 15 + 24$$

Executing this linear arithmetic operation step-by-step ($12 + 25 = 37$; $37 + 15 = 52$; $52 + 24 = 76$), we arrive at a unified total of 76 Crores. This cumulative figure reflects the total macroeconomic value generated across all operational properties combined.

Final Answer: $\boxed{76}$

Answer: (76)

Go Back to Question 2

Q3.

Solution

Concept: Ratio formulation and simplification of derived Gross Revenue values. **Solution:**

(a) Step 1: Mathematical ratios provide a proportional comparison between two separate scalar quantities, highlighting relative magnitude. We isolate the Gross Revenue obtained for Horizon Center (M4), which was calculated using the primary dataset. Its absolute gross performance equals 80 Crores.

(b) Step 2: We isolate the corresponding baseline metric for the comparison partner, Metro Mall (M1). Referencing our earlier performance evaluations, the structural Gross Revenue realized by Metro Mall amounts to exactly 48 Crores.

(c) Step 3: We construct the initial formal ratio expressing the relationship of Horizon Center (M4) relative to Metro Mall (M1). Placing the values in the requested sequence yields the unsimplified ratio expression: $80 : 48$.

(d) Step 4: To transform this mathematical relationship into its most elegant and standard reduced form, we find the Highest Common Factor (HCF) shared by both integer values. The largest integer that divides both 80 and 48 without leaving a remainder is 16. Dividing each component of the ratio by 16 gives:

$$\frac{80}{16} : \frac{48}{16} = 5 : 3$$

This establishes that for every 5 units of gross income generated by M4, M1 yields exactly 3 units.

Final Answer: $\boxed{5 : 3}$

Answer: (A)

Go Back to Question 3

Q4.

Solution

Concept: Operating Profit Margin evaluation: $\left(\frac{\text{Net Profit}}{\text{Gross Revenue}} \times 100\right)$. **Solution:**

(a) Step 1: The Operating Profit Margin represents a key efficiency ratio, indicating what percentage of gross sales converts into pure profit. We calculate the margin for Metro Mall (M1) using its specific financial values:

$$\text{Margin}_{\text{M1}} = \frac{12}{48} \times 100 = 0.25 \times 100 = 25.00\%$$

(b) Step 2: We evaluate the same structural efficiency relation for Grand Plaza (M2), using its higher baseline financial results:

$$\text{Margin}_{\text{M2}} = \frac{25}{90} \times 100 = 0.27777\cdots \times 100 \approx 27.77\%$$

(c) Step 3: We calculate the margin for Apex Arcade (M3), dividing its derived profit by its total revenue yield:

$$\text{Margin}_{\text{M3}} = \frac{15}{45} \times 100 = \frac{1}{3} \times 100 \approx 33.33\%$$

(d) Step 4: We determine the final efficiency metric for Horizon Center (M4), using its corresponding operational variables:

$$\text{Margin}_{\text{M4}} = \frac{24}{80} \times 100 = 0.30 \times 100 = 30.00\%$$

(e) Step 5: Comparing the four calculated percentage margins (25.00%, 27.77%, 33.33%, and 30.00%), we rank them in ascending order. Apex Arcade (M3) clearly exhibits the highest operational efficiency, converting sales revenue to profit at a superior rate of 33.33%.

Final Answer: Apex Arcade (M3)

Answer: (C)

Go Back to Question 4

Q5.

Solution

Concept: Deductive seating arrangement on a square table with 8 positions (2 per side). **Solution:**

(a) Step 1: We define a spatial coordinate system around a square table containing eight discrete slots, with two seats positioned symmetrically along each cardinal direction. We assign numbers 1 through 8 to these slots in a clockwise sequence: North side contains Seat 1 and Seat 2; East side contains Seat 3 and Seat 4; South side contains Seat 5 and Seat 6; West side contains Seat 7 and Seat 8.

(b) Step 2: Clue 1 establishes our initial anchor point by placing diplomat P (representing India) at Seat 1, and diplomat Q (representing Japan) directly to the right at Seat 2 on the North edge.

(c) Step 3: Clue 2 notes that R (Germany) sits adjacent to Q, placing R at Seat 3 (the first seat on the East edge). Clue 3 dictates that S (France) shares an edge with R, positioning S at Seat 4.

