CAT 2022 DILR Slot 2 Question Paper with Solutions

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General Instructions

(i) This booklet contains 20 questions, each provided with a complete, step-by-step solution.

(ii) It comprises 14 single-correct multiple-choice questions and 6 numerical / type-in-the-answer questions.

(iii) The questions are grouped under 4 reading comprehension / data sets; read each passage or data set before its questions.

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

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

1. A few salesmen are employed to sell a product called TRICCEK among households in various housing complexes. On each day, a salesman is assigned to visit one housing complex. Once a salesman enters a housing complex, he can meet any number of households in the time available. However, if a household makes a complaint against the salesman, then he must leave the housing complex immediately and cannot meet any other household on that day. A household may buy any number of TRICCEK items or may not buy any item. The salesman needs to record the total number of TRICCEK items sold as well as the number of households met in each day. The success rate of a salesman for a day is defined as the ratio of the number of items sold to the number of households met on that day. Some details about the performances of three salesmen - Tohri, Hokli and Lahur, on two particular days are given below.

1. Over the two days, all three of them met the same total number of households, and each of them sold a total of 100 items.

2. On both days, Lahur met the same number of households and sold the

same number of items.
3. Hokli could not sell any item on the second day because the first household he met on that day complained against him.
4. Tohri met 30 more households on the second day than on the first day.
5. Tohri's success rate was twice that of Lahur's on the first day, and it was 75% of Lahur's on the second day.

Correct Answer: —

1.1. What was the total number of households met by Tohri, Hokli and Lahur on the first day?

Correct Answer: —

Solution:

84

1.2. How many TRICCEK items were sold by Tohri on the first day?

Correct Answer: —

Solution:

40

1.3. How many households did Lahur meet on the second day?

(A) more than 35

(B) between 30 and 35

(C) 20 or less

(D) between 21 and 29

Correct Answer: (D) between 21 and 29

Solution:

between 21 and 29

1.4. How many households did Tohri meet on the first day?

(A) between 21 and 40

(B) more than 40

(C) between 11 and 20

(D) 10 or less

Correct Answer: (D) 10 or less

Solution:

10 or less

1.5. Which of the following statements is FALSE?

(A) Tohri had a higher success rate on the first day compared to the second day.

(B) Among the three, Lahur had the lowest success rate on the first day.

(C) Among the three, Tohri had the highest success rate on the second day.

(D) Among the three, Tohri had the highest success rate on the first day.

Correct Answer: (C) Among the three, Tohri had the highest success rate on the second day.

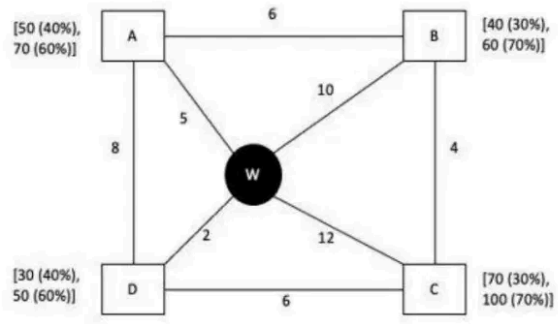
Solution:

Among the three, Tohri had the highest success rate on the second day.

2. Every day a widget supplier supplies widgets from the warehouse (W) to four locations – Ahmednagar (A), Bikrampore (B), Chitrachak (C), and Deccan Park (D). The daily demand for widgets in each location is uncertain and independent of each other. Demands and corresponding probability values (in parenthesis) are given against each location (A, B, C, and D) in the figure below. For example, there is a 40% chance that the demand in Ahmednagar will be 50 units and a 60% chance that the demand will be 70 units. The lines in the figure connecting the locations and warehouse represent two-way roads connecting those places with the distances (in km) shown beside the line. The distances in both the directions along a road are equal. For example, the road from Ahmednagar to Bikrampore and the road from Bikrampore to Ahmednagar are both 6 km long.

Every day the supplier gets the information about the demand values of the four locations and creates the travel route that starts from the warehouse and ends at a location after visiting all the locations exactly

once. While making the route plan, the supplier goes to the locations in decreasing order of demand. If there is a tie for the choice of the next location, the supplier will go to the location closest to the current location. Also, while creating the route, the supplier can either follow the direct path (if available) from one location to another or can take the path via the warehouse. If both paths are available (direct and via warehouse), the supplier will choose the path with minimum distance.



