Questions

1. In an examination, there were 75 questions. 3 marks were awarded for each correct answer, 1 mark was deducted for each wrong answer, and 1 mark was awarded for each unattempted question. Rayan scored 97 marks in the examination. If the number of unattempted questions was higher than the number of attempted questions, then the maximum number of correct answers that Rayan could have written in the examination is _____.

2. Consider the arithmetic progression 3, 7, 11, …, and let A_n denote the sum of the first n terms of this progression. Then, the value of $\frac{1}{25}\sum_{n=1}^{25} A_n$ is _____.

   A. 442 B. 404

   C. 455 D. 415

3. Let r and c be real numbers. If r and –r are the roots of $5x^3 + cx^2 – 10x + 9 = 0$, then the value of c is _____.

   A. 4 B. –4

   C. $-\frac{9}{2}$ D. $\frac{9}{2}$

4. The number of integer solutions of the equation $(x^2 - 10)^{(x^2-3x-10)} = 1$ is ____.

5. In triangle ABC, altitudes AD and BE are drawn to the corresponding bases. If ∠BAC = 45° and ∠ABC = θ, then $\frac{AD}{BE}$ equals _____.

   A. $\sqrt{2}cos\ \theta$ B. 1

   C. $\sqrt{2}sin\ \theta$ D. $\frac{(sin\ \theta+cos\ \theta)}{\sqrt{2}}$

6. Suppose for all integers x, there are two functions f and g such that f(x) + f(x – 1) – 1 = 0 and $g(x) = x^2$. If $f(x^2 – x) = 5$, then the value of the sum f(g(5)) + g(f(5)) is _____.

7. For a natural number n, assume that (15,000)! is divisible by (n!)!. The largest possible value of n is ____.

   A. 5 B. 4

   C. 6 D. 7

8. Two ships meet mid-ocean, and then, one ship goes south and the other ship goes west, both travelling at constant speeds. Two hours later, they are 60 km apart. If the speed of one of the ships is 6 km per hour more than the other one, then the speed, in km per hour, of the slower ship is _____.

   A. 24 B. 18

C. 20

D. 12

9. Five students, including Amit, appear for an examination in which the possible marks are integers between 0 and 50, both inclusive. The average marks for all the students is 38, and exactly three students got more than 32. If no two students got the same marks and Amit got the least marks among the five students, then the difference between the highest and lowest possible marks scored by Amit is _____.

A. 22

B. 20

C. 21

D. 24

10. There are two containers of the same volume. The first container is half-filled with sugar syrup and the second container is half-filled with milk. Half the content of the first container is transferred to the second container, and then the half of this mixture is transferred back to the first container. Next, half the content of the first container is transferred back to the second container. Then, the ratio of sugar syrup and milk in the second container is _____.

A. 6 : 5

B. 5 : 6

C. 4 : 5

D. 5 : 4

11. On day one, there are 100 particles in a laboratory experiment. On day n, where $n \geq 2$, one out of every n particle produces another particle. If the total number of particles in the laboratory experiment increases to 1000 on day m, then m equals _____.

A. 19

B. 17

C. 16

D. 18

12. In an election, there were four candidates, and 80% of the registered voters casted their votes. One of the candidates received 30% of the casted votes while the other three candidates received the remaining casted votes in the proportion of 1 : 2 : 3. If the winner of the election received 2512 votes more than the candidate with the second highest votes, then the number of registered voters was _____.

A. 62800

B. 50240

D. 60288

C. 40192

13. Manu earns ₹4000 per month and wants to save an average of ₹550 per month in a year. In the first nine months, his monthly expense was ₹3500, and he foresees that from the tenth month onward, his monthly expense will increase to ₹3700. In order to meet his yearly savings target, his monthly earnings, in rupees, from the tenth month onward should be _____.

A. ₹4350

B. ₹4400

C. ₹4300

D. ₹4200

14. Let f(x) be a quadratic polynomial in x such that f(x) ≥0 for all real numbers x. If f(2) = 0 and f(4) = 6, then f(–2) is equal to _____.

A. 36 B. 12

C. 24 D. 6

15. The number of integers greater than 2000 that can be formed with the digits 0, 1, 2, 3, 4, and 5, using each digit at most once, is _____.

A. 1480 B. 1440

C. 1200 D. 1420

16. The length of each side of an equilateral triangle ABC is 3 cm. Let D be a point on BC such that the area of triangle ADC is half the area of triangle ABD. Then the length of AD, in cm, is _____.

A. $\sqrt{7}$ B. $\sqrt{6}$

C. $\sqrt{8}$ D. $\sqrt{5}$

17. If a and b are non-negative real numbers such that a + 2b = 6, then the average of the maximum and minimum possible values of (a + b) is _____.

A. 3.5 B. 4.5

C. 3 D. 4

18. The average of a non-decreasing sequence of N numbers $a_1, a_2, \ldots, a_N$ is If a_1 is replaced by $6a_1$, the new average becomes 400. Then, the number of possible values of a_1 is ____.

19. The number of distinct integer values of n satisfying $\frac{4-log_2 n}{3-log_4 n} < 0$ is _____.

20. Two regular polygons, A and B, have a number of sides in the ratio of 1 : 2 and interior angles in the ratio of 3 : Then, the number of sides of B equals _____.

21. Mr. Pinto invests one-fifth of his capital at an interest rate of 6%, one-third at 10%, and the remaining at 1%, each being simple interest per annum. Then, the minimum number of years required for the cumulative interest income from these investments to equal or exceed his initial capital is _____.

22. The times taken by Anu, Tanu, and Manu to complete any job alone are in the ratio of 5 : 8 : They accept a job which they can finish in 4 days if they all work together for 8 hours each day. However, Anu and Tanu work together for the first 6 days, working 6 hours 40 minutes per day. Then, the number of hours that Manu will take to complete the remaining job working alone is _____.

23. **Direction:** Based on the given information, solve the questions that follow:

    A specialty 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.

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

24. **Direction:** Based on the given information, solve the questions that follow:

    A specialty 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.

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    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.

    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

25. **Direction:** Based on the given information, solve the questions that follow:

A specialty 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.

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

26. **Direction:** Based on the given information, solve the questions that follow:

A specialty 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.

How many cosmetic products did not have FDA approval?

A. 50

B. Cannot be determined

C. 60

D. 10

27. **Direction:** Based on the given information, solve the questions that follow:

A specialty 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.

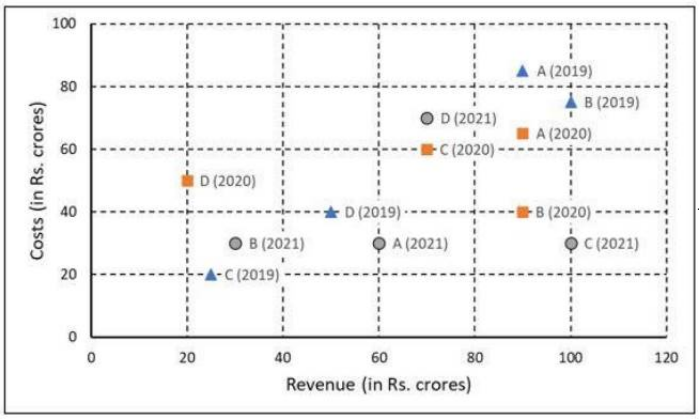
How many foreign products were FDA-approved cosmetic products?

28. **Direction:** Based on the given information, solve the questions that follow:

The two plots below show data for four companies code-named A, B, C, and D over three years, 2019, 2020, and 2021.

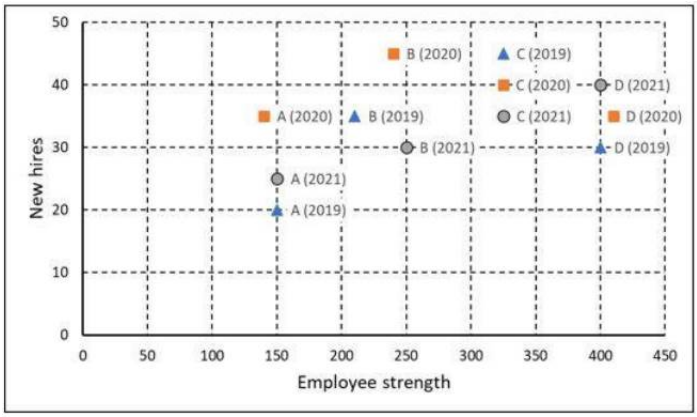
The first plot shows the revenues earned and costs incurred by the companies during these years. For example, in 2021, company C earned Rs. 100 crores in revenue and spent Rs. 30 crores.

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.



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

29. **Direction:** Based on the given information, solve the questions that follow:

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 earned 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.

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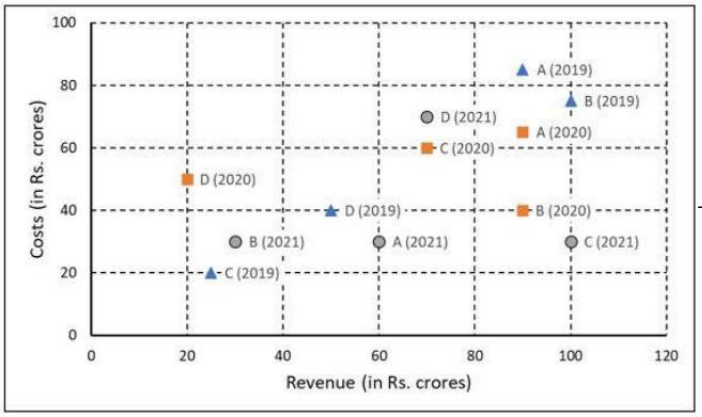

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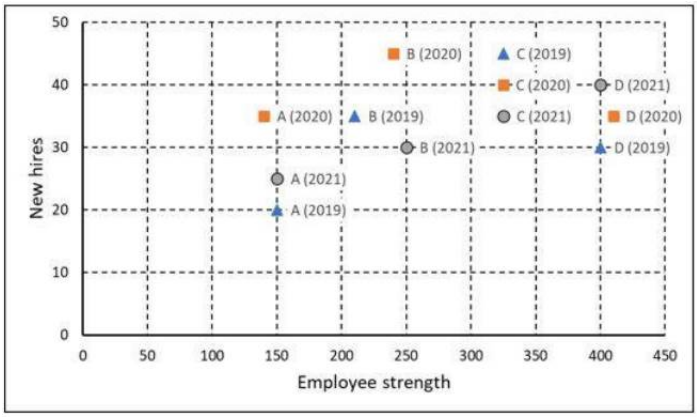
For example, Company B had 250 employees at the start of 2021, and 30 new employees joined the company during the year.



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

30. **Direction:** Based on the given information, solve the questions that follow:

The two plots below show data for four companies code-named A, B, C, and D over three years, 2019, 2020, and 2021.

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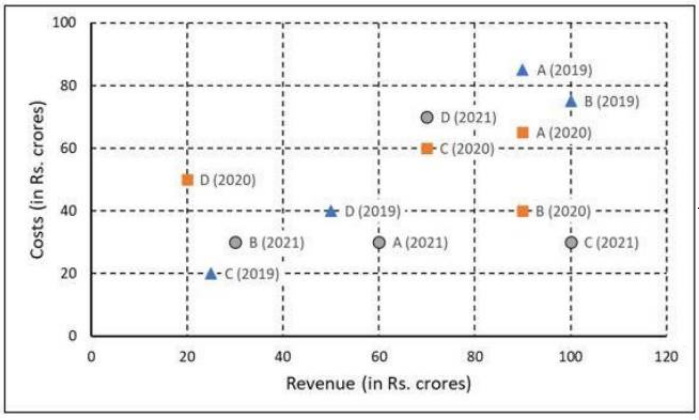

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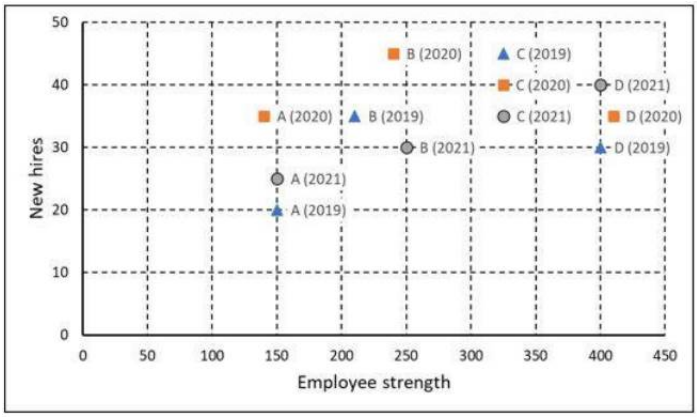

The ratio of a company's annual profit to its annual costs is a measure of its performance. Which of the four companies had the lowest value of this ratio in 2019?