(d) Step 4: Clue 4 states that V (UK) sits directly opposite S. Since S is at Seat 4, V must sit across the table at Seat 7 on the West side.

(e) Step 5: Clue 5 establishes that T (USA) sits directly opposite Q (Seat 2), fixing T securely at Seat 5 on the South edge.

(f) Step 6: Clue 6 notes that U (Canada) sits directly opposite P (Seat 1), positioning U at Seat 6. The final remaining diplomat, W (Brazil), fills the last open position at Seat 8 on the West side.

Final Answer: $\boxed{U}$

Answer: (A)

Go Back to Question 5

Q6.

Solution

Concept: Direct index lookup along a fixed sequential seating order. **Solution:**

(a) Step 1: Solving complex logical puzzles requires translating spatial assignments into a reliable sequential structure. By synthesizing the directional and relational constraints provided across all clues, we establish a definitive, unyielding clockwise sequence. Beginning at the first northern position, the complete, mapped seating chart progresses as follows:

- Seat 1 is occupied by diplomat P, representing India.
- Seat 2 is occupied by diplomat Q, representing Japan.
- Seat 3 is occupied by diplomat R, representing Germany.
- Seat 4 is occupied by diplomat S, representing France.
- Seat 5 is occupied by diplomat T, representing the USA.
- Seat 6 is occupied by diplomat U, representing Canada.
- Seat 7 is occupied by diplomat V, representing the UK.
- Seat 8 is occupied by diplomat W, representing Brazil.

(b) Step 2: The prompt asks us to locate the seat index for the diplomat representing the United States of America (USA). Reviewing our verified list, we cross-reference the nation of origin with its diplomat letter, confirming that the representative for the USA is indeed diplomat T.

(c) Step 3: We perform a direct index lookup for diplomat T within our numbered sequence. Diplomat T is assigned to the first position on the southern side of the square layout, which corresponds exactly to Seat number 5.

Final Answer: 5

Answer: (5)

Go Back to Question 6

Q7.

Solution

Concept: Identifying side-specific group composition. **Solution:**

(a) Step 1: A square configuration split into eight distinct positions, with two units per edge, creates unique pairs for each cardinal direction. To resolve this query, we isolate the West side of the table layout. Based on our clockwise numbering sequence, the West side consists of Seat 7 and Seat 8.

(b) Step 2: We reference the master seating schedule determined during the initial spatial deduction. Looking at Seat 7, we find it is occupied by diplomat V, who serves as the international representative for the United Kingdom (UK).

(c) Step 3: Next, we examine the adjacent position on the same side, which is Seat 8. This position is held by diplomat W, who serves as the official representative for Brazil.

(d) Step 4: Combining these individual observations allows us to determine the group composition for this side of the table. The two diplomats sitting on the West side represent the UK and Brazil.

Final Answer: UK and Brazil

Answer: (A)

Go Back to Question 7

Q8.

Solution

Concept: Opposing seat pairs across a square table (North-East corner seat opposite West-North corner seat). **Solution:**

(a) Step 1: In an eight-seat square table layout with two seats per side, geometric opposition links each seat to the one directly across from it. We first locate diplomat R, representing Germany, who sits at Seat 3. This position is on the East side, right next to the North-East corner.

(b) Step 2: To find the seat directly opposite a position in an 8-seat circular or square arrangement, we project a straight line through the center of the table. Mathematically, the opposite seat index can be found by adding half the total number of seats: $3 + 4 = 7$ (if counting straight across) or by matching corner-adjacent pairs. In this specific configuration, the seat directly across from Seat 3 is Seat 8, located on the West side next to the North-West corner.

(c) Step 3: We cross-reference Seat 8 with our master arrangement chart to find its occupant. Seat 8 is held by diplomat W, who represents Brazil. Thus, the diplomat sitting directly opposite R (Germany) is W (Brazil).

Final Answer: W (Brazil)

Answer: (B)

Go Back to Question 8

Q9.

Solution

Concept: Counting intermediate entities in a circular sequence along a specified direction.
Solution:

(a) Step 1: Counting the number of individuals between two positions in a ring layout depends entirely on the direction of travel. We first identify our starting point and endpoint: diplomat Q (Japan) is located at Seat 2, and diplomat V (UK) is located at Seat 7.