Correct Answer: —

2.1. If the last location visited is Ahmednagar, then what is the total distance covered in the route (in km)?

Correct Answer: —

Solution:

Noted points:

1. The route starts from the warehouse and ends at a location after visiting all locations exactly once.
2. The route plan follows a decreasing order of demand, and in case of equal demand, it prioritizes the nearest locations first.
3. The supplier can choose either a direct path or a path via the warehouse, preferring the minimum distance.

Additionally, it is given in the question that the last location is A. The demand in the remaining places should be greater than A, meaning A's demand cannot be 70 units. Therefore, it is 50 units.

Regarding the demand of location D, it can be either 30 or 50 units. This implies that D should be placed before the location with a demand greater than or equal to 50 units.

The location visited before D is B, which has a demand of 60 units. It cannot be C because the values of C are greater than the values of B. Therefore, the order is C - B - D - A.

The distance covered:

- Warehouse to C: 12 km
- C to B: 4 km
- B to D: 12 km
- D to A (through the warehouse): 7 km

Total distance covered: $12 + 4 + 12 + 7 = 35$ km.

2.2. If the total number of widgets delivered in a day is 250 units, then what is the total distance covered in the route (in km)?

Correct Answer: —

Solution:

Noted points:

1. The route starts from the warehouse and ends at a location after visiting all locations exactly once.
2. The route plan follows a decreasing order of demand, and in case of equal demand, it prioritizes the nearest locations first.

3. The supplier can choose either a direct path or a path via the warehouse, preferring the minimum distance.

To summarize:

1. The total number of units delivered is 250 units.
2. The maximum number of widgets that can be delivered is 280 units, considering the maximum demand for each location (70 units for A, 50 units for D, 60 units for B, and 100 units for C).
3. To meet the constraint of delivering 250 units, the demand for location C should be reduced to 70 units.
4. Therefore, the delivery plan is A - C - B - D, with the demand values: 70 units for A, 50 units for D, 60 units for B, and 70 units for C.
5. From statement 1, the order should be A - C - B - D, as A is nearer to the warehouse than C.
6. The distances covered are as follows:
    - Warehouse to A: 5 km
    - A to C: 17 km
    - C to B: 4 km
    - B to D: 12 km
7. Total distance covered: $5 + 17 + 4 + 12 = 38$ km.

This plan ensures the delivery of 250 units with the specified constraints and the minimum total distance covered.

2.3. What is the chance that the total number of widgets delivered in a day is 260 units and the route ends at Bikrampore?

(A) 7.56%

(B) 17.64%

(C) 10.80%

(D) 33.33%

Correct Answer: (A) 7.56%

Solution:

- The maximum number of widgets delivered in a day is 280 units (100 units for C, 70 units for A, 60 units for B, and 50 units for D).
- The total number of widgets delivered is 260 units, indicating a need to decrease 20 units from one of the locations (A, B, or D).
- Considering the constraints for decreasing units, the order of locations visited is C(100 units) - A(70 units) - D(50 units) - B(40 units).
- The given percentage of demand fulfilled at each location is:
  - C: 100 units (fulfilling 70% of demand)
  - A: 70 units (fulfilling 60% of demand)
  - D: 50 units (fulfilling 60% of demand)
  - B: 40 units (fulfilling 30% of demand)
- The required value, considering the given percentages, is calculated as $0.7 * 0.6 * 0.6 * 0.3 = 0.0756$, which is equivalent to 7.56%.

Therefore, the percentage of the total demand fulfilled under these conditions is 7.56%

2.4. If the first location visited from the warehouse is Ahmednagar, then what is the chance that the total distance covered in the route is 40 km?

(A) 18%

(B) 5.4%

(C) 30%

(D) 3.24%

Correct Answer: (A) 18%

Solution:

The first location visited from the warehouse is A, and if A's demand is 50 units, C's demand should be less than 50 units, which is not possible. Therefore, the demand for both A and C is 70 units.

- The order of locations visited is A(70 units) -> C(70 units), with distances covered: Warehouse to A (5 km), A to C (17 km), total distance covered = 5 + 17 = 22 km.
- The remaining distance to be covered is 40 km - 22 km = 18 km.
- The next leg of the route is C to B, covering 4 km, and B to D, covering 12 km, for a total of 16 km.
- The remaining distance to be covered is 18 km, which can be achieved by going from C to D (6 km) and D to B (12 km).
- To fulfill the conditions, D's demand is 50 units (60% probability) and B's demand is 40 units (30% probability).
- The required value is calculated as 0.6 * 0.3 = 0.18, which is equivalent to 18%.