A. Company C

B. Company A

C. Company B

D. Company D

31. **Direction:** Based on the given information, solve the questions that follow:

The two plots below show data for four companies code-named A, B, C, and D over three years, 2019, 2020, and 2021.

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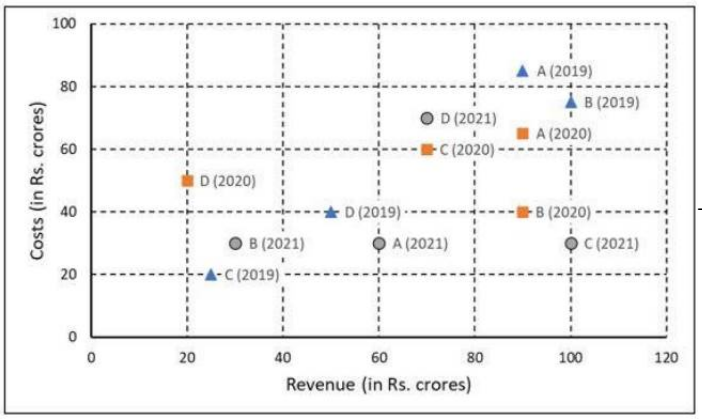
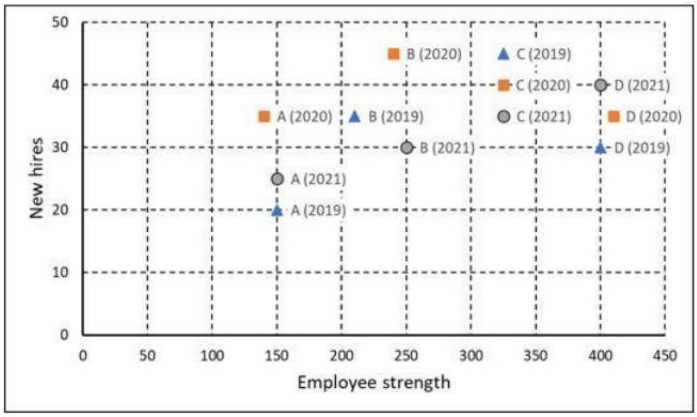


The second plot shows the number of employees employed by the company (employee strength) at the start of each of these three years, as well as the number of new employees hired each year (new hires).

For example, Company B had 250 employees at the start of 2021, and 30 new employees joined the company during the year.



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

A. Company A

B. Company D

C. Company C

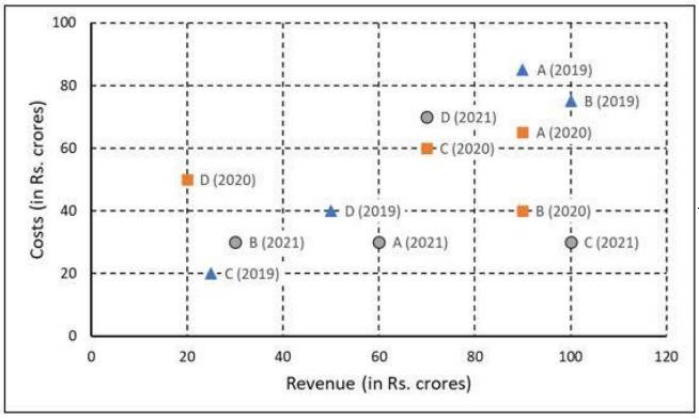
D. Company B

32. **Direction:** Based on the given information, solve the questions that follow:

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 earned 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.



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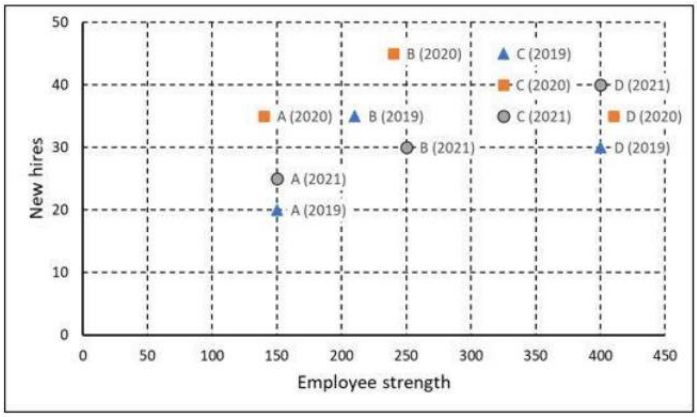


Considering all three years, which company had the highest annual profit?

A. Company A

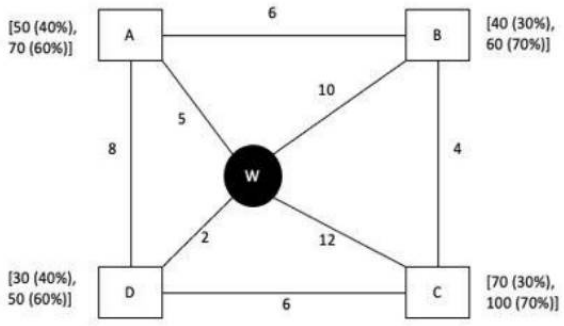
B. Company B

C. Company C

D. Company D

33. **Direction:** Based on the given information, solve the questions that follow.

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. The 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 warehouses represent two-way roads connecting those places with the distances (in km) shown beside the line. The distance in both the directions along a road is 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 at the least distance.

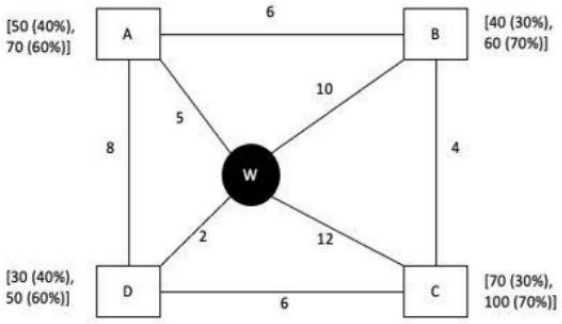
If Ahmednagar is not the first location to be visited in a route and the total route distance is 29 km, then which of the following is a possible number of widgets delivered on that day?

A. 220 B. 200

C. 250 D. 210

34. **Direction:** Based on the given information, solve the questions that follow.

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. The 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 warehouses represent two-way roads connecting those places with the distances (in km) shown beside the line. The distance in both the directions along a road is 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 at the least distance.

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?

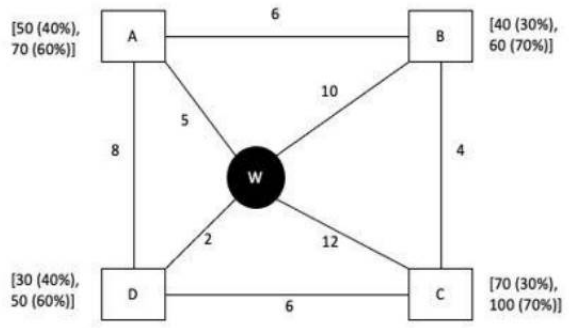
A. 5.4% B. 18%

C. 30% D. 3.24%

35. **Direction:** Based on the given information, solve the questions that follow.

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. The 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 warehouses represent two-way roads connecting those places with the distances (in km) shown beside the line. The distance in both the directions along a

road is 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 at the least distance.

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

A. 7.56%

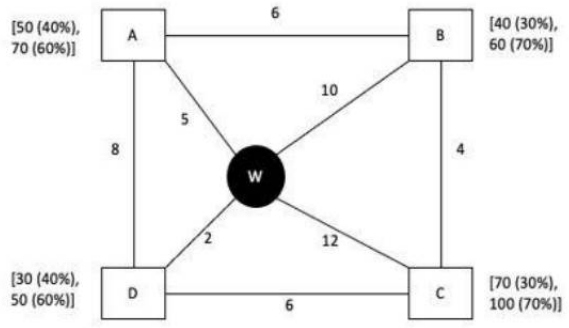
B. 33.33%

C. 17.64%

D. 10.80%

36. **Direction:** Based on the given information, solve the questions that follow.

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. The 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 warehouses represent two-way roads connecting those places with the distances (in km) shown beside the line. The distance in both the directions along a road is equal. For example, the road from Ahmednagar to Bikrampore and the road from Bikrampore to Ahmednagar are both 6 km long.



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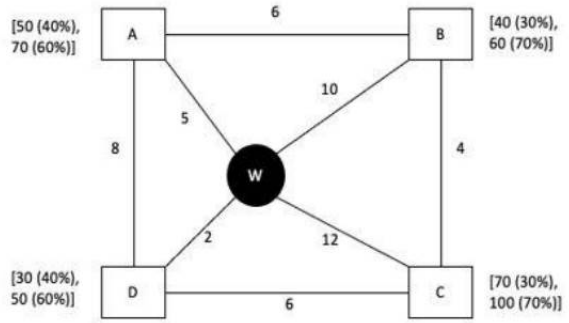
If the total number of widgets delivered in a day is 250 units, then what is the total distance covered in the route (in km)?

37. **Direction:** Based on the given information, solve the questions that follow.

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. The 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 warehouses represent two-way roads connecting those places with the distances (in km) shown beside the line. The distance in both the directions along a road is 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 at the least distance.

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

38. **Direction:** Based on the given information, solve the questions that follow:

A few salesmen are employed to sell a product called TRICCEK to 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 visited 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 performance 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 visited 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 visited that day complained against him.

4. Tohri visited 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.

Which of the following statements is FALSE?

A. Tohri had a higher success rate on the first day as 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.

39. **Direction:** Based on the given information, solve the questions that follow:

A few salesmen are employed to sell a product called TRICCEK to 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 visited 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 performance 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 visited 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 visited that day complained against him.

4. Tohri visited 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.

How many households did Tohri visit on the first day?

A. More than 40 B. 10 or less

C. Between 21 and 40 D. Between 11 and 20

40. **Direction:** Based on the given information, solve the questions that follow:

A few salesmen are employed to sell a product called TRICCEK to 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 visited 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 performance 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 visited 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 visited that day complained against him.

4. Tohri visited 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.

How many households did Lahur visit on the second day?

A. More than 35 B. Between 30 and 35

C. 20 or less D. Between 21 and 29

41. **Direction:** Based on the given information, solve the questions that follow:

A few salesmen are employed to sell a product called TRICCEK to 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 visited 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 performance 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 visited 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 visited that day complained against him.

4. Tohri visited 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.

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

42. **Direction:** Based on the given information, solve the questions that follow:

A few salesmen are employed to sell a product called TRICCEK to 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 visited 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 performance 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 visited 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 visited that day complained against him.

4. Tohri visited 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.

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

43. The four sentences (labelled 1, 2, 3 and 4) below, when properly sequenced, would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

1) From chemical pollutants in the environment to the damming of rivers to invasive species transported through global trade and travel, every environmental issue is different and there is no single tech solution that can solve this crisis.

2) Discourse on the threat of environmental collapse revolves around cutting down emissions, but biodiversity loss and ecosystem collapse are caused by myriad and diverse reasons.

3) This would require legislation that recognises the rights of future generations and other species that allows the judiciary to uphold a much higher standard of environmental protection than currently possible.

4) Clearly, our environmental crisis requires large political solutions, not minor technological ones, so, instead of focusing on infinite growth, we could consider a path of stable-state economies, while preserving markets and healthy competition.

44. The four sentences (labelled 1, 2, 3 and 4) below, when properly sequenced, would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

1) The trajectory of cheerfulness through the self is linked to the history of the word ‘cheer’ which comes from an Old French meaning ‘face’.

2) Translations of the Bible into vernacular languages, expanded the noun ‘cheer’ into the more abstract ‘cheerful-ness’, something that circulates as an emotional and social quality defining the self and a moral community.