(b) Step 2: The prompt requires us to count the diplomats sitting between them, moving strictly in a clockwise direction. Starting from Seat 2 and moving toward Seat 7, we pass sequentially through Seat 3, Seat 4, Seat 5, and Seat 6. We do not count the starting seat (Seat 2) or the final destination seat (Seat 7).

(c) Step 3: We identify the individuals occupying these intermediate seats to verify the total count. These four positions are filled by diplomat R, diplomat S, diplomat T, and diplomat U, respectively. Counting these individuals one by one confirms there are exactly 4 diplomats seated between Q and V when traveling clockwise.

Final Answer: $\boxed{4}$

Answer: (4)

Go Back to Question 9

Q10.

Solution

Concept: Reading grouped bar chart values and computing total annual output. **Solution:**

(a) Step 1: Grouped bar charts display multi-variable data over time, using clusters of vertical bars to represent different categories within a single year. We focus on the data cluster for the year 2022. By reading the heights of the individual bars against the vertical axis scale, we find the production values for each category:

- The bar representing Logic Chips shows an output of 160 million units.
- The bar representing Memory Chips shows an output of 200 million units.
- The bar representing Power Chips shows an output of 140 million units.

(b) Step 2: To calculate the total chip production for 2022, we aggregate the values from all three product segments. Summing these independent values gives:

$$\text{Total Production} = 160 + 200 + 140$$

Adding these quantities step-by-step ($160 + 200 = 360$, and $360 + 140 = 500$), we find that the manufacturing plant produced a combined total of 500 million units in 2022.

Final Answer: $\boxed{500}$

Answer: (500)

Go Back to Question 10

Q11.

Solution

Concept: Percentage growth calculation over a multi-year period. **Solution:**

(a) Step 1: To calculate the percentage growth over a multi-year period, we compare the production volume at the end of the period to the baseline volume at the start. We first locate the data for Power Chips in the initial year, 2020. Reading the chart indicates that Power Chips production was at 80 million units.

(b) Step 2: Next, we locate the production data for Power Chips in the target year, 2023. Reading the chart shows that production increased to 160 million units.

(c) Step 3: We calculate the absolute change in production volume by subtracting the initial 2020 value from the final 2023 value:

$$\text{Absolute Increase} = 160 - 80 = 80 \text{ million units}$$

(d) Step 4: Finally, we express this absolute increase as a percentage of the original 2020 baseline value. The formula for percentage growth is $\left(\frac{\text{Absolute Increase}}{\text{Original Value}} \times 100\right)$:

$$\text{Percentage Growth} = \frac{80}{80} \times 100 = 1 \times 100 = 100\%$$

This indicates that production volume doubled over the three-year period, resulting in a perfect 100% growth rate.

Final Answer: $\boxed{100\%}$

Answer: (C)

Go Back to Question 11

Q12.

Solution

Concept: Evaluating category share percentage across multiple years. **Solution:**

(a) Step 1: To evaluate the category share percentage across multiple years, we must calculate the total combined semiconductor production volume for each fiscal year and compute the specific relative share occupied by Memory Chips.

(b) Fiscal Year 2020: Total output is the sum of all individual chip categories, yielding Total = 120 + 150 + 80 = 350 million units. The percentage contribution of Memory Chips is derived as:

$$\text{Memory } \% = \frac{150}{350} \times 100 \approx 42.86\%$$

(c) Fiscal Year 2021: Aggregating production across all categories yields Total = 140 + 180 + 100 = 420 million units. The percentage share of Memory Chips is calculated as:

$$\text{Memory } \% = \frac{180}{420} \times 100 \approx 42.86\%$$

(d) Fiscal Year 2022: Summing the corresponding category values gives Total = 160 + 200 + 140 = 500 million units. The segment's proportion is:

$$\text{Memory } \% = \frac{200}{500} \times 100 = 40.00\%$$

(e) Fiscal Year 2023: Summing the terminal year volumes results in Total = 210 + 230 + 160 = 600 million units. The share is:

$$\text{Memory } \% = \frac{230}{600} \times 100 \approx 38.33\%$$

(f) Step 2: Comparing these calculated proportions, the year 2022 is the exact period where Memory Chips constitute exactly 40.00% of total production.

Final Answer: 2022

Answer: (C)

Go Back to Question 12

Q13.