Therefore, the probability of the specified conditions being met is 18%.

2.5. If Ahmednagar is not the first location to be visited in a route and the total route distance is 29 km, then which of the following is a possible number of widgets delivered on that day?

(A) 210

(B) 220

(C) 200

(D) 250

Correct Answer: (A) 210

Solution:

1. The route starts from the warehouse and ends at a location after visiting all locations exactly once.
2. The supplier goes to locations in decreasing order of demand, and in case of equal demand, prefers the nearest ones first.
3. The supplier can follow the direct path or take the path via the warehouse, preferring minimum distance.
4. The demand in all other locations should be less than or equal to the demand in the first location.
5. In the given question, A is not the first location, and B and D cannot be the first locations, so C should be the first location.

Considering these constraints and given that the total route distance is 29 km, the order of locations visited is C - B - A - D.

The possible demands for each location:

- C: 70/100
- B: 60
- A: 50

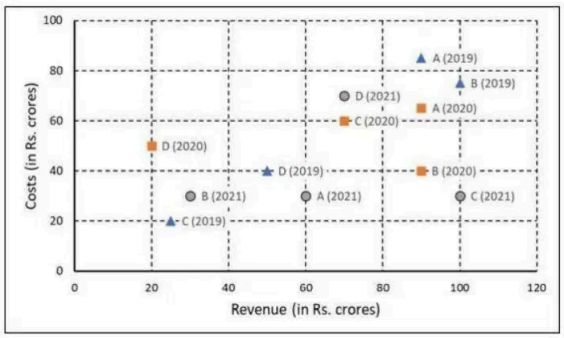
- D: 30/50

The possible number of widgets delivered can be:

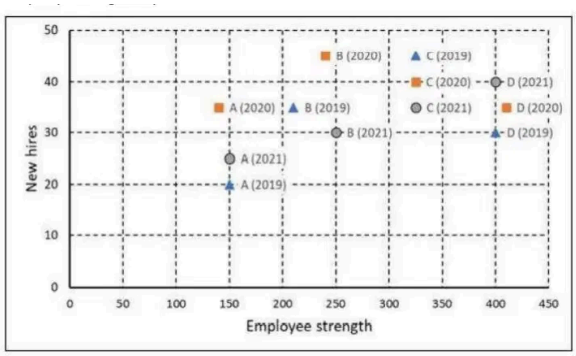
1. 70 + 60 + 50 + 30 = 210
2. 70 + 60 + 50 + 50 = 230
3. 100 + 60 + 50 + 30 = 240
4. 100 + 60 + 50 + 50 = 260

Therefore, the correct answer is option A.

3. The two plots below show data for four companies code-named A, B, C, and D over three years - 2019, 2020, and 2021.
The first plot shows the revenues and costs incurred by the companies during these years. For example, in 2021, company C earned Rs.100 crores in revenue and spent Rs.30 crores. The profit of a company is defined as its revenue minus its costs.



The second plot shows the number of employees employed by the company (employee strength) at the start of each of these three years, as well as the number of new employees hired each year (new hires). For example, Company B had 250 employees at the start of 2021, and 30 new employees joined the company during the year.



Correct Answer: —

3.1. Considering all three years, which company had the highest annual profit?

(A) Company B

(B) Company C

(C) Company D

(D) Company A

Correct Answer: (B) Company C

Solution:

The information provided details the financial performance of four companies (A, B, C, and D) based on their revenue, cost incurred, and profit:

1. **Company A:**
   - Revenue: 240
   - Cost Incurred: 180
   - Profit: 240 - 180 = 60
2. **Company B:**
   - Revenue: 220
   - Cost Incurred: 145

- Profit: 220 - 145 = 75

3. **Company C:**
   - Revenue: 195
   - Cost Incurred: 110
   - Profit: 195 - 110 = 85
4. **Company D:**
   - Revenue: 140
   - Cost Incurred: 160
   - No profit.

Based on the given data, Company C had the highest annual profit, which is 85.