3) When you take on a cheerful expression, no matter what the state of your soul, your cheerfulness moves into the self: the interior of the self is changed by the power of cheer.

4) People in the medieval ‘Canterbury Tales’ have a ‘piteous’ or a ‘sober’ cheer; ‘cheer’ is an expression and a body part, lying at the intersection of emotions and physiognomy.

45. The four sentences (labelled 1, 2, 3 and 4) below, when properly sequenced, would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

1) Women may prioritize cooking because they feel they alone are responsible for mediating a toxic and unhealthy food system.

2) Food is commonly framed through the lens of individual choice: you can choose to eat healthily.

3) This is particularly so in a neoliberal context where the state has transferred the responsibility for food onto individual consumers.

4) The individualized framing of choice appeals to a popular desire to experience agency, but draws away from the structural obstacles that stratify individual food choices.

46. There is a sentence that is missing in the paragraph below. Look at the paragraph and decide in which blank (option 1, 2, 3, or 4) the following sentence would best fit.

Sentence: Most were first-time users of a tablet and a digital app.

Paragraph: Aage Badhein’s USP lies in the ethnographic research that constituted the foundation of its development process. Customizations based on learning directly from potential users were critical to making this self-paced app suitable for both a literate and non-literate audience. ___(1)___ The user interface caters to a Hindi-speaking audience who have minimal to no experience with digital services and devices. ___(2)___ The content and functionality of the app are suitable for a wide audience. This includes youth preparing for an independent role in life or a student ready to create a strong foundation of financial management early in her life. ___(3)___ Household members desirous of improving their family’s

financial strength to reach their aspirations can also benefit. We piloted Aage Badhein in early 2021 with over 400 women from rural areas. ___(4)___ The digital solution generated a large amount of interest in the communities.

A. Option 1

B. Option 2

C. Option 3

D. Option 4

47. There is a sentence that is missing in the paragraph below. Look at the paragraph and decide in which blank (option 1, 2, 3, or 4) the following sentence would best fit.

Sentence: This was years in the making but fast-tracked during the pandemic, when "people started being more mindful about their food", he explained.

Paragraph: For millennia, ghee has been a venerated staple of the subcontinental diet, but it fell out of favour a few decades ago when saturated fats were largely considered to be unhealthy. ___(1)___ But more recently, as the thinking around saturated fats is shifting globally, Indians are finding their own way back to this ingredient that is so integral to their cuisine. ___(2)___ For Karmakar, a renewed interest in ghee is emblematic of a return-to-basics movement in India. ___(3)___ This movement is also part of an overall trend towards "slow food". In keeping with the movement's philosophy, ghee can be produced locally (even at home) and has inextricable cultural ties. ___(4)___ At a basic level, ghee is a type of clarified butter believed to have originated in India as a way to preserve butter from going rancid in the hot climate.

A. Option 1

B. Option 2

C. Option 3

D. Option 4

48. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Several of the world’s earliest cities were organised along egalitarian lines. In some regions, urban populations governed themselves for centuries without any indication of the temples and palaces that would later emerge; in others, temples and palaces never emerged at all, and there is simply no evidence of a class of administrators or any other sort of ruling stratum. It would seem that the mere fact of urban life does not, necessarily, imply any particular form of political organization, and never did. Far from resigning us to inequality, the picture that is now emerging of humanity’s past may open our eyes to egalitarian possibilities we otherwise would have never considered.

A. The emergence of a class of administrators and ruling stratum transformed the egalitarian urban life of ancient cities to the hierarchical civic organisations of today.

B. We now have the evidence in support of the existence of an egalitarian urban life in some ancient cities, where political and civic organisation was far less hierarchical.

C. The lack of hierarchical administration in ancient cities can be deduced by the absence of religious and regal structures such as temples and palaces.

D. Contrary to our assumption that urban settlements have always involved hierarchical political and administrative structures, ancient cities were not organised in this way.

49. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

There's a common idea that museum artworks are somehow timeless objects available to admire for generations to come. But many are objects of decay. Even the most venerable Old Master paintings don't escape: pigments discolour, varnishes crack, canvases warp. This challenging fact of art-world life is down to something that sounds more like a thread from a morality tale: inherent vice. Damien Hirst's iconic shark floating in a tank – entitled The Physical Impossibility of Death in the Mind of Someone Living – is a work that puts a spotlight on inherent vice. When he made it in 1991, Hirst got himself in a pickle by not using the right kind of pickle to preserve the giant fish. The result was that the shark began to decompose quite quickly – its preserving liquid clouding, the skin wrinkling, and an unpleasant smell wafting from the tank.

A. Museums have to guard timeless art treasures from intrinsic defects such as the deterioration of paint, polish and canvas.

B. Artworks may not last forever; they may deteriorate with time, and the challenge is to slow down their degeneration.

C. The role of museums has evolved to ensure that the artworks are preserved forever in addition to guarding and displaying them.

D. Museums are left with the moral responsibility of restoring and preserving the artworks since artists cannot preserve their works beyond their life.

50. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Today, many of the debates about behavioural control in the age of big data echo Cold War-era anxieties about brainwashing, insidious manipulation and repression in the ‘technological society’. In his book Psychopolitics, Han warns of the sophisticated use of targeted online content, enabling ‘influence to take place on a pre-reflexive level’. On our current trajectory, “freedom will prove to have been merely an interlude.” The fear is that the digital age has not liberated us but exposed us, by offering up our private lives to machine-learning algorithms that can process masses of personal and behavioural data. In a world of influencers and digital entrepreneurs, it’s not easy to imagine the resurgence of a culture engendered through disconnect and disaffiliation, but concerns over the threat of online targeting, polarisation and big data have inspired recent polemics about the need to rediscover solitude and disconnect.

A. The role of technology in influencing public behaviour is reminiscent of the manner in which behaviour was manipulated during the Cold War.

B. With big data making personal information freely available, the debate on the nature of freedom and the need for privacy has resurfaced.

C. The notion of freedom and privacy is at stake in a world where artificial intelligence is capable of influencing behaviour through data gathered online.

D. Rather than freeing us, digital technology is enslaving us by collecting personal information and influencing our online behaviour.

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

[Octopuses are] misfits in their own extended families . . . They belong to the Mollusca class Cephalopoda. But they don’t look like their cousins at all. Other molluscs include sea snails, sea slugs, bivalves – most are shelled invertebrates with a dorsal foot. Cephalopods are all arms, and can be as tiny as 1 centimetre and as large at 30 feet. Some of them have brains the size of a walnut, which is large for an invertebrate. . . .

It makes sense for these molluscs to have added protection in the form of a higher cognition; they don’t have a shell covering them, and pretty much everything feeds on cephalopods, including humans. But how

did cephalopods manage to secure their own invisibility cloak? Cephalopods fire from multiple cylinders to achieve this in varying degrees from species to species. There are four main catalysts – chromatophores, iridophores, papillae and leucophores. . . .

[Chromatophores] are organs on their bodies that contain pigment sacs, which have red, yellow and brown pigment granules. These sacs have a network of radial muscles, meaning muscles arranged in a circle radiating outwards. These are connected to the brain by a nerve. When the cephalopod wants to change colour, the brain carries an electrical impulse through the nerve to the muscles that expand outwards, pulling open the sacs to display the colours on the skin. Why these three colours? Because these are the colours the light reflects at the depths they live in (the rest is absorbed before it reaches those depths). . . .

Well, what about other colours? Cue the iridophores. Think of a second level of skin that has thin stacks of cells. These can reflect light back at different wavelengths. . . . It's using the same properties that we've seen in hologram stickers, or rainbows on puddles of oil. You move your head and you see a different colour. The sticker isn't doing anything but reflecting light – it's your movement that's changing the appearance of the colour. This property of holograms, oil and other such surfaces is called "iridescence". . . .

Papillae are sections of the skin that can be deformed to make a texture bumpy. Even humans possess them (goosebumps) but cannot use them in the manner that cephalopods can. For instance, the use of these cells is how an octopus can wrap itself over a rock and appear jagged or how a squid or cuttlefish can imitate the look of a coral reef by growing miniature towers on its skin. It actually matches the texture of the substrate it chooses.

Finally, the leucophores: According to a paper, published in Nature, cuttlefish and octopuses possess an additional type of reflector cell called a leucophore. They are cells that scatter full spectrum light so that they appear white in a similar way that a polar bear's fur appears white. Leucophores will also reflect any filtered light shown on them . . . If the water appears blue at a certain depth, the octopuses and cuttlefish can appear blue; if the water appears green, they appear green, and so on and so forth.

Based on the passage, it can be inferred that camouflaging techniques in an octopus are most dissimilar to those in:

A. cuttlefish

B. squids

C. polar bears

D. sea snails

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

[Octopuses are] misfits in their own extended families . . . They belong to the Mollusca class Cephalopoda. But they don't look like their cousins at all. Other molluscs include sea snails, sea slugs, bivalves – most are shelled invertebrates with a dorsal foot. Cephalopods are all arms, and can be as tiny as 1 centimetre and as large at 30 feet. Some of them have brains the size of a walnut, which is large for an invertebrate. . . .

It makes sense for these molluscs to have added protection in the form of a higher cognition; they don't have a shell covering them, and pretty much everything feeds on cephalopods, including humans. But how did cephalopods manage to secure their own invisibility cloak? Cephalopods fire from multiple cylinders

to achieve this in varying degrees from species to species. There are four main catalysts – chromatophores, iridophores, papillae and leucophores. . . .

[Chromatophores] are organs on their bodies that contain pigment sacs, which have red, yellow and brown pigment granules. These sacs have a network of radial muscles, meaning muscles arranged in a circle radiating outwards. These are connected to the brain by a nerve. When the cephalopod wants to change colour, the brain carries an electrical impulse through the nerve to the muscles that expand outwards, pulling open the sacs to display the colours on the skin. Why these three colours? Because these are the colours the light reflects at the depths they live in (the rest is absorbed before it reaches those depths). . . .

Well, what about other colours? Cue the iridophores. Think of a second level of skin that has thin stacks of cells. These can reflect light back at different wavelengths. . . . It's using the same properties that we've seen in hologram stickers, or rainbows on puddles of oil. You move your head and you see a different colour. The sticker isn't doing anything but reflecting light – it's your movement that's changing the appearance of the colour. This property of holograms, oil and other such surfaces is called "iridescence". . . .

Papillae are sections of the skin that can be deformed to make a texture bumpy. Even humans possess them (goosebumps) but cannot use them in the manner that cephalopods can. For instance, the use of these cells is how an octopus can wrap itself over a rock and appear jagged or how a squid or cuttlefish can imitate the look of a coral reef by growing miniature towers on its skin. It actually matches the texture of the substrate it chooses.

Finally, the leucophores: According to a paper, published in Nature, cuttlefish and octopuses possess an additional type of reflector cell called a leucophore. They are cells that scatter full spectrum light so that they appear white in a similar way that a polar bear's fur appears white. Leucophores will also reflect any filtered light shown on them . . . If the water appears blue at a certain depth, the octopuses and cuttlefish can appear blue; if the water appears green, they appear green, and so on and so forth.

Based on the passage, we can infer that all of the following statements, if true, would weaken the camouflaging adeptness of Cephalopods EXCEPT:

A. the number of chromatophores in Cephalopods is half the number of iridophores and leucophores.

B. the temperature of water at the depths at which Cephalopods reside renders the transmission of neural signals difficult.

C. the hydrostatic pressure at the depths at which Cephalopods reside renders radial muscle movements difficult.

D. light reflects the colours red, green, and yellow at the depths at which Cephalopods reside.

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

[Octopuses are] misfits in their own extended families . . . They belong to the Mollusca class Cephalopoda. But they don't look like their cousins at all. Other molluscs include sea snails, sea slugs, bivalves – most are shelled invertebrates with a dorsal foot. Cephalopods are all arms, and can be as tiny as 1 centimetre and as large at 30 feet. Some of them have brains the size of a walnut, which is large for an invertebrate. . . .

