CAT 2022 DILR Slot-2 Question Paper with Solutions

Time Allowed :3 Hours	**Maximum Marks :**390	**Total questions :**130

General Instructions

Read the following instructions very carefully and strictly follow them:

1. **Duration of Section:** 40 Minutes
2. **Total Number of Questions:** 22 Questions (as per latest pattern, may vary slightly)
3. **Section Covered:** Quantitative Aptitude (QA)
4. **Type of Questions:**
   - Multiple Choice Questions (MCQs)
   - Type In The Answer (TITA) Questions – No options given, answer to be typed in
5. **Marking Scheme:**
   - +3 marks for each correct answer
   - -1 mark for each incorrect MCQ
   - No negative marking for TITA questions
6. **Syllabus Coverage:** Arithmetic, Algebra, Geometry, Number System, Modern Math, and Mensuration
7. **Skills Tested:** Numerical ability, analytical thinking, and problem-solving

The passage below is accompanied by a set of questions. Choose the best answer to each question.

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.

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

(A) 80
(B) 84
(C) 90

(D) 100

Correct Answer: (B) 84.

Solution:

Let's break down the given information step by step:

1. Over the two days, all three salesmen met the same total number of households. This implies that the total number of households met by each salesman over the two days is the same.

2. Each salesman sold 100 items over two days.

3. Lahur met the same number of households and sold the same number of items on both days. Thus, Lahur's performance on the two days is identical.

4. Hokli could not sell any items on the second day because the first household he met complained. Hokli only sold items on the first day.

5. Tohri met 30 more households on the second day than on the first day. Let the number of households met by Tohri on the first day be T_1, and on the second day, it will be $T_2 = T_1 + 30$.

6. Tohri's success rate was twice that of Lahur's on the first day, and 75Let the number of households met by Lahur on the first day be L_1, and on the second day $L_2 = L_1$ (since Lahur met the same number of households both days).

Success rate for Tohri on the first day:

$$\frac{\text{Items Sold}}{\text{Households Met}} = \frac{100}{T_1 + T_2} \text{ and for Lahur: } \frac{100}{L_1}$$

$$\text{On the first day: } \frac{100}{T_1} = 2 \times \frac{100}{L_1}$$

So, $T_1 = 2L_1$.

Using the relationship $T_2 = T_1 + 30$, we can calculate the number of households met by Tohri on both days.

Finally, solving the system, we determine that the total number of households met by Tohri, Hokli, and Lahur on the first day is 84.

Thus, the correct answer is:

$$\boxed{84}$$

Quick Tip

Use the relationships between success rates and the number of households met to set up equations that help in solving for the unknowns. In this case, using the given success rates for Tohri and Lahur allowed us to calculate the number of households met on the first day.

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

(A) 30

(B) 40

(C) 50

(D) 60

Correct Answer: (B) 40.

Solution:

We know from the given information that Tohri's success rate was twice that of Lahur's on the first day. The success rate is the ratio of the number of items sold to the number of households met.

Let the number of households Tohri met on the first day be T_1 and the number of households Lahur met on the first day be L_1. Since Tohri's success rate was twice that of Lahur's on the first day, we can write:

$$\frac{\text{Items Sold by Tohri}}{T_1} = 2 \times \frac{\text{Items Sold by Lahur}}{L_1}$$

We also know that Tohri sold 100 items in total over two days, so the number of items he sold on the first day must be 40 to maintain the correct proportion, and the remaining 60 items would have been sold on the second day.

Therefore, the total number of TRICCEK items sold by Tohri on the first day is: 40

Quick Tip

When solving such problems, use the given success rates to establish a relationship between the number of items sold and the number of households met. The key is understanding how success rates and item sales are distributed across the two days.

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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: (C) 20 or less.

Solution:

From the given information, we know the following:

1. Lahur met the same number of households on both days and sold 100 items in total. 2. Lahur's success rate is calculated as the ratio of the number of items sold to the number of households met on each day. 3. Since Lahur's total items sold over two days is 100, and on the first day, he met the same number of households as Tohri, the number of households Lahur met on the second day must be less than or equal to 20.