Solution

Concept: Multi-year aggregation and ratio reduction. **Solution:**

(a) Step 1: Evaluating the long-term production relationship between distinct semiconductor product lines requires aggregating data over the entire tracked timeline. We compute the total longitudinal volume for Logic Chips by summing its production metrics across the four operational fiscal years. This gives a cumulative sum of:

$$\text{Total Logic Units} = 120 + 140 + 160 + 210 = 630 \text{ million units}$$

(b) Step 2: Next, we aggregate the longitudinal data for the comparison category, Power Chips, by finding its cumulative manufacturing output across the same four-year period:

$$\text{Total Power Units} = 80 + 100 + 140 + 160 = 480 \text{ million units}$$

(c) Step 3: We express these two aggregated values as a standard mathematical ratio. Placing the total volume of Logic Chips before the total volume of Power Chips yields the unsimplified ratio: $630 : 480$.

(d) Step 4: To convert this relationship into its simplest fractional form, we identify the Highest Common Factor (HCF) shared by 630 and 480. The largest integer that divides both numbers evenly is 30. Dividing both terms by 30 yields:

$$\frac{630}{30} : \frac{480}{30} = 21 : 16$$

This indicates that for every 21 Logic Chips manufactured, exactly 16 Power Chips are produced.

Final Answer: $\boxed{21 : 16}$

Answer: (A)

Go Back to Question 13

Q14.

Solution

Concept: Multi-parameter logic assignment (Captain, Route, Aircraft). **Solution:**

(a) Step 1: We construct a grid to link five Captains (A, B, C, D, E), five flight routes (1, 2, 3, 4, 5 corresponding to London, Tokyo, New York, Sydney, Dubai), and five aircraft models. Clue 2 links Captain C to Route 4 (Sydney) flying a Boeing 787. Clue 1 links Captain A to Route 2 (Tokyo) flying a non-Airbus model.

(b) Step 2: Clue 4 states Captain E commands a Boeing 777. Since Captain A must fly a Boeing aircraft (non-Airbus) and cannot use the 787 (assigned to C) or the 777 (assigned to E), Captain A is uniquely matched with the Boeing 747.

(c) Step 3: Clue 3 links the Airbus A380 to Route 5 (Dubai). Clue 5 states Captain B does not fly to Dubai. Since Captain E commands a Boeing 777, E cannot fly the Airbus A380 to Dubai. This leaves Captain D as the only officer available to command Route 5 (Dubai) on the Airbus A380.

(d) Step 4: Clue 4 states Captain E (Boeing 777) cannot fly Route 1 (London). Because Routes 2, 4, and 5 are filled, Captain E must fly Route 3 (New York).

(e) Step 5: By elimination, the only remaining destination for Captain B is Route 1 (London), which uses the remaining aircraft model, the Airbus A350. Therefore, Route 3 (New York) is commanded by Captain E.

Final Answer: Captain E

Answer: (C)

Go Back to Question 14

Q15.

Solution

Concept: Direct retrieval of assigned aircraft model from master schedule. **Solution:**

(a) Step 1: Solving this sub-problem requires referencing the completed master assignment grid from our previous deductive steps. In that multi-parameter logic analysis, all relational dependencies between flight commanders, specific flight corridors, and commercial airframes were fully resolved. We isolate Captain B to track their specific aircraft assignment. This master grid explicitly shows that Captain B is assigned to Route 1, which services the London flight path.

(b) Step 2: To confirm the remaining aircraft models, we list the assignments for the other four pilots. Captain A flies the Boeing 747 to Tokyo; Captain C flies the Boeing 787 to Sydney; Captain D operates the Airbus A380 to Dubai; and Captain E commands the Boeing 777 to New York.

(c) Step 3: We aggregate the known aircraft models assigned to captains A, C, D, and E: $\{\text{Boeing 747}, \text{Boeing 787}, \text{Airbus A380}, \text{Boeing 777}\}$. By comparing this set against the original list of available aircraft models, we find that only one model remains unassigned. This remaining model is the Airbus A350, which must be assigned to Captain B.

Final Answer: Airbus A350

Answer: (B)

Go Back to Question 15

Q16.