It makes sense for these molluscs to have added protection in the form of a higher cognition; they don't have a shell covering them, and pretty much everything feeds on cephalopods, including humans. But how did cephalopods manage to secure their own invisibility cloak? Cephalopods fire from multiple cylinders to achieve this in varying degrees from species to species. There are four main catalysts – chromatophores, iridophores, papillae and leucophores. . . .

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Well, what about other colours? Cue the iridophores. Think of a second level of skin that has thin stacks of cells. These can reflect light back at different wavelengths. . . . It's using the same properties that we've seen in hologram stickers, or rainbows on puddles of oil. You move your head and you see a different colour. The sticker isn't doing anything but reflecting light – it's your movement that's changing the appearance of the colour. This property of holograms, oil and other such surfaces is called "iridescence". . . .

Papillae are sections of the skin that can be deformed to make a texture bumpy. Even humans possess them (goosebumps) but cannot use them in the manner that cephalopods can. For instance, the use of these cells is how an octopus can wrap itself over a rock and appear jagged or how a squid or cuttlefish can imitate the look of a coral reef by growing miniature towers on its skin. It actually matches the texture of the substrate it chooses.

Finally, the leucophores: According to a paper, published in Nature, cuttlefish and octopuses possess an additional type of reflector cell called a leucophore. They are cells that scatter full spectrum light so that they appear white in a similar way that a polar bear's fur appears white. Leucophores will also reflect any filtered light shown on them . . . If the water appears blue at a certain depth, the octopuses and cuttlefish can appear blue; if the water appears green, they appear green, and so on and so forth.

Which one of the following statements is not true about the camouflaging ability of Cephalopods?

A. Cephalopods can change their texture.

B. Cephalopods can change their colour.

C. Cephalopods can take on the colour of their predator.

D. Cephalopods can blend into the colour of their surroundings.

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

[Octopuses are] misfits in their own extended families . . . They belong to the Mollusca class Cephalopoda. But they don't look like their cousins at all. Other molluscs include sea snails, sea slugs, bivalves – most are shelled invertebrates with a dorsal foot. Cephalopods are all arms, and can be as tiny as 1 centimetre and as large at 30 feet. Some of them have brains the size of a walnut, which is large for an invertebrate. . . .

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All of the following are reasons for octopuses being 'misfits' EXCEPT that they:

A. exhibit higher intelligence than other molluscs. B. do not possess an outer protective shell.

C. are consumed by humans and other animals. D. have several arms.

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

When we teach engineering problems now, we ask students to come to a single "best" solution defined by technical ideals like low cost, speed to build, and ability to scale. This way of teaching primes students to believe that their decision-making is purely objective, as it is grounded in math and science. This is known as technical-social dualism, the idea that the technical and social dimensions of engineering problems are readily separable and remain distinct throughout the problem-definition and solution process.

Nontechnical parameters such as access to a technology, cultural relevancy or potential harms are deemed political and invalid in this way of learning. But those technical ideals are at their core social and political choices determined by a dominant culture focused on economic growth for the most privileged segments of society. By choosing to downplay public welfare as a critical parameter for engineering design, we risk

creating a culture of disengagement from societal concerns amongst engineers that is antithetical to the ethical code of engineering.

In my field of medical devices, ignoring social dimensions has real consequences. . . . Most FDA-approved drugs are incorrectly dosed for people assigned female at birth, leading to unexpected adverse reactions. This is because they have been inadequately represented in clinical trials.

Beyond physical failings, subjective beliefs treated as facts by those in decision-making roles can encode social inequities. For example, spirometers, routinely used devices that measure lung capacity, still have correction factors that automatically assume smaller lung capacity in Black and Asian individuals. These racially based adjustments are derived from research done by eugenicists who thought these racial differences were biologically determined and who considered nonwhite people as inferior. These machines ignore the influence of social and environmental factors on lung capacity.

Many technologies for systemically marginalized people have not been built because they were not deemed important such as better early diagnostics and treatment for diseases like endometriosis, a disease that afflicts 10 percent of people with uteruses. And we hardly question whether devices are built sustainably, which has led to a crisis of medical waste and health care accounting for 10 percent of U.S. greenhouse gas emissions.

Social justice must be made core to the way engineers are trained. Some universities are working on this. . . . Engineers taught this way will be prepared to think critically about what problems we choose to solve, how we do so responsibly and how we build teams that challenge our ways of thinking.

Individual engineering professors are also working to embed societal needs in their pedagogy. Darshan Karwat at the University of Arizona developed activist engineering to challenge engineers to acknowledge their full moral and social responsibility through practical self-reflection. Khalid Kadir at the University of California, Berkeley, created the popular course Engineering, Environment, and Society that teaches engineers how to engage in place-based knowledge, an understanding of the people, context and history, to design better technical approaches in collaboration with communities. When we design and build with equity and justice in mind, we craft better solutions that respond to the complexities of entrenched systemic problems.

In this passage, the author is making the claim that:

A. the objective of best solutions in engineering has shifted the focus of pedagogy from humanism and social obligations to technological perfection.

B. technical-social dualism has emerged as a technique for engineering students to incorporate social considerations into their technical problem-solving processes.

C. engineering students today are taught to focus on objective technical outcomes, independent of the social dimensions of their work.

D. engineering students today are trained to be non-subjective in their reasoning as this best enables them to develop much-needed universal solutions.

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

When we teach engineering problems now, we ask students to come to a single “best” solution defined by technical ideals like low cost, speed to build, and ability to scale. This way of teaching primes students to believe that their decision-making is purely objective, as it is grounded in math and science. This is known

as technical-social dualism, the idea that the technical and social dimensions of engineering problems are readily separable and remain distinct throughout the problem-definition and solution process.

Nontechnical parameters such as access to a technology, cultural relevancy or potential harms are deemed political and invalid in this way of learning. But those technical ideals are at their core social and political choices determined by a dominant culture focused on economic growth for the most privileged segments of society. By choosing to downplay public welfare as a critical parameter for engineering design, we risk creating a culture of disengagement from societal concerns amongst engineers that is antithetical to the ethical code of engineering.

In my field of medical devices, ignoring social dimensions has real consequences. . . . Most FDA-approved drugs are incorrectly dosed for people assigned female at birth, leading to unexpected adverse reactions. This is because they have been inadequately represented in clinical trials.

Beyond physical failings, subjective beliefs treated as facts by those in decision-making roles can encode social inequities. For example, spirometers, routinely used devices that measure lung capacity, still have correction factors that automatically assume smaller lung capacity in Black and Asian individuals. These racially based adjustments are derived from research done by eugenicists who thought these racial differences were biologically determined and who considered nonwhite people as inferior. These machines ignore the influence of social and environmental factors on lung capacity.

Many technologies for systemically marginalized people have not been built because they were not deemed important such as better early diagnostics and treatment for diseases like endometriosis, a disease that afflicts 10 percent of people with uteruses. And we hardly question whether devices are built sustainably, which has led to a crisis of medical waste and health care accounting for 10 percent of U.S. greenhouse gas emissions.

Social justice must be made core to the way engineers are trained. Some universities are working on this. . . . Engineers taught this way will be prepared to think critically about what problems we choose to solve, how we do so responsibly and how we build teams that challenge our ways of thinking.

Individual engineering professors are also working to embed societal needs in their pedagogy. Darshan Karwat at the University of Arizona developed activist engineering to challenge engineers to acknowledge their full moral and social responsibility through practical self-reflection. Khalid Kadir at the University of California, Berkeley, created the popular course Engineering, Environment, and Society that teaches engineers how to engage in place-based knowledge, an understanding of the people, context and history, to design better technical approaches in collaboration with communities. When we design and build with equity and justice in mind, we craft better solutions that respond to the complexities of entrenched systemic problems.

The author gives all of the following reasons for why marginalised people are systematically discriminated against in technology-related interventions EXCEPT:

A. “And we hardly question whether devices are built sustainably, which has led to a crisis of medical waste and health care accounting for 10 percent of U.S. greenhouse gas emissions.”

B. “These racially based adjustments are derived from research done by eugenicists who thought these racial differences were biologically determined and who considered nonwhite people as inferior.”

C. “Beyond physical failings, subjective beliefs treated as facts by those in decision-making roles can

D. “But those technical ideals are at their core social and political choices determined by a dominant

encode social inequities.”

culture focused on economic growth for the most privileged segments of society.”

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

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All of the following are examples of the negative outcomes of focusing on technical ideals in the medical sphere EXCEPT the:

A. neglect of research and development of medical technologies for the diagnosis and treatment of diseases that typically afflict marginalised communities.

B. exclusion of non-privileged groups in clinical trials which leads to incorrect drug dosages.

C. incorrect assignment of people as female at birth which has resulted in faulty drug interventions.

D. continuing calibration of medical devices based on past racial biases that have remained unadjusted for changes.

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

When we teach engineering problems now, we ask students to come to a single “best” solution defined by technical ideals like low cost, speed to build, and ability to scale. This way of teaching primes students to believe that their decision-making is purely objective, as it is grounded in math and science. This is known as technical-social dualism, the idea that the technical and social dimensions of engineering problems are readily separable and remain distinct throughout the problem-definition and solution process.

Nontechnical parameters such as access to a technology, cultural relevancy or potential harms are deemed political and invalid in this way of learning. But those technical ideals are at their core social and political choices determined by a dominant culture focused on economic growth for the most privileged segments of society. By choosing to downplay public welfare as a critical parameter for engineering design, we risk creating a culture of disengagement from societal concerns amongst engineers that is antithetical to the ethical code of engineering.

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Social justice must be made core to the way engineers are trained. Some universities are working on this. . . . Engineers taught this way will be prepared to think critically about what problems we choose to solve, how we do so responsibly and how we build teams that challenge our ways of thinking.

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We can infer that the author would approve of a more evolved engineering pedagogy that includes all of the following EXCEPT:

A. making considerations of environmental sustainability intrinsic to the development of technological solutions.

B. moving towards technical-social dualism where social community needs are incorporated in problem-definition and solutions.

C. design that is based on the needs of communities using local knowledge and responding to local priorities.

D. a more responsible approach to technical design and problem-solving than a focus on speed in developing and bringing to scale.

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

We begin with the emergence of the philosophy of the social sciences as an arena of thought and as a set of social institutions. The two characterisations overlap but are not congruent. Academic disciplines are social institutions. . . . My view is that institutions are all those social entities that organise action: they link acting individuals into social structures. There are various kinds of institutions. Hegelians and Marxists emphasise universal institutions such as the family, rituals, governance, economy and the military. These are mostly institutions that just grew. Perhaps in some imaginary beginning of time they spontaneously appeared. In their present incarnations, however, they are very much the product of conscious attempts to mould and plan them. We have family law, established and disestablished churches, constitutions and laws, including those governing the economy and the military. Institutions deriving from statute, like joint-stock companies are formal by contrast with informal ones such as friendships. There are some institutions that come in both informal and formal variants, as well as in mixed ones. Consider the fact that the stock exchange and the black market are both market institutions, one formal one not. Consider further that there are many features of the work of the stock exchange that rely on informal, noncodifiable agreements, not least the language used for communication. To be precise, mixtures are the norm . . . From constitutions at the top to by-laws near the bottom we are always adding to, or tinkering with, earlier institutions, the grown and the designed are intertwined.

It is usual in social thought to treat culture and tradition as different from, although alongside, institutions. The view taken here is different. Culture and tradition are sub-sets of institutions analytically isolated for explanatory or expository purposes. Some social scientists have taken all institutions, even purely local ones, to be entities that satisfy basic human needs – under local conditions . . . Others differed and declared any structure of reciprocal roles and norms an institution. Most of these differences are differences of emphasis rather than disagreements. Let us straddle all these versions and present institutions very generally . . . as structures that serve to coordinate the actions of individuals. . . . Institutions themselves then have no aims or purpose other than those given to them by actors or used by actors to explain them . . .

Language is the formative institution for social life and for science . . . Both formal and informal language is involved, naturally grown or designed. (Language is all of these to varying degrees.) Languages are paradigms of institutions or, from another perspective, nested sets of institutions. Syntax, semantics, lexicon and alphabet/character-set are all institutions within the larger institutional framework of a written language. Natural languages are typical examples of what Ferguson called ‘the result of human action, but not the execution of any human design’[;] reformed natural languages and artificial languages introduce design into their modifications or refinements of natural language. Above all, languages are paradigms of institutional tools that function to coordinate.