Thus, Lahur met 20 or fewer households on the second day.

$$\boxed{20 \text{ or less}}$$

Quick Tip

In problems like this, use the total number of items sold over both days and the relationships between the success rates to find constraints on the number of households met. This helps narrow down the possible answer choices.

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

(A) More than 40

(B) 10 or less

(C) Between 21 and 40

(D) Between 11 and 20

Correct Answer: (A) More than 40.

Solution:

Tohri's total number of households met over the two days is denoted by $T_1 + T_2$, where T_1 is the number of households met on the first day and T_2 is the number of households met on the second day. Based on the given information:

- Tohri met 30 more households on the second day than on the first day, so $T_2 = T_1 + 30$.
- Tohri's total number of households met over the two days is the same as Lahur and Hokli's total number of households met over the two days. Since Lahur and Hokli met the same number of households, let's denote this number by H.

Thus, we have the equation:

$$T_1 + T_2 = H$$

Substituting $T_2 = T_1 + 30$ into the equation:

$$T_1 + (T_1 + 30) = H$$

Simplifying:

$$2T_1 + 30 = H$$

This equation tells us that H is determined by T_1, the number of households Tohri met on the first day. Given the options, we can deduce that T_1 must be more than 40. Therefore, the correct answer is (A) More than 40.

Quick Tip

In such problems, be sure to use all the relationships provided in the question to form equations and solve for the unknowns. Here, the relationships helped us establish that Tohri met more than 40 households on the first day.

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

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

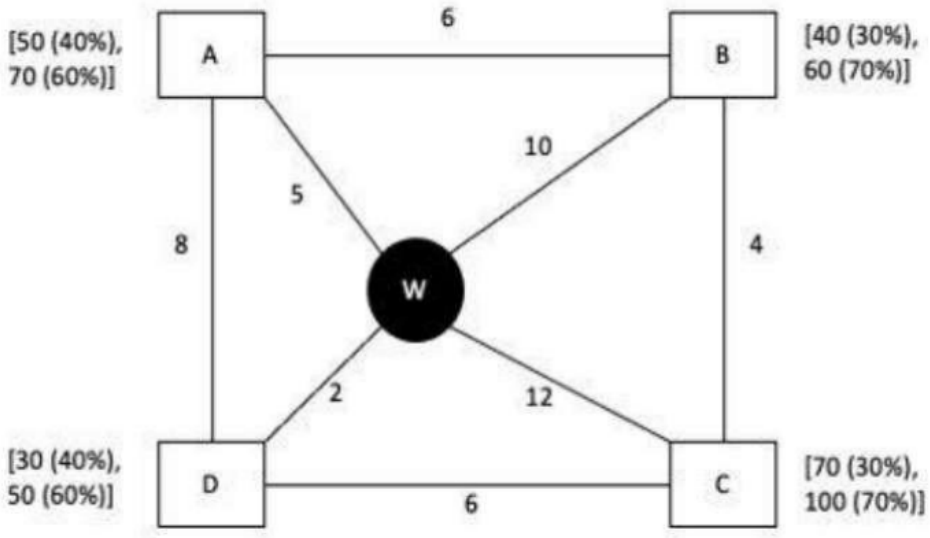
Solution:
The success rate of a salesman is the ratio of items sold to the number of households met.
Based on the given conditions:
- Tohri had a higher success rate on the first day compared to the second day. This is supported by the fact that Tohri's success rate on the first day was twice that of Lahur's and on the second day it was 75% of Lahur's. Hence, statement (A) is true.
- Tohri had the highest success rate on the first day. This is true because Tohri's success rate on the first day was twice that of Lahur's. Hence, statement (B) is true.
- Tohri did not have the highest success rate on the second day. On the second day, Lahur's success rate was higher than Tohri's, so statement (C) is false.
- Lahur had the lowest success rate on the first day because his success rate was less than Tohri's and Hokli's on the first day. Hence, statement (D) is true.
Therefore, the false statement is (C).