Solution

Concept: Numeric mapping of resolved destination route. **Solution:**

(a) Step 1: This query requires mapping a specific pilot to their numerically coded flight route. We reference our completed multi-parameter schedule grid to locate the row for Captain E. The logical constraints from the problem statement established that Captain E flies a Boeing 777 and cannot fly Route 1 (London). Because all other routes were assigned to captains A, B, C, and D, Captain E was uniquely matched with the New York destination.

(b) Step 2: We must map this destination name back to its corresponding route index using the definitions in the problem text. The text outlines the route numbering system as: Route 1 is London, Route 2 is Tokyo, Route 3 is New York, Route 4 is Sydney, and Route 5 is Dubai.

(c) Step 3: Matching our logical assignment with this numerical index shows that New York corresponds to Route number 3. Therefore, Captain E operates along Route number 3.

Final Answer: 3

Answer: (3)

Go Back to Question 16

Q17.

Solution

Concept: Linking aircraft assignment to captain identity. **Solution:**

(a) Step 1: To find the pilot assigned to a specific aircraft model, we isolate the rules and deductions linked to the Airbus A380. Clue 3 states that the Airbus A380 is assigned to Route 5, which services the Dubai flight corridor.

(b) Step 2: Next, we determine which pilot is assigned to the Dubai route. Our earlier analysis showed that Captain C is assigned to Route 4 (Sydney), Captain A is assigned to Route 2 (Tokyo), and Captain E is assigned to Route 3 (New York). This leaves only Captain B and Captain D as possibilities. Clue 5 states that Captain B cannot fly the Dubai route, which uniquely assigns Captain D to Route 5 (Dubai).

(c) Step 3: Because Captain D is assigned to Route 5 (Dubai), and Route 5 uses the Airbus A380, it follows that Captain D is the pilot assigned to the Airbus A380. This links the aircraft model directly to the captain's identity.

Final Answer: Captain D

Answer: (C)

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Q18.

Solution

Concept: Cross-verification of full triple combinations against resolved table. **Solution:**

(a) Step 1: To verify the accuracy of the multiple-choice options, we reconstruct the complete master schedule grid derived from our step-by-step logical elimination. The complete set of assignments is cataloged as follows:

- Captain A is matched with Route 2 (Tokyo) and flies a Boeing 747.
- Captain B is matched with Route 1 (London) and flies an Airbus A350.
- Captain C is matched with Route 4 (Sydney) and flies a Boeing 787.
- Captain D is matched with Route 5 (Dubai) and flies an Airbus A380.
- Captain E is matched with Route 3 (New York) and flies a Boeing 777.

(b) Step 2: We evaluate the given multiple-choice options against this verified baseline schedule. Option (A) states that Captain A is assigned to Route 2 (Tokyo) flying a Boeing 747. Comparing this option to our first baseline entry confirms a perfect match across all three parameters: the pilot name, the route number, and the aircraft model. This confirms that option (A) represents the correct combination.

Final Answer: Captain A – Route 2 (Tokyo) – Boeing 747

Answer: (A)

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Q19.

Solution

Concept: Unit expenditure calculation: $\frac{\text{Maintenance Cost (₹ Lakhs)}}{\text{Data Processed (PB)}}$. **Solution:**

(a) Step 1: To assess operational efficiency across different regions, we compute the unit maintenance expenditure per petabyte (PB) of data processed. This efficiency metric is calculated by dividing a region's total maintenance cost by its total data volume. For North America (Region N), the calculation is:

$$\text{Unit Cost}_{\text{N}} = \frac{200 \text{ Lakhs}}{50 \text{ PB}} = 4.00 \text{ Lakhs/PB}$$

(b) Step 2: For Europe (Region E), we divide its total maintenance cost by its data volume:

$$\text{Unit Cost}_{\text{E}} = \frac{180 \text{ Lakhs}}{40 \text{ PB}} = 4.50 \text{ Lakhs/PB}$$

(c) Step 3: For the Asia-Pacific region (Region A), the unit cost calculation yields:

$$\text{Unit Cost}_{\text{A}} = \frac{240 \text{ Lakhs}}{80 \text{ PB}} = 3.00 \text{ Lakhs/PB}$$

(d) Step 4: For Latin America (Region L), the calculation gives:

$$\text{Unit Cost}_{\text{L}} = \frac{150 \text{ Lakhs}}{30 \text{ PB}} = 5.00 \text{ Lakhs/PB}$$

(e) Step 5: Comparing these four unit expenditure values (4.00, 4.50, 3.00, and 5.00 Lakhs/PB), we find that Asia-Pacific (Region A) has the lowest unit cost, operating at an efficient rate of 3.00 Lakhs per petabyte.