Which of the following statements best represents the essence of the passage?

A. The stock exchange and the black market are both market institutions.

B. It is usual in social thought to treat culture and tradition as different from institutions.

C. Language is the fundamental formal institution for social life and for science.

D. Institutions are structures that serve to coordinate the actions of individuals.

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

We begin with the emergence of the philosophy of the social sciences as an arena of thought and as a set of social institutions. The two characterisations overlap but are not congruent. Academic disciplines are social institutions. . . . My view is that institutions are all those social entities that organise action: they link acting individuals into social structures. There are various kinds of institutions. Hegelians and Marxists emphasise universal institutions such as the family, rituals, governance, economy and the military. These are mostly institutions that just grew. Perhaps in some imaginary beginning of time they spontaneously appeared. In their present incarnations, however, they are very much the product of conscious attempts to mould and plan them. We have family law, established and disestablished churches, constitutions and laws, including those governing the economy and the military. Institutions deriving from statute, like joint-stock companies are formal by contrast with informal ones such as friendships. There are some institutions that come in both informal and formal variants, as well as in mixed ones. Consider the fact that the stock exchange and the black market are both market institutions, one formal one not. Consider further that there are many features of the work of the stock exchange that rely on informal, noncodifiable agreements, not least the language used for communication. To be precise, mixtures are the norm . . . From constitutions at the top to by-laws near the bottom we are always adding to, or tinkering with, earlier institutions, the grown and the designed are intertwined.

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“Consider the fact that the stock exchange and the black market are both market institutions, one formal one not.” Which one of the following statements best explains this quote, in the context of the passage?

A. Market instruments can be formally traded in the stock exchange and informally traded in the black market.

B. The stock exchange and the black market are both organised to function by rules.

C. The stock exchange and the black market are examples of how, even within the same domain, different kinds of institutions can co-exist.

D. The stock exchange and the black market are both dependent on the market to survive.

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

We begin with the emergence of the philosophy of the social sciences as an arena of thought and as a set of social institutions. The two characterisations overlap but are not congruent. Academic disciplines are social institutions. . . . My view is that institutions are all those social entities that organise action: they link acting individuals into social structures. There are various kinds of institutions. Hegelians and Marxists emphasise universal institutions such as the family, rituals, governance, economy and the military. These are mostly institutions that just grew. Perhaps in some imaginary beginning of time they spontaneously appeared. In their present incarnations, however, they are very much the product of conscious attempts to mould and plan them. We have family law, established and disestablished churches, constitutions and laws, including those governing the economy and the military. Institutions deriving from statute, like joint-stock companies are formal by contrast with informal ones such as friendships. There are some institutions that come in both informal and formal variants, as well as in mixed ones. Consider the fact that the stock exchange and the black market are both market institutions, one formal one not. Consider further that there are many features of the work of the stock exchange that rely on informal, noncodifiable agreements, not least the language used for communication. To be precise, mixtures are the norm . . . From constitutions at the top to by-laws near the bottom we are always adding to, or tinkering with, earlier institutions, the grown and the designed are intertwined.

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In the first paragraph of the passage, what are the two “characterisations” that are seen as overlapping but not congruent?

A. “the philosophy of the social sciences” and “a set of social institutions”.

B. “an arena of thought” and “academic disciplines".

C. “academic disciplines” and “institutions”.

D. “individuals” and “social structures”.

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

We begin with the emergence of the philosophy of the social sciences as an arena of thought and as a set of social institutions. The two characterisations overlap but are not congruent. Academic disciplines are social institutions. . . . My view is that institutions are all those social entities that organise action: they link acting individuals into social structures. There are various kinds of institutions. Hegelians and Marxists emphasise universal institutions such as the family, rituals, governance, economy and the military. These are mostly institutions that just grew. Perhaps in some imaginary beginning of time they spontaneously appeared. In their present incarnations, however, they are very much the product of conscious attempts to mould and plan them. We have family law, established and disestablished churches, constitutions and laws, including those governing the economy and the military. Institutions deriving from statute, like joint-stock companies are formal by contrast with informal ones such as friendships. There are some institutions that come in both informal and formal variants, as well as in mixed ones. Consider the fact that the stock exchange and the black market are both market institutions, one formal one not. Consider further that there are many features of the work of the stock exchange that rely on informal, noncodifiable agreements, not least the language used for communication. To be precise, mixtures are the norm . . . From constitutions at the top to by-laws near the bottom we are always adding to, or tinkering with, earlier institutions, the grown and the designed are intertwined.

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design into their modifications or refinements of natural language. Above all, languages are paradigms of institutional tools that function to coordinate.

All of the following inferences from the passage are false, EXCEPT:

A. as concepts, “culture” and “tradition” have no analytical, explanatory or expository power, especially when they are treated in isolation.

B. “natural language” refers to that stage of language development where no conscious human intent is evident in the formation of language.

C. institutions like the family, rituals, governance, economy, and the military are natural and cannot be consciously modified.

D. the institution of friendship cannot be found in the institution of joint-stock companies because the first is an informal institution, while the second is a formal one.

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

Humans today make music. Think beyond all the qualifications that might trail after this bald statement: that only certain humans make music, that extensive training is involved, that many societies distinguish musical specialists from nonmusicians, that in today’s societies most people listen to music rather than making it, and so forth. These qualifications, whatever their local merit, are moot in the face of the overarching truth that making music, considered from a cognitive and psychological vantage, is the province of all those who perceive and experience what is made. We are, almost all of us, musicians — everyone who can entrain (not necessarily dance) to a beat, who can recognize a repeated tune (not necessarily sing it), who can distinguish one instrument or one singing voice from another. I will often use an antique word, recently revived, to name this broader musical experience. Humans are musicking creatures. . . .

The set of capacities that enables musicking is a principal marker of modern humanity. There is nothing polemical in this assertion except a certain insistence, which will figure often in what follows, that musicking be included in our thinking about fundamental human commonalities. Capacities involved in musicking are many and take shape in complicated ways, arising from innate dispositions . . . Most of these capacities overlap with nonmusical ones, though a few may be distinct and dedicated to musical perception and production. In the area of overlap, linguistic capacities seem to be particularly important, and humans are (in principle) language-makers in addition to music-makers — speaking creatures as well as musicking ones.

Humans are symbol-makers too, a feature tightly bound up with language, not so tightly with music. The species Cassirer dubbed Homo symbolicus cannot help but tangle musicking in webs of symbolic thought and expression, habitually making it a component of behavioral complexes that form such expression. But in fundamental features musicking is neither language-like nor symbol-like, and from these differences come many clues to its ancient emergence.

If musicking is a primary, shared trait of modern humans, then to describe its emergence must be to detail the coalescing of that modernity. This took place, archaeologists are clear, over a very long durée: at least 50,000 years or so, more likely something closer to 200,000, depending in part on what that coalescence is taken to comprise. If we look back 20,000 years, a small portion of this long period, we reach the lives of humans whose musical capacities were probably little different from our own. As we look farther back we reach horizons where this similarity can no longer hold — perhaps 40,000 years ago, perhaps 70,000, perhaps 100,000. But we never cross a line before which all the cognitive capacities recruited in modern

musicking abruptly disappear. Unless we embrace the incredible notion that music sprang forth in full-blown glory, its emergence will have to be tracked in gradualist terms across a long period.

This is one general feature of a history of music's emergence . . . The history was at once sociocultural and biological . . . The capacities recruited in musicking are many, so describing its emergence involves following several or many separate strands.

Which one of the following statements, if true, would weaken the author's claim that humans are musicking creatures?

A. Musical capacities are primarily socio-cultural, which explains the wide diversity of musical forms.

B. Nonmusical capacities are of far greater consequence to human survival than the capacity for music.

C. From a cognitive and psychological vantage, musicking arises from unconscious dispositions, not conscious ones.

D. As musicking is neither language-like nor symbol-like, it is a much older form of expression.

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

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"Think beyond all the qualifications that might trail after this bald statement . . ." In the context of the passage, what is the author trying to communicate in this quoted extract?

A. A bald statement is one that requires no qualifications to infer its meaning.

B. Thinking beyond qualifications allows us to give free reign to musical expressions.

C. Although there may be many caveats and other considerations, the statement is essentially true.

D. A bald statement is one that is trailed by a series of qualifying clarifications and caveats.

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

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This is one general feature of a history of music's emergence . . . The history was at once sociocultural and biological . . . The capacities recruited in musicking are many, so describing its emergence involves following several or many separate strands.

Based on the passage, which one of the following statements is a valid argument about the emergence of music/musicking?

A. 20,000 years ago, human musical capacities were not very different from what they are today.

B. Although musicking is not language-like, it shares the quality of being a form of expression.

C. All musical work is located in the overlap between linguistic capacity and music production.

D. Anyone who can perceive and experience music must be considered capable of musicking.

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

Humans today make music. Think beyond all the qualifications that might trail after this bald statement: that only certain humans make music, that extensive training is involved, that many societies distinguish musical specialists from nonmusicians, that in today's societies most people listen to music rather than making it, and so forth. These qualifications, whatever their local merit, are moot in the face of the overarching truth that making music, considered from a cognitive and psychological vantage, is the province of all those who perceive and experience what is made. We are, almost all of us, musicians — everyone who can entrain (not necessarily dance) to a beat, who can recognize a repeated tune (not necessarily sing it), who can distinguish one instrument or one singing voice from another. I will often use an antique word, recently revived, to name this broader musical experience. Humans are musicking creatures. . . .

The set of capacities that enables musicking is a principal marker of modern humanity. There is nothing polemical in this assertion except a certain insistence, which will figure often in what follows, that musicking be included in our thinking about fundamental human commonalities. Capacities involved in musicking are many and take shape in complicated ways, arising from innate dispositions . . . Most of these capacities overlap with nonmusical ones, though a few may be distinct and dedicated to musical perception and production. In the area of overlap, linguistic capacities seem to be particularly important, and humans are (in principle) language-makers in addition to music-makers — speaking creatures as well as musicking ones.

Humans are symbol-makers too, a feature tightly bound up with language, not so tightly with music. The species Cassirer dubbed Homo symbolicus cannot help but tangle musicking in webs of symbolic thought and expression, habitually making it a component of behavioral complexes that form such expression. But

in fundamental features musicking is neither language-like nor symbol-like, and from these differences come many clues to its ancient emergence.

If musicking is a primary, shared trait of modern humans, then to describe its emergence must be to detail the coalescing of that modernity. This took place, archaeologists are clear, over a very long durée: at least 50,000 years or so, more likely something closer to 200,000, depending in part on what that coalescence is taken to comprise. If we look back 20,000 years, a small portion of this long period, we reach the lives of humans whose musical capacities were probably little different from our own. As we look farther back we reach horizons where this similarity can no longer hold — perhaps 40,000 years ago, perhaps 70,000, perhaps 100,000. But we never cross a line before which all the cognitive capacities recruited in modern musicking abruptly disappear. Unless we embrace the incredible notion that music sprang forth in full-blown glory, its emergence will have to be tracked in gradualist terms across a long period.

This is one general feature of a history of music's emergence . . . The history was at once sociocultural and biological . . . The capacities recruited in musicking are many, so describing its emergence involves following several or many separate strands.

Which one of the following sets of terms best serves as keywords to the passage?

A. Humans; Musicking; Linguistic capacities; Symbol-making; Modern humanity.

B. Humans; Psychological vantage; Musicking; Cassirer; Emergence of music.

C. Musicking; Cognitive psychology; Antique; Symbol-makers; Modernity.

D. Humans; Capacities; Language; Symbols; Modernity.

Solutions

1. Correct Answer : 24

Sol 1.

Let C, W, and U be the number of correct, incorrect, and unattempted questions.
Given that, $C + W + U = 75$ …(1)

$3C - W + U = 97$ ….(2)

$U > C + W$

Thus, the minimum value of $U = 38$
$4C + 2U = 172$ or $2C + U = 86$ or $C = \frac{86 - U}{2}$

Thus, the maximum value of $C = \frac{86 - 38}{2} = \frac{48}{2} = 24$
Hence, 24 is the correct answer.

2. Correct Answer : C

Sol 2.