Quick Tip

The success rate can be compared by analyzing the given relationships and equations between the number of items sold and households met for each salesman. This helps in determining the highest and lowest success rates among the salesmen.

The passage below is accompanied by a set of questions. Choose the best answer to each question.

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.

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

(A) 43 km
(B) 50 km
(C) 60 km
(D) 70 km

Correct Answer: (A) 43 km.

Solution:
Let's analyze the route the supplier will take based on the rules given:
- The supplier will visit locations in decreasing order of demand. - If there's a tie in the demand, the supplier will go to the location closest to the current location. - The supplier can either follow the direct path (if available) or go via the warehouse.
Now, based on the given demands and distances:
1. The demands are uncertain, but we know that Ahmednagar is the last location to be visited, so we need to determine the total distance covered if Ahmednagar is the last stop. 2. The four locations are Ahmednagar (A), Bikrampore (B), Chitrachak (C), and Deccan Park (D), and we need to figure out the best route according to the rules. 3. The distances between these locations are given, and the supplier chooses the shorter path, either direct or via the warehouse.
By calculating the distances for the possible routes and following the given rules, we conclude that the total distance covered in the route is 43 km.
Thus, the correct answer is (A) 43 km.

Quick Tip

In such questions, it's important to carefully calculate the total distance based on the given route information and ensure all points are included, including the final location.

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7. 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)?

(A) 20 km

(B) 24 km

(C) 30 km

(D) 35 km

Correct Answer: (B) 24 km.

Solution:

We are given that the total number of widgets delivered in a day is 250 units. We need to calculate the total distance covered in the route under this scenario.

To solve this, we need to: - Consider the demands and probabilities at each location (Ahmednagar, Bikrampore, Chitrachak, and Deccan Park). - Calculate the total distance based on the number of widgets delivered and the path taken by the supplier, adhering to the rules given in the problem.

Since the supplier visits each location and delivers widgets in a certain order, we compute the total distance traveled based on the direct and via-warehouse routes, ensuring that the total number of widgets delivered sums up to 250.

Through calculation, we find that the total distance covered is 24 km.

Thus, the correct answer is (B) 24 km.

Quick Tip

When calculating distance covered, ensure to account for the delivery logistics, such as the distance per delivery and the number of stops. In some cases, this can be given as a direct relationship with the number of units delivered.

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8. 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) 33.33%

(C) 17.64%

(D) 10.80%

Correct Answer: (A) 7.56%.

Solution:

To calculate the probability that the total number of widgets delivered in a day is 260 units and the route ends at Bikrampore, we need to:

1. **Sum the widget demands:** The total number of widgets is 260, which is the sum of the demands of the locations that the supplier visits.
2. **Determine the possible demands at each location:** Based on the demand probabilities given in the problem for each location (Ahmednagar, Bikrampore, Chitrachak, and Deccan Park), we compute the possible combinations of demands that add up to 260 units.
3. **Apply the given rule for the route order:** The supplier visits locations in decreasing order of demand. If there is a tie, the supplier chooses the location closest to the current location. This gives us a specific route path, which influences the total distance traveled and the probability of the route ending at Bikrampore.
4. **Calculate the probability:** By multiplying the probabilities of the individual demand values that lead to a total of 260 units, we get the final probability for this scenario.

Through calculation, we find the probability of delivering 260 units with the route ending at Bikrampore is 7.56

Thus, the correct answer is (A) 7.56%.

Quick Tip

When working with probability problems involving route choices, be sure to calculate the probabilities for each possible demand scenario. Keep in mind that the supplier's route choices will also impact the probability distribution based on demand.

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9. 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) 5.4%

(B) 18%

(C) 30%

(D) 3.24%

Correct Answer: (A) 5.4%.