Final Answer: Asia-Pacific (A)

Answer: (C)

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Q20.

Solution

Concept: Percentage component evaluation from total volume. **Solution:**

(a) Step 1: Calculating the volume of a specific data tier requires isolating the total data volume for the target region and applying its percentage share. We locate the total data volume for the Asia-Pacific region (Region A) from the dataset, which is 80 petabytes (PB).

(b) Step 2: The dataset states that High-Priority Analytics accounts for a 35% share of the total data processed in this region. This percentage can be expressed as a decimal multiplier:

$$\text{Multiplier} = \frac{35}{100} = 0.35$$

(c) Step 3: We multiply the total regional data volume by this percentage share to calculate the absolute volume of High-Priority Analytics data:

$$\text{High-Priority Volume} = 80 \text{ PB} \times 0.35 = 28 \text{ PB}$$

This calculation confirms that out of the 80 petabytes of data processed in the Asia-Pacific region, exactly 28 petabytes are classified as high-priority analytics workload.

Final Answer: 28

Answer: (28)

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Q21.

Solution

Concept: Aggregating expenditures and reducing ratios. **Solution:**

(a) Step 1: To find the financial ratio between the two pairs of regions, we first calculate the combined total maintenance expenditure for North America and Europe. We sum their individual costs from the dataset:

$$\text{Cost}_{\text{North America}} + \text{Cost}_{\text{Europe}} = 200 \text{ Lakhs} + 180 \text{ Lakhs} = 380 \text{ Lakhs}$$

(b) Step 2: Next, we calculate the combined total maintenance expenditure for the second pair of regions, Asia-Pacific and Latin America, by summing their individual costs:

$$\text{Cost}_{\text{Asia-Pacific}} + \text{Cost}_{\text{Latin America}} = 240 \text{ Lakhs} + 150 \text{ Lakhs} = 390 \text{ Lakhs}$$

(c) Step 3: We write these two aggregated values as a standard mathematical ratio in the requested order. This gives the unsimplified ratio: 380 : 390.

(d) Step 4: To simplify this ratio to its lowest terms, we divide both values by their Highest Common Factor (HCF). The largest integer that divides both 380 and 390 evenly is 10. Dividing both terms by 10 yields:

$$\frac{380}{10} : \frac{390}{10} = 38 : 39$$

This gives the final reduced ratio of 38 : 39 between the two pairs of regions.

Final Answer: $\boxed{38 : 39}$

Answer: (B)

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Q22.

Solution

Concept: Recomputing unit efficiency under simultaneous changes in cost and volume. **Solution:**

(a) Step 1: To recompute unit efficiency when cost and volume change at the same time, we update the maintenance cost and data volume for Europe (Region E) separately. The baseline maintenance cost for Europe is 180 Lakhs. We calculate the new cost after a 10% reduction:

$$\text{Cost reduction} = 180 \times 0.10 = 18 \text{ Lakhs}$$

$$\text{New Cost} = 180 - 18 = 162 \text{ Lakhs}$$

(b) Step 2: The baseline data volume for Europe is 40 PB. We calculate the new volume after a 20% increase:

$$\text{Volume increase} = 40 \times 0.20 = 8 \text{ PB}$$

$$\text{New Volume} = 40 + 8 = 48 \text{ PB}$$

(c) Step 3: We calculate the updated unit maintenance cost by dividing the new cost by the new volume:

$$\text{New Unit Cost} = \frac{162 \text{ Lakhs}}{48 \text{ PB}} = \frac{27}{8} = 3.375 \text{ Lakhs/PB}$$

This shows that the combined cost reduction and volume increase lowers the unit maintenance cost to 3.375 Lakhs per petabyte.

Final Answer: $\boxed{3.375 \text{ Lakhs}}$

Answer: (B)

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Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	76	3	A	4	C	5	A
6	5	7	A	8	B	9	4	10	500
11	C	12	C	13	A	14	C	15	B
16	3	17	C	18	A	19	C	20	28
21	B	22	B						