The given series is an AP with $a = 3$ *and* $d = 4$.

$$A_n = \frac{n}{2}(2a + n - 1)d = \frac{n}{2}(6 + 4n - 4) = n(1 + 2n) = 2n^2 + n$$

Thus,

$$\frac{1}{25}\sum_{n=1}^{25} A_n = \frac{1}{25}\sum_{n=1}^{25} 2n^2 + n = \frac{1}{25}(2\sum_{n=1}^{25} n^2 + \sum_{n=1}^{25} n)$$

$$\frac{1}{25}\sum_{n=1}^{25} A_n = \frac{1}{25}(2 \times \frac{25 \times 26 \times 51}{6} + \frac{25 \times 26}{2}) = 442 + 13 = 455$$

Hence, option C is the correct answer.

3. Correct Answer : C

Sol 3.

As r and –r are roots,
$5r^3 + cr^2 - 10r + 9 = 0$ and $-5r^3 + cr^2 + 10r + 9 = 0$
On adding both the equations, we get $2cr^2 + 18 = 0$,

$cr^2 = -9$ or $c = \frac{-9}{r^2}$
On subtracting both the equations, we get $10r^3 - 20r = 0$,
$r^3 = 2r$, then $r = 0$ or $r^2 = 2$

Thus, $c = 0, \frac{-9}{2}$

Hence, option C is the correct answer.

4. Correct Answer : 4

Sol 4. Given that, $(x^2 - 10)^{(x^2 - 3x - 10)} = 1$

This is possible in the following three cases:

Case I:

$x^2 - 3x - 10 = 0$

$(x - 5)(x + 2) = 0$

Or $x = 5, -2$

Case II:

$x^2 - 10 = 1$

$x^2 = 1 + 10 = 11$

x is not an integer.

Case III :

$x^2 - 10 = -1$ and $x^2 - 3x - 10$ are even.

$x^2 = -1 + 10 = 9$ or $x = 3$ or $x = -3$

When x = 3, $x^2 - 3x - 10 = 9 - 9 - 10 = -10$ (even)

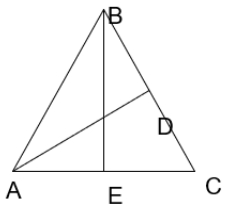
When x = –3, $x^2 - 3x - 10 = 9 + 9 - 10 = 8$ (even)

Thus, the values of x which satisfy the condition are 5, –2, 3, and –4.

Hence, 4 is the correct answer.

5. Correct Answer : A

Sol 5.



Using the formula for the area of a triangle,

$\frac{1}{2} \times AC \times AB \times Sin\ 45^o = \frac{1}{2} \times AB \times BC \times Sin\theta$

$AC \times \frac{1}{\sqrt{2}} = BC \times Sin\theta$ or $\frac{AC}{BC} = \sqrt{2}\ Sin\theta$

Also, $\frac{1}{2} \times AC \times BE = \frac{1}{2} \times AD \times BC$

$\frac{AC}{BC} = \frac{AD}{BE} = \sqrt{2}\, Sin\theta$

Hence, option A is the correct answer.

6. Correct Answer : 12

Sol 6.

Given that,

f(x) + f(x – 1) – 1 = 0
Or f(x) = 1 – f(x – 1) …(1)
f(x(x – 1)) = 5
f(2) = f (2(2 – 1)) = 5

From (1),

f(3) = 1 – f(2) = 1 – 5 = –4

f(4) = 1 – f(3) = 1 – (-4) = 1 + 4 = 5
f(5) = 1 – f(4) = 1 – 5 = –4
Which means, f(odd number) = –4 and f(even number) = 5

f(g(5)) + g(f(5))

= $f(5^2)$ + g(–4)

= f(25) + g(–4)

= –4 + 16

= 12
Hence, 12 is the correct answer.

7. Correct Answer : D

Sol 7.

For (15,000)! to be divisible by (n!)!,
$n! < 15000$

Going by the options,

$7! = 5040$ is less than 15000.
Hence, option D is the correct answer.

8. Correct Answer : B

Sol 8.

Let the speed of the slower ship be ‘x’ km per hour.

Then, the speed of the other ship will be ‘x + 6’ km per hour.
The two ships move perpendicularly, forming a right angled triangle with the length of hypotenuse equal to 60 km. The length of the perpendiculars after 2 hours will be 2x km and (2x + 12) km.
Thus, $60 = \sqrt{(2x)^2 + (2x + 12)^2}$

$3600 = 4x^2 + 4x^2 + 48x + 144$

$x^2 + 6x - 430$

$(x + 24)(x - 18) = 0$

As speed cannot be negative, $x = 18$ km/h
Hence, option B is the correct answer.

9. Correct Answer : B

Sol 9.

To get the minimum marks Amit scored, let’s assume the other people scored as high as possible.
That is, $A + 32 + 48 + 49 + 50 = 5 \times 38 = 190$ then $A = 11$
As only 3 people received more than 32 and Amit scored the least, the highest possible marks of Amit $= 31$ and the next person gets 32. Thus, the remaining 127 is distributed among the remaining 3 people.
Difference $= 31 - 11 = 20$
Hence, option B is the correct answer.

10. Correct Answer : B

Sol 10. Let A and B be the first and second containers, respectively, and the volume of each container be 200 litres.

	A (sugar syrup, milk)	B (sugar syrup, milk)
Initially	100, 0	0, 100
After the 1st transfer	(100 – 50 = 50, 0)	(0 + 50 = 50, 100)
After the 2nd transfer	(50 + 25 = 75; 0 + 50 = 50)	(50 – 25 = 25; 100 – 50 = 50)
After the 3rd transfer	(75 – 37.5 = 37.5; 50 – 25 = 25)	(25 + 37.5 = 62.5; 50 + 25 = 75)

Thus, the required ratio = 62.5 : 75 = 5 : 6
Hence, option B is the correct answer.

11. Correct Answer : A

Sol 11.

According to the question,

Number of particles on n^{th} day = Number of particles on $(n-1)^{th}$ day + $\frac{1}{n}$ of the number of particles on $(n-1)^{th}$ day

When n = 2, number of particles in the laboratory $= 100 + \frac{1}{2} \times 100 = 150$

Similarly,

When n = 3, number of particles in the laboratory $= 150 + \frac{1}{3} \times 150 = 200$

When n = 4, number of particles in the laboratory $= 150 + \frac{1}{4} \times 200 = 250$

That is, an increase of 50 particles a day.

Thus, on the m^{th} day, $1000 = 100 + (m-1)50$

$18 = (m-1)$ or $m = 19$

Hence, option A is the correct answer.

12. Correct Answer : A

Sol 12.

Let the number of voters be 300X.

Then, votes casted = $240X$

Number of votes received by the person who received 30% of the casted votes $= \frac{30}{100} \times 240X = 72X$

Remaining votes $(240X - 72X) = 168X$ will be distributed as $28X, 56X$, and $84X$.

Given that, $84X - 72X = 2512$

$$X = \frac{628}{3}$$

Thus, $300X = 300 \times \frac{628}{3} = 62800$

Hence, option A is the correct answer.

13. Correct Answer : B

Sol 13.

The amount that was suppose to save $= 550 \times 12 = ₹6600$

The amount saved till 9th month $= (4000 - 3500) \times 9 = ₹4500$

Remaining amount $= 6600 - 4500 = ₹2100$

The money must be save per month from the 10^{th} month $= \frac{2100}{3} = ₹700$

Thus, to meet the savings target, the monthly salary from the 10^{th} month must be $= 3700 + 700 = ₹4400$

Hence, option B is the correct answer.

14. Correct Answer : C

Sol 14.

As $f(x) \geq 0$ and 2 is one of the roots,
The function will be of the form, $f(x) = k(x-2)^2$ and $k > 0$,

where 'k' is a constant.
Given that, $f(4) = 6 = k(4-2)^2$ or $k = \frac{3}{2}$

Thus, $f(-2) = \frac{3}{2}(-2-2)^2 = \frac{3}{2} \times 16 = 24$
Hence, option C is the correct answer.

15. Correct Answer : B

Sol 15.

As the number is greater than 2000, the number can be formed with four digits, five digits, or six digits.
Number of four-digit numbers that can be formed $= 4 \times 5 \times 4 \times 3 = 240$

Number of five-digit numbers that can be formed $= 5 \times 5 \times 4 \times 3 \times 2 = 600$

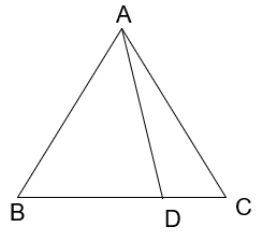
Number of six-digit numbers that can be formed $= 5 \times 5 \times 4 \times 3 \times 2 \times 1 = 600$

Total $= 600 + 600 + 240 = 1440$

Hence, option B is the correct answer.

16. Correct Answer : A

Sol 16.



Let AE be perpendicular to BC.
Given that, $\frac{1}{2} \times AE \times DC = \frac{1}{2}(\frac{1}{2} \times AE \times BD)$

$BD = 2DC$, then $BD = 2$ cm and $DC = 1$ cm
For any equilateral triangle,

Altitude = Median
Thus, EC = 1.5 cm, ED = $\frac{1}{2}$ cm, and AE = $\frac{\sqrt{3}}{2} \times 3 = \frac{3\sqrt{3}}{2}$ cm
Using Pythagoras theorem, $AD = \sqrt{(\frac{1}{2})^2 + (\frac{3\sqrt{3}}{2})^2} = \sqrt{7}$ cm
Hence, option A is the correct answer.

17. Correct Answer : B

Sol 17.

Given that, $a + 2b = 6$

$a + b = 6 - b$

So, the maximum value of a + b when b = 0 will be 6.

And the minimum value of a + b, when a = 0 and b = 3, will be 0 + 3 = 3.

Thus, the average $= \frac{6+3}{2} = 4.5$

Hence, option B is the correct answer.

18. Correct Answer : 14

Sol 18.

Given that, $\frac{a_1 + a_2 + \ldots\ldots\ldots + a_N}{N} = 300$ …(1)

Also, $\frac{6a_1 + a_2 + \ldots\ldots\ldots + a_N}{N} = 400$ …(2)

Thus (2) – (1) gives,

$5a_1 = 100N$

$a_1 = 20N$

As all the terms are non-decreasing, all the terms can either be equal or greater than a_1.

When the terms are equal,

$a_1 = 300 = 20N$ or $N = 15$ (maximum value)

All the values of N till 15, except N = 1, satisfies the given conditions.

Thus, 14 is the correct answer.

19. Correct Answer : 47

Sol 19. $\frac{4 - log_2\ n}{3 - log_4\ n} < 0$

As the fraction is less than zero, either the numerator is negative or the denominator is negative. Thus,

$4 - log_2 n < 0$ or $3 - log_4 n < 0$

$4 < log_2 n$ or $3 < log_4 n$

$2^4 < n$ or $4^3 < n$

$16 < n$ or $64 < n$

So, n should be between 16 and 64.

Number of values that n can have = 63 – 16 = 47

Hence, 47 is the correct answer.

20. Correct Answer : 10

Sol 20.

Let the number of sides be n and 2n for the regular polygons A and B, respectively.

The measure of interior angle of a regular polygon with 'n' sides = $(180^0 - \frac{360^0}{n})$

Given that, $\frac{(180^0 - \frac{360^0}{n})}{(180^0 - \frac{360^0}{2n})} = \frac{3}{4}$

$4(n-2) = \frac{3}{2}(2n-2)$

$2n = 10$ or n = 5
Number of sides in polygon B $= 2 \times 5 = 10$
Hence, 10 is the correct answer.

21. Correct Answer : 20

Sol 21.

Let 'X' be the amount invested, and 'N' be the number of years it is invested such that the cumulative interest income from these investments equals or exceeds his initial capital.
$(\frac{X}{5} \times \frac{6}{100} + \frac{X}{3} \times \frac{10}{100} + (X - \frac{X}{5} - \frac{X}{3}) \times \frac{1}{100}) \times N \geq X$

$(\frac{6}{5} + \frac{10}{3} + \frac{7}{15}) \times N \geq 100$
$N \geq \frac{100}{5} = 20$
Hence, 20 is the correct answer.