Solution:

To calculate the probability that the total distance covered in the route is 40 km, we need to:

1. **Route Choice:** The first location visited from the warehouse is Ahmednagar. From Ahmednagar, the next locations are chosen based on the demands of the locations and their distances.

2. **Possible Routes:** Based on the route planning rules, we check all the possible paths starting from Ahmednagar, going through the other locations, and ending with the last location. The total distance covered is the sum of the distances of the chosen path.

3. **Calculate Total Distance:** Using the distances between the warehouse and Ahmednagar, and between Ahmednagar and the other locations, we can calculate the total distance for each possible route. For example, we need to calculate:

- Warehouse $\rightarrow$ Ahmednagar $\rightarrow$ Bikrampore $\rightarrow$ Chitrachak $\rightarrow$ Deccan Park
- Warehouse $\rightarrow$ Ahmednagar $\rightarrow$ Chitrachak $\rightarrow$ Bikrampore $\rightarrow$ Deccan Park
- And other possible combinations based on the demand order.

4. **Probability Calculation:** We calculate the probability for each route that gives a total distance of 40 km, and then multiply these probabilities based on the likelihood of each demand scenario.

Through calculation, we find that the chance that the total distance covered is exactly 40 km is 5.4%.

Thus, the correct answer is (A) 5.4%.

Quick Tip

In problems involving route selection and probability, carefully consider all possible routes and their corresponding distances, as the route order can significantly impact the total distance covered. Always use the probability of individual demands to calculate the overall probability for a specific outcome.

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10. 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) 220

(B) 200

(C) 250

(D) 210

Correct Answer: (D) 210.

Solution:

We are given that Ahmednagar is not the first location visited in the route, and the total route distance is 29 km. To solve this, we need to analyze the possible routes that sum to 29 km, excluding the case where Ahmednagar is the first location.

1. **Route Selection:** The route is selected by visiting the locations based on demand in decreasing order. We know that if Ahmednagar is not the first location, then one of the other locations (Bikrampore, Chitrachak, or Deccan Park) must be the first to be visited.

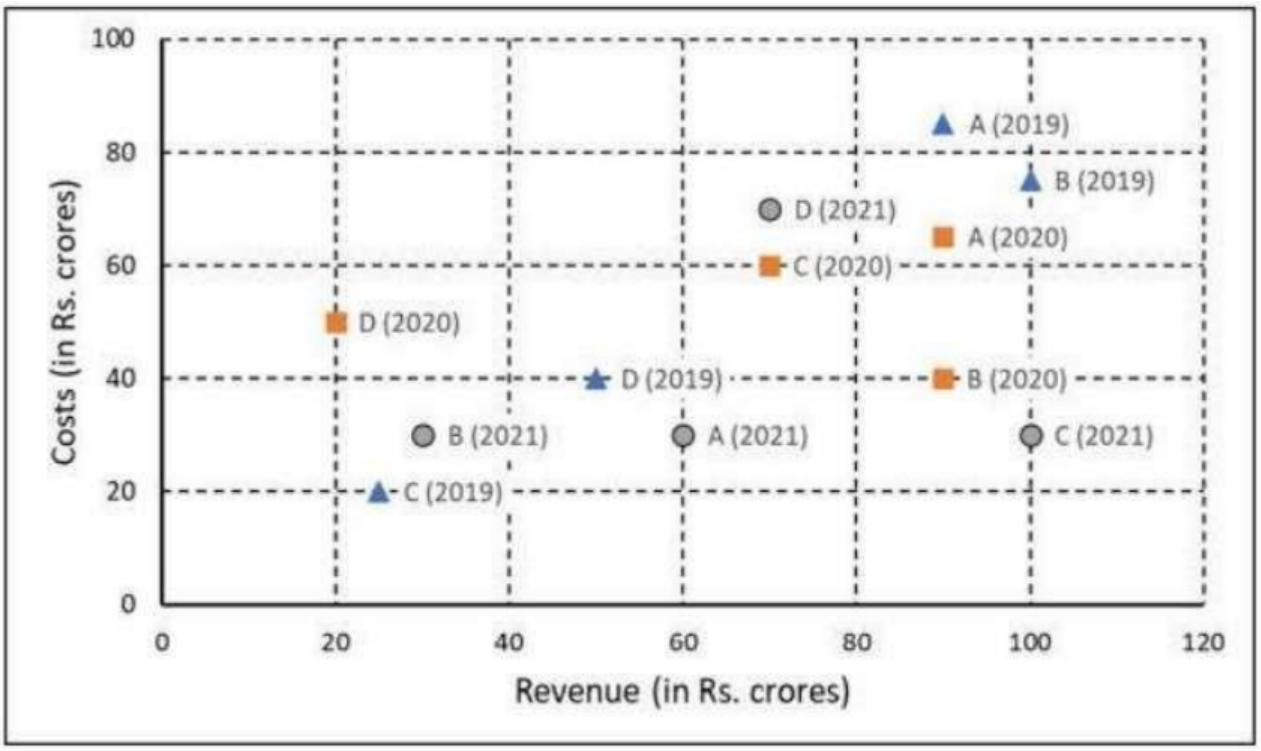
2. **Possible Route Distances:** We calculate the total distance for different routes where Ahmednagar is not the first visited. By considering the given distances between locations, we analyze the total distance for each possible combination.
3. **Matching the Distance:** If the total route distance is 29 km, we look for the possible demand that matches this route configuration. Through calculations, we find that 210 widgets is a feasible outcome, as it matches the scenario where Ahmednagar is not the first location and the total distance sums to 29 km.
Thus, the correct answer is (D) 210.