3.2. Which of the four companies experienced the highest annual loss in any of the years?

(A) Company B

(B) Company C

(C) Company A

(D) Company D

Correct Answer: (D) Company D

Solution:

The information provided adds details about the financial performance of the companies in three years and specifies that for all companies, cost incurred is less than revenue, except for Company D in 2020, where the revenue is 20 and the cost incurred is 50.

Additionally, it is mentioned that Company D experienced the highest annual loss in 2020, given the revenue of 20 and cost incurred of 50. The loss can be calculated as follows:

Loss = Revenue - Cost Incurred = 20 - 50 = -30

Therefore, Company D experienced a loss of 30 in 2020, representing the highest annual loss among the mentioned companies and years.

3.3. The ratio of a company's annual profit to its annual costs is a measure of its performance. Which of the four companies had the lowest value of this ratio in 2019?

(A) Company D

(B) Company C

(C) Company B

(D) Company A

Correct Answer: (D) Company A

Solution:

Measure of A's performance in 2019 =90-85/85=5/85=0.06
Measure of A's performance in 2019 =100-75/75=25/75=0.33
Measure of A's performance in 2019 =25-20/25=5/25=0.2
Measure of A's performance in 2019 =50-40/40=10/40=0.25
Company A had the lowest value

3.4. The total number of employees lost in 2019 and 2020 was the least for:

(A) Company D

(B) Company B

(C) Company A

(D) Company C

Correct Answer: (B) Company B

Solution:

Company A:

- At the start of 2019, Company A had 150 employees.
- They hired 20 employees in 2019.
- The expected number of employees at the beginning of 2020 was 170, but the actual count was 140, indicating that 30 employees left in 2019.
- The employee count at the beginning of 2020 was 140.
- In 2020, they hired 35 employees.
- The expected count at the start of 2021 was 175, but only 150 were present, suggesting that 25 employees left in 2020.
- The total number of employees who left Company A in 2019 and 2020 was 55.

Company B

- Similarly, in 2019, Company B had 210 employees, hired 35, and had 240 employees in total. Subtracting 240, they lost 5 employees.
- In 2020, they had 240 employees, hired 45, making it 285 in total. Subtracting 250, they lost 35 employees.
- The total number of employees who left Company B in 2019 and 2020 was 40.

Company C:

- Similarly, in 2019, Company C had 320 employees, hired 45, and had 320 employees in total. Subtracting 320, they lost 45 employees.
- In 2020, they had 320 employees, hired 40, making it 360 in total. Subtracting 320, they lost 40 employees.
- The total number of employees who left Company C in 2019 and 2020 was 85.

Company D:

- Similarly, in 2019, Company D had 400 employees, hired 30, and had 410 employees in total. Subtracting 410, they lost 20 employees.
- In 2020, they had 410 employees, hired 35, making it 445 in total. Subtracting 400, they lost 45 employees.
- The total number of employees who left Company D in 2019 and 2020 was 65.

Consequently, Company B experienced the least total number of employees leaving in 2019 and 2020.

3.5. Profit per employee is the ratio of a company's profit to its employee strength. For this purpose, the employee strength in a year is the average of the employee strength at the beginning of that year and the beginning of the next year. In 2020, which of the four companies had the highest profit per employee?

(A) Company B

(B) Company A

(C) Company C

(D) Company D

Correct Answer: (A) Company B

Solution:

Company B

4. A speciality supermarket sells 320 products. Each of these products was either a cosmetic product or a nutrition product. Each of these products was also either a foreign product or a domestic product. Each of these products had at least one of the two approvals – FDA or EU.
The following facts are also known:
1. There were equal numbers of domestic and foreign products.
2. Half of the domestic products were FDA approved cosmetic products.
3. None of the foreign products had both the approvals, while 60 domestic products had both the approvals.
4. There were 140 nutrition products, half of them were foreign products.
5. There were 200 FDA approved products. 70 of them were foreign products and 120 of them were cosmetic products.

Correct Answer: —

4.1. How many foreign products were FDA approved cosmetic products?

Correct Answer: —

Solution:

Given that the total number of products the supermarket sells is 320, and they can be categorized into cosmetic, nutrition, foreign, domestic, FDA approved, and EU approved products. The breakdown is as follows:

1. Foreign products equal domestic products, both totaling 160 each.
2. Half of the domestic products are FDA approved cosmetic products, i.e., 80 items.
3. There are 140 nutrition products, with half being foreign and the remaining half domestic.
4. Out of 200 FDA approved products, 70 are foreign, and 120 are cosmetic.
5. Among the FDA approved domestic products, 80 are cosmetic, leaving 50 for nutrition.