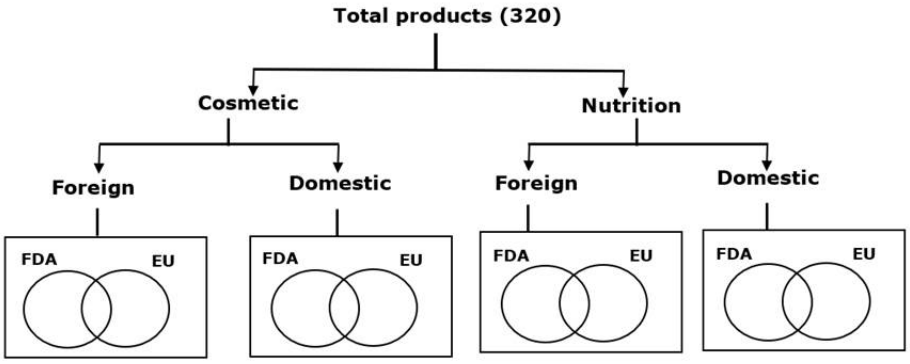
22. Correct Answer : 6

Sol 22. As the time taken is in the ratio of 5 : 8 : 10,
The ratio of their efficiencies will be $\frac{1}{5} : \frac{1}{8} : \frac{1}{10}$ or $8 : 5 : 4$.
Total work $= 17x \times 4 \times 8 = 544x$
Anu and Tanu worked for 6 hours 40 minutes per day for the first 6 days
$= 13x \times 6 \times 6\frac{2}{3} = 13x \times 6 \times \frac{20}{3} = 520x$

The remaining work $= 544x - 520x = 24x$ will be done by Manu in $\frac{24x}{4x} = 6$ hours.
Hence, 6 is the correct answer.

23. Correct Answer : 50

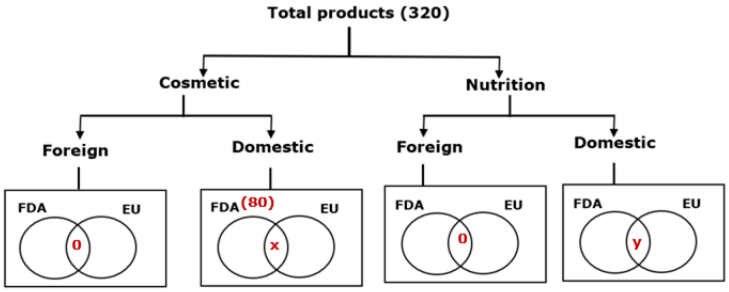
Sol 23. From the question stem, we can draw a tree as sunder:



Using statements 1,2, and 3

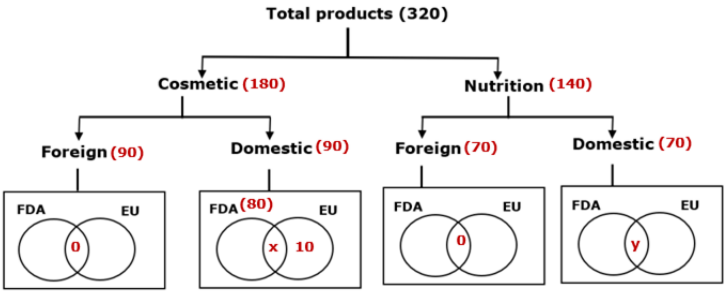
Each of domestic and foreign products = 160

Thus, domestic FDA-approved cosmetic products = 80



Here, x + y = 60

Using statement 4



Here, x + y = 60

Using statement 5

Out of 200 FDA-approved products, 70 were foreign products. Thus, 130 will be domestic. Now, there are 50 cosmetics that are domestic products. Thus, the remaining 50 will be FDA-approved domestic nutrition products.

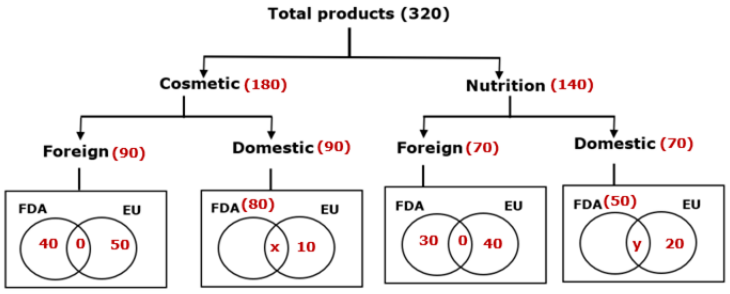
Hence, EU-approved domestic nutrition products will only be 70 - 50 = 20

Also, out of 200 FDA-approved products, 120 of them were cosmetic products.

Since there are 80 FDA-approved domestic cosmetic products, the FDA-approved foreign cosmetic products will only be 120 - 80 = 40. Hence, EU-approved foreign cosmetic products will only be 90 – 40 = 50.

Now, of the 70 FDA-approved foreign products, 40 are FDA-approved foreign cosmetic products only. Thus, the remaining 30 will be FDA-approved foreign nutrition products only.

Hence, EU-approved foreign nutrition products will only be 70 – 30 = 40.



Here, x + y = 60

Now, all the variables in the above diagram must be greater than or equal to 0.

Thus, y ≥ 0 or 60 – x ≥ 0 or x ≤ 60.

Moreover, FDA-approved domestic nutrition products will only be:

50 – y or 50 – (60 – x) or x - 10 ≥ 0 or x ≥ 10

Hence, 10 ≤ x ≤ 60.

If 50 nutrition products did not have EU approval, i.e., 50 - y + 30 = 50 or y = 30

Hence, x = 30.

Thus, the number of domestic cosmetic products that did not have EU approval:

= 80 – x

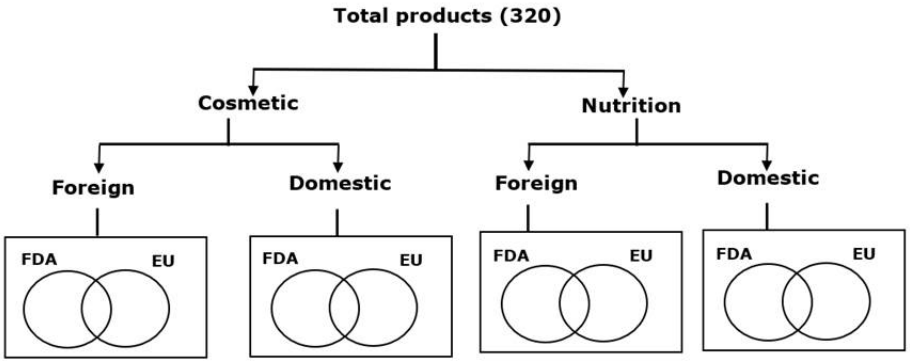
= 80 – 30

= 50

Hence, 50 is the correct answer.

24. Correct Answer : B

Sol 24. From the question stem, we can draw a tree as sunder:



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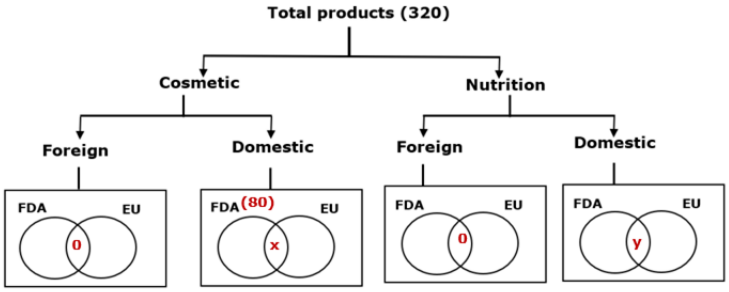

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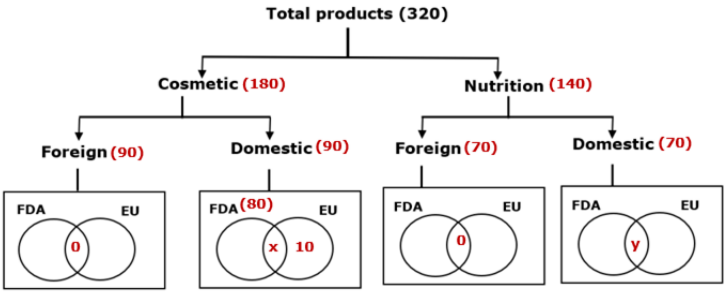

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Using statement 5

Out of 200 FDA-approved products, 70 were foreign products. Thus, 130 will be domestic. Now, there are 50 cosmetics that are domestic products. Thus, the remaining 50 will be FDA-approved domestic nutrition products.

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Also, out of 200 FDA-approved products, 120 of them were cosmetic products.

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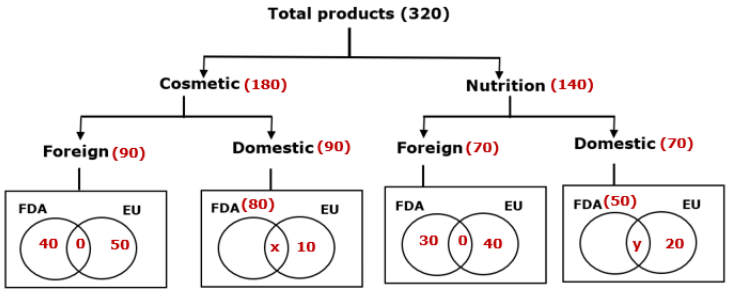
Now, of the 70 FDA-approved foreign products, 40 are FDA-approved foreign cosmetic products only. Thus, the remaining 30 will be FDA-approved foreign nutrition products only.

Hence, EU-approved foreign nutrition products will only be 70 – 30 = 40.



Here, x + y = 60

Now, all the variables in the above diagram must be greater than or equal to 0.

Thus, y ≥ 0 or 60 – x ≥ 0 or x ≤ 60.

Moreover, FDA-approved domestic nutrition products will only be:

50 – y or 50 – (60 – x) or x - 10 ≥ 0 or x ≥ 10

Hence, 10 ≤ x ≤ 60.

70 cosmetic products did not have EU approval, of which 40 are cosmetic domestics with only FDA approval. Thus, the remaining 30 will be FDA-approved foreign cosmetics only.

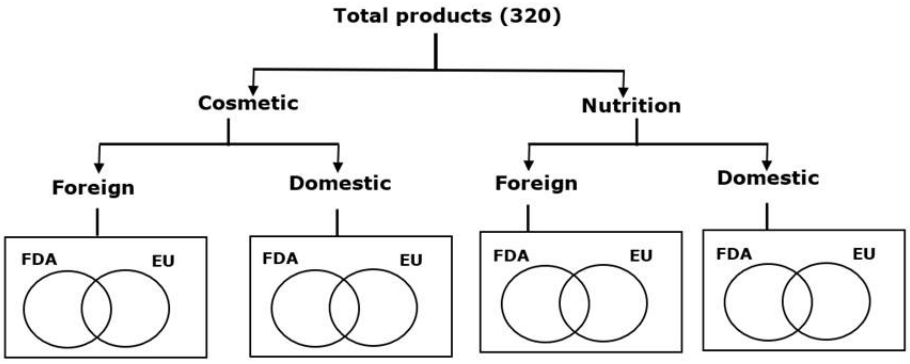
So, 80 - 30 = 50(x) are those cosmetic products that have both FDA and EU approval.

Hence, y = 60 – 50 = 10 are those nutrition products that have both FDA and EU approval.

Hence, option B is the correct answer.