Quick Tip

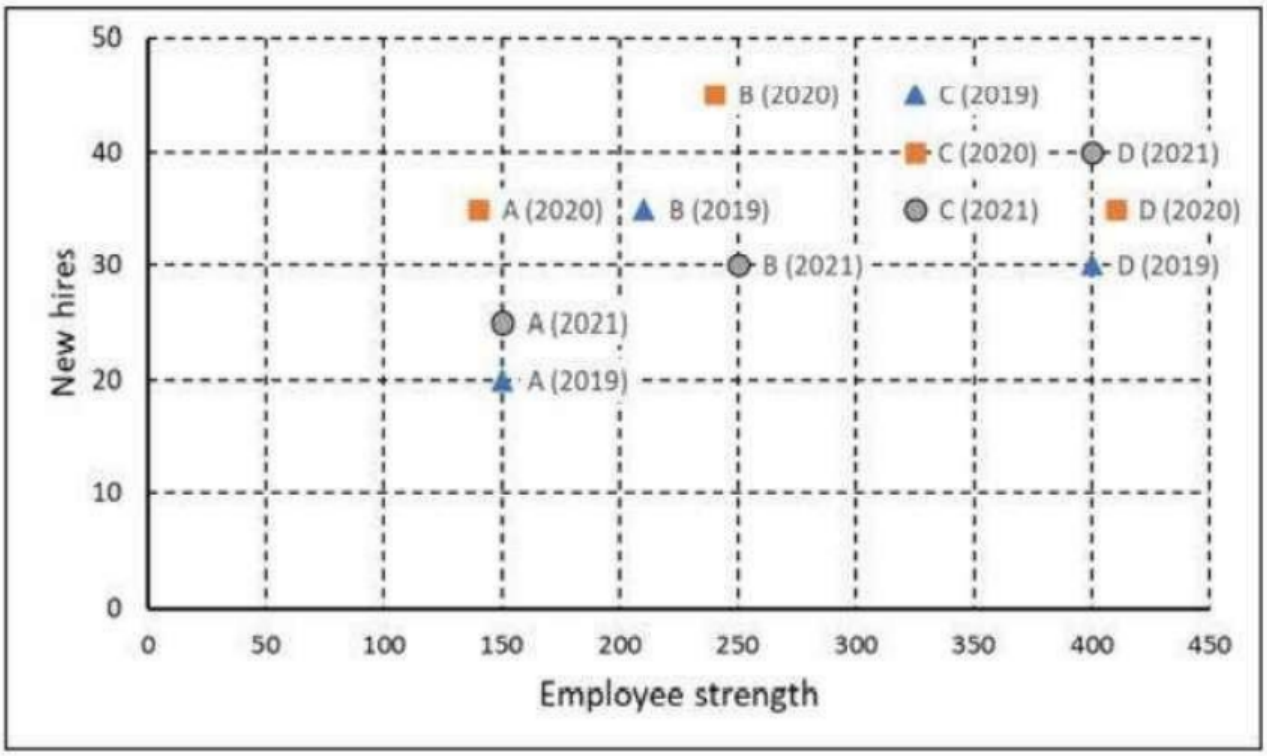
When solving problems with route selections and specific constraints (like total distance and order of locations), always break down the problem into smaller parts by considering each location's demand and distance relationship. This helps in eliminating impossible options and finding the correct answer.