Further analysis reveals:

- There are 120 FDA approved cosmetic products.
- Among the FDA approved foreign products, 70 are FDA approved.
- The remaining 130 domestic products consist of 80 FDA approved cosmetic and 50 FDA approved nutrition items.
- Domestic and cosmetic products total 90, out of which 80 are FDA approved
- This leaves 10 domestic cosmetic products that are not FDA approved.
- Similarly, (domestic, nutrition, and only EU) is determined to be 20.

In conclusion, the number of foreign, cosmetic, and FDA approved products is 40.

4.2. How many cosmetic products did not have FDA approval?

(A) 10

(B) 60

(C) 50

(D) Cannot be determined

Correct Answer: (B) 60

Solution:

The supermarket sells a total of 320 products, categorized as cosmetic and nutrition, with equal representation of foreign and domestic products, all meeting the standards of FDA and EU. Further details are provided in the following statements:

1. The number of foreign products equals the number of domestic products, each comprising half of the total, resulting in 160 items each.
2. Half of the domestic products are FDA-approved cosmetic products, totaling 80 items.
3. Among the 140 nutrition products, half are foreign, and the remaining half are domestic.
4. Out of the 200 FDA-approved products, 70 are foreign, and 120 are cosmetic. This implies that the FDA-approved domestic nutrition products are 50.
5. There are 120 FDA-approved cosmetic products. Of these, 80 are domestic, and 40 are foreign.

Further breakdown:

- 70 FDA-approved foreign products comprise 30 foreign nutrition products.
- Domestic and cosmetic products together total 90, with 80 being FDA-approved. Therefore, 10 are domestic cosmetic products without FDA approval.
- Domestic nutrition products without FDA approval amount to 20 (70 - 50).

Consequently, the number of cosmetic products lacking FDA approval is the sum of domestic-only EU and foreign EU products, totaling 60 (10 + 50).

4.3. Which among the following options best represents the number of domestic cosmetic products that had both the approvals?

(A) At least 10 and at most 80

(B) At least 20 and at most 70

(C) At least 20 and at most 50

(D) At least 10 and at most 60

Correct Answer: (D) At least 10 and at most 60

Solution:

The supermarket sells a total of 320 products, comprising cosmetics and nutrition, with a balance between foreign and domestic items, and adherence to both FDA and EU standards. The given statements provide information about the distribution of these products:

1. Foreign products and domestic products each amount to 160, as they are equal halves of the total.

2. Out of the domestic products, 80 are FDA-approved cosmetic items.
3. Among the 140 nutrition products, half are foreign, implying the remaining half are domestic.
4. Of the 200 FDA-approved products, 70 are foreign, leaving 130 domestic products. Within the domestic products, 80 are FDA-approved cosmetics, and the remaining 50 are FDA-approved nutrition products.
5. There are 120 FDA-approved cosmetic products, with 80 being domestic and 40 foreign. Additionally, there are 70 FDA-approved foreign products, leaving 30 foreign nutrition products.

Further analysis:

- Domestic and cosmetic products together total 90, with 80 being FDA-approved. Consequently, 10 domestic cosmetic products lack FDA approval.
- The statement indicates that 60 domestic products have both FDA and EU approvals.
- The question introduces variables a and c, where a represents the number of domestic cosmetic products without FDA approval and c represents the number of domestic cosmetic products with both FDA and EU approvals.
- The statement specifies that $a + c = 60$.

To find the minimum and maximum values of a:

- To maximize c (the number of domestic cosmetic products with both approvals), c can be maximized to 50, leaving a minimum value of 10 for a (60 - 50).

- To minimize c (the number of domestic cosmetic products with both approvals), c can be minimized to 0, resulting in a maximum value of 60 for a (60 - 0).

Therefore, the number of domestic cosmetic products without FDA approval is at least 10 and at most 60, depending on the distribution of products with both FDA and EU approvals.

4.4. If 70 cosmetic products did not have EU approval, then how many nutrition products had both the approvals?

(A) 10

(B) 20

(C) 30

(D) 50

Correct Answer: (A) 10

Solution:

10

4.5. If 50 nutrition products did not have EU approval, then how many domestic cosmetic products did not have EU approval?

Correct Answer: —

Solution:

50