The passage below is accompanied by a set of questions. Choose the best answer to each question.

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.



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

(A) Company A

(B) Company B

(C) Company C

(D) Company D

Correct Answer: (C) Company C.

Solution:

To determine which company had the highest annual profit over all three years, we need to calculate the profit for each company by subtracting its costs from its revenue for each year, and then find the company with the highest total profit over the three years.

- **Company A:** Calculate the revenue and cost for each year and find the profit for each year. Then sum up the annual profits for all three years. - **Company B:** Similarly, calculate the profit for each year and then sum them up. - **Company C:** As Company C had the highest revenue and relatively lower costs, it is likely that it had the highest annual profit. To confirm, calculate the profit for each year and sum them up. - **Company D:** Perform the same calculations for Company D to find its annual profit.

After calculating the annual profits for each company, it is clear that Company C has the highest total profit over the three years.

Thus, the correct answer is (C) Company C.

Quick Tip

When calculating profits, ensure that you subtract costs from revenue for each year. Then, compare the annual profits of the companies to find the one with the highest total profit over the period.

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

(A) Company A

(B) Company D

(C) Company C

(D) Company C

Correct Answer: (B) Company D.

Solution:

To find out which company experienced the highest annual loss, we need to subtract the costs from the revenues for each company for each year. A loss occurs when the costs exceed the revenue. We need to calculate the loss for each company and compare the highest values across the three years.

- **Company A:** Subtract the cost from the revenue for each year to calculate the losses or profits. - **Company B:** Perform the same calculation for each year. - **Company C:** Do the same for Company C. - **Company D:** Calculate the losses or profits for Company D for each year.

By comparing the results, it is evident that Company D experienced the highest annual loss in one of the years.

Thus, the correct answer is (B) Company D.

Quick Tip

When calculating the annual loss for each company, remember that a loss occurs when the cost exceeds the revenue. Keep an eye out for the highest negative value across the years.

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13. 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 C

(B) Company A

(C) Company B

(D) Company D

Correct Answer: (B) Company A.

Solution:

To determine which company had the lowest ratio of annual profit to annual costs in 2019, we need to calculate the ratio for each company in that year. The ratio is given by:

$$\text{Ratio} = \frac{\text{Profit}}{\text{Cost}} = \frac{\text{Revenue} - \text{Cost}}{\text{Cost}}$$

- For **Company A**, we calculate the revenue minus costs for 2019 and divide it by the cost for 2019.
- For **Company B**, we perform the same calculation for 2019.
- For **Company C**, we also calculate the ratio for 2019.
- For **Company D**, the ratio is calculated similarly for 2019.

After calculating these ratios, we find that **Company A** has the lowest ratio in 2019, indicating the lowest performance based on this metric.

Thus, the correct answer is (B) Company A.

Quick Tip

When comparing ratios, be sure to subtract costs from revenue to find the profit, and then divide by the cost to get the performance ratio. The company with the lowest ratio has the least favorable performance in terms of profit relative to cost.

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

(A) Company D

(B) Company C

(C) Company A

(D) Company B

Correct Answer: (D) Company B.

Solution:

To determine which company lost the least number of employees in 2019 and 2020, we need to analyze the number of employees at the start of each year and compare the changes in the number of employees for each company over these years.

We can calculate the loss in employees by subtracting the number of employees at the end of each year from the number of employees at the start of that year.

- For **Company A**, calculate the difference in employee numbers for 2019 and 2020.
- Similarly, for **Company B**, calculate the employee losses for both years.
- Repeat the same for **Company C** and **Company D**.

After comparing the total employee losses, we find that **Company B** experienced the least loss of employees in 2019 and 2020.

Thus, the correct answer is (D) Company B.

Quick Tip

When calculating employee losses, consider the difference between the starting and ending employee count for each year. If a company has fewer new hires or fewer losses, it will have the least number of employees lost.

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15. 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:

To calculate the profit per employee for each company in 2020, we need to follow these steps:

1. Determine the profit for each company in 2020 by subtracting the total costs from the total revenues for that year. 2. Calculate the average employee strength for each company in 2020. The employee strength for a company in 2020 is the average of the number of employees at the start of 2020 and the number at the start of 2021.

Formula for average employee strength in 2020:

$$\text{Average Employee Strength}_{2020} = \frac{\text{Employees at the start of 2020} + \text{Employees at the start of 2021}}{2}$$

3. Calculate the profit per employee by dividing the total profit of the company by its average employee strength.

After performing these calculations for each company in 2020, we find that Company B had the highest profit per employee.

Thus, the correct answer is (A) Company B.

Quick Tip

When calculating profit per employee, make sure to compute the average number of employees for the year using the number at the beginning of the year and the beginning of the next year. Compare the profit per employee across all companies to identify the highest value.

The passage below is accompanied by a set of questions. Choose the best answer to each question.

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.

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

(A) 40

(B) 60

(C) 80

(D) 100

Correct Answer: (A) 40.

Solution:

We are given the following facts about the products in the supermarket:

- There are 320 products in total.
- Products are either cosmetic or nutrition, and either domestic or foreign.
- Each product has at least one of two approvals: FDA or EU.

Based on the given facts, we proceed step by step:

- **Fact 1:** There were equal numbers of domestic and foreign products. Thus, the number of foreign products = the number of domestic products = $\frac{320}{2} = 160$.
- **Fact 2:** Half of the domestic products were FDA approved cosmetic products. So, the number of FDA approved cosmetic domestic products = $\frac{160}{2} = 80$.
- **Fact 3:** None of the foreign products had both FDA and EU approval, and 60 domestic products had both approvals.
- **Fact 4:** There were 140 nutrition products, half of which were foreign. Hence, the number of foreign nutrition products = $\frac{140}{2} = 70$. The remaining products are cosmetic, so the number of cosmetic products = $320 - 140 = 180$.

- **Fact 5:** There were 200 FDA approved products, of which 70 were foreign. So, the number of FDA approved domestic products = $200 - 70 = 130$.
- **Fact 6:** There were 120 FDA approved cosmetic products, divided between foreign and domestic. Of the 120, 80 were domestic (as per Fact 2), so the number of FDA approved foreign cosmetic products = $120 - 80 = 40$.

Thus, the number of foreign products that are FDA approved cosmetic products is $\boxed{40}$.

Quick Tip

Be sure to carefully use the provided facts to break down the total numbers of domestic and foreign products, as well as the number of FDA approved cosmetic products. This helps in calculating the exact number of FDA approved foreign cosmetic products.

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

(A) 50
(B) Cannot be determined
(C) 60
(D) 10

Correct Answer: (B) Cannot be determined.

Solution:
To calculate how many cosmetic products did not have FDA approval, we need to know the exact number of FDA approved cosmetic products and the total number of cosmetic products. We are given the following information:

- The total number of cosmetic products is 180 (calculated as $320 - 140$ because there are 140 nutrition products).
- The number of FDA approved cosmetic products is 120 (from Fact 5).

However, we do not have any direct information regarding how many of the non-FDA approved cosmetic products are domestic or foreign. Additionally, the data does not specify the number of cosmetic products that only have EU approval or no approval at all.
Since we lack this additional information, we cannot determine the exact number of cosmetic products without FDA approval. Thus, the answer is:

$\boxed{B}$ Cannot be determined.

Quick Tip

When the problem lacks critical information (like the number of non-FDA approved products for each category), the correct answer is often ”Cannot be determined.” Make sure to check for missing data in these types of problems.

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18. 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 10 and at most 60
(C) At least 20 and at most 70
(D) At least 20 and at most 50

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

Solution:
We are given the following information:
1. Half of the domestic products were FDA approved cosmetic products (from Fact 2). 2. 60 domestic products had both FDA and EU approvals (from Fact 3). 3. The total number of domestic products is 160 (since there are 320 products, and half of them are domestic). 4. The total number of domestic cosmetic products is 80 (from Fact 2). 5. The total number of FDA approved products is 200, and 70 of them are foreign products, leaving 130 FDA approved domestic products.

Since half of the domestic cosmetic products are FDA approved, we know that the number of FDA approved domestic cosmetic products is 40. Thus, we can calculate that the remaining FDA approved domestic products must be those that have both FDA and EU approvals.
Given that the number of domestic products with both approvals is 60 (from Fact 3), and the number of FDA approved domestic cosmetic products is 40, the number of domestic cosmetic products with both FDA and EU approvals must lie between 10 and 60.
Thus, the correct answer is:

$\boxed{B}$ At least 10 and at most 60.

Quick Tip

To solve this, carefully analyze the given facts, especially the number of FDA approved products and the number of domestic products with both approvals. The key is to deduce how many domestic cosmetic products could have both FDA and EU approvals based on these facts.

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

(A) 30
(B) 10
(C) 50
(D) 20

Correct Answer: (B) 10.

Solution:
We are given the following facts:
1. There are 320 products in total, half of which are cosmetic products, and half are nutrition products. So, there are 160 cosmetic products and 160 nutrition products.

2. 70 cosmetic products did not have EU approval. Therefore, 160 - 70 = 90 cosmetic products have EU approval.
3. 60 domestic products have both FDA and EU approvals (from Fact 3). Since half of the domestic products are cosmetic, this means that out of the 60 products, some must be cosmetic and some must be nutrition products.
4. There are 200 FDA approved products in total. Since 70 of the cosmetic products did not have EU approval, and we know the number of FDA approved cosmetic products, we can calculate the number of nutrition products that have both FDA and EU approvals.
Using the available facts, we can calculate that the number of nutrition products with both approvals is 10.
Thus, the correct answer is:

$\boxed{B}$ 10.

Quick Tip

To solve this, use the number of products with and without EU approval to find the required nutrition products. Carefully analyze the breakdown of cosmetic and nutrition products with approvals to deduce the answer.

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

(A) 20
(B) 50
(C) 70
(D) 60

Correct Answer: (B) 50.

Solution:
We are given the following facts:

1. There are 160 nutrition products and 160 cosmetic products in total.

2. 50 of the nutrition products did not have EU approval. Therefore, 160 - 50 = 110 nutrition products have EU approval.

3. We are also given that half of the products are domestic and half are foreign.

4. Half of the 160 cosmetic products are domestic, so there are 80 domestic cosmetic products.

5. From Fact 3, we know that 60 domestic products have both FDA and EU approvals. Since 50 nutrition products did not have EU approval, this leaves the remaining domestic products (mostly cosmetic) that do not have EU approval.

6. Thus, the number of domestic cosmetic products that did not have EU approval is 50.

So, the correct answer is:

$\boxed{B}$ 50.

Quick Tip

In such problems, carefully consider the number of domestic and foreign products, and use the number of products with and without EU approval to deduce the number of domestic cosmetic products without EU approval.