25. Correct Answer : B

Sol 25. From the question stem, we can draw a tree as sunder:



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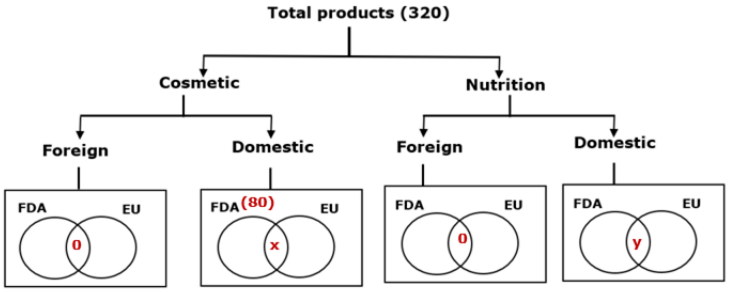

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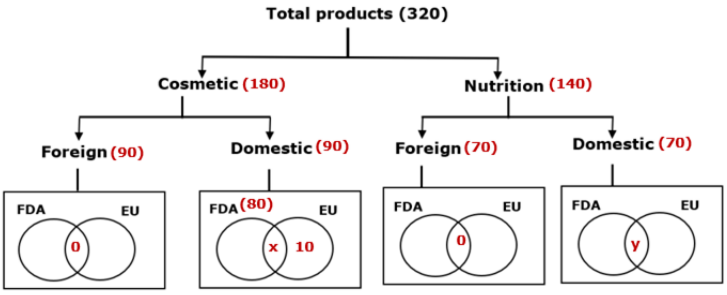

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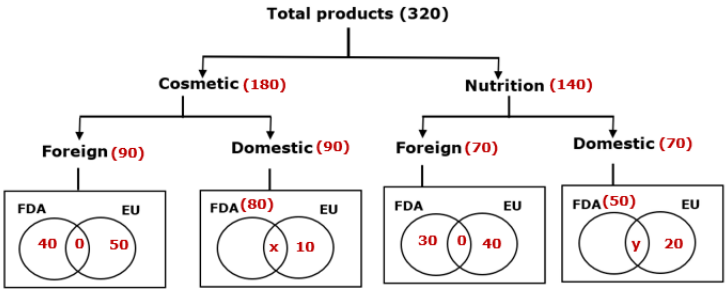


Here, x + y = 60

Now, all the variables in the above diagram must be greater than or equal to 0.

Thus, y ≥ 0 or 60 – x ≥ 0 or x ≤ 60.

Moreover, FDA-approved domestic nutrition products will only be:

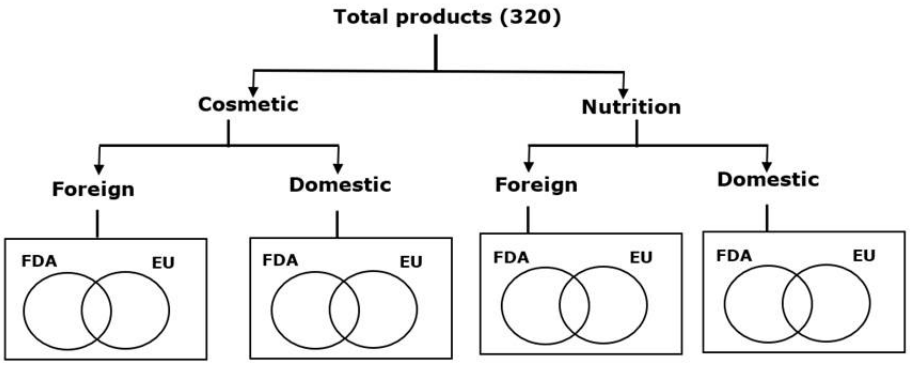
50 – y or 50 – (60 – x) or x - 10 ≥ 0 or x ≥ 10

Hence, 10 ≤ x ≤ 60.

From the final table, we can say that option B is the correct answer.

26. Correct Answer : C

Sol 26. From the question stem, we can draw a tree as sunder:



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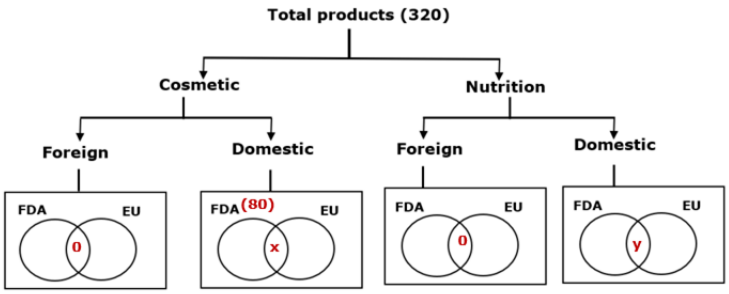
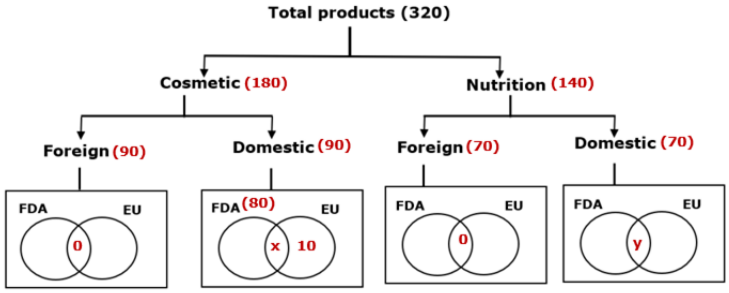


Here, x + y = 60

Using statement 4



Here, x + y = 60

Using statement 5

Out of 200 FDA-approved products, 70 were foreign products. Thus, 130 will be domestic. Now, there are 50 cosmetics that are domestic products. Thus, the remaining 50 will be FDA-approved domestic nutrition products.

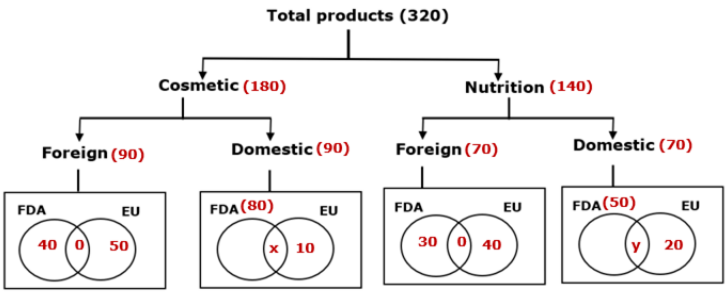
Hence, EU-approved domestic nutrition products will only be 70 - 50 = 20

Also, out of 200 FDA-approved products, 120 of them were cosmetic products.

Since there are 80 FDA-approved domestic cosmetic products, the FDA-approved foreign cosmetic products will only be 120 - 80 = 40. Hence, EU-approved foreign cosmetic products will only be 90 – 40 = 50.

Now, of the 70 FDA-approved foreign products, 40 are FDA-approved foreign cosmetic products only. Thus, the remaining 30 will be FDA-approved foreign nutrition products only.

Hence, EU-approved foreign nutrition products will only be 70 – 30 = 40.



Here, x + y = 60

Now, all the variables in the above diagram must be greater than or equal to 0.

Thus, $y \geq 0$ or $60 - x \geq 0$ or $x \leq 60$.

Moreover, FDA-approved domestic nutrition products will only be:

$50 - y$ or $50 - (60 - x)$ or $x - 10 \geq 0$ or $x \geq 10$

Hence, $10 \leq x \leq 60$.

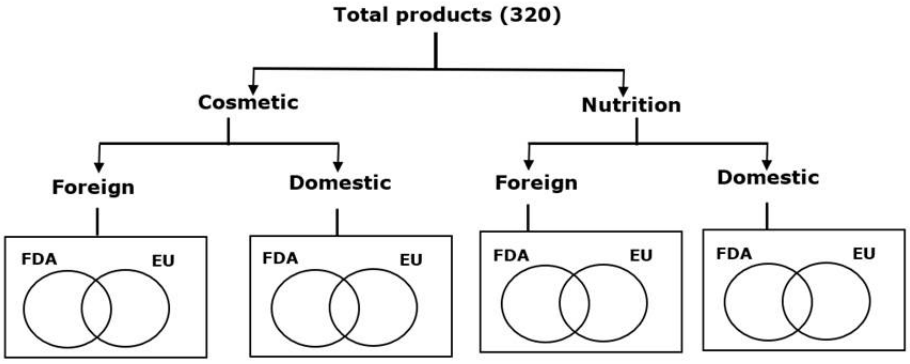
Number of cosmetic products that have FDA approval = 40 + 80 = 120

Thus, the number of cosmetic products that did not have FDA approval is 180 – 120 = 60.

Hence, 60 is the correct answer.

27. Correct Answer : 40

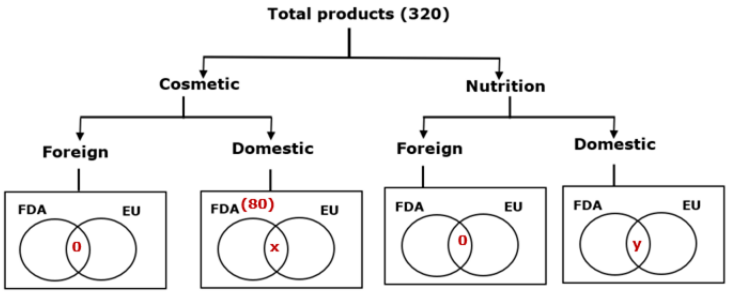
Sol 27. From the question stem, we can draw a tree as sunder:



Using statements 1,2, and 3

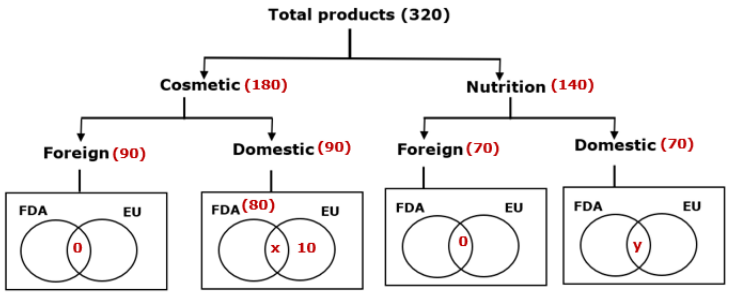
Each of domestic and foreign products = 160

Thus, domestic FDA-approved cosmetic products = 80



Here, x + y = 60

Using statement 4



Here, x + y = 60

Using statement 5

Out of 200 FDA-approved products, 70 were foreign products. Thus, 130 will be domestic. Now, there are 50 cosmetics that are domestic products. Thus, the remaining 50 will be FDA-approved domestic nutrition products.

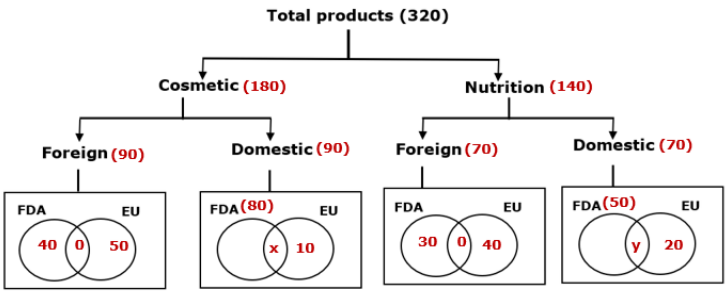
Hence, EU-approved domestic nutrition products will only be 70 - 50 = 20

Also, out of 200 FDA-approved products, 120 of them were cosmetic products.

Since there are 80 FDA-approved domestic cosmetic products, the FDA-approved foreign cosmetic products will only be 120 - 80 = 40. Hence, EU-approved foreign cosmetic products will only be 90 – 40 = 50.

Now, of the 70 FDA-approved foreign products, 40 are FDA-approved foreign cosmetic products only. Thus, the remaining 30 will be FDA-approved foreign nutrition products only.

Hence, EU-approved foreign nutrition products will only be 70 – 30 = 40.



Here, x + y = 60

Now, all the variables in the above diagram must be greater than or equal to 0.

Thus, $y \geq 0$ or $60 - x \geq 0$ or $x \leq 60$.

Moreover, FDA-approved domestic nutrition products will only be:

$50 - y$ or $50 - (60 - x)$ or $x - 10 \geq 0$ or $x \geq 10$

Hence, $10 \leq x \leq 60$.

From the final diagram, the number of foreign products that were FDA-approved cosmetic products is 40 + 0 = 40.

Hence, 40 is the correct answer.

28. Correct Answer : A

Sol 28. From the two given graphs, we can draw the following table:

All the costs and revenues are in crores.

	2019				2020				2021			
	Cost	Rev	Empl	New	Cost	Rev	Empl	New	Cost	Rev	Empl	New
A	85	90	150	20	65	90	140	35	30	60	150	25
B	75	100	210	35	40	90	240	45	30	30	250	30
C	20	25	325	45	60	70	325	40	30	100	325	35
D	40	50	400	30	50	20	410	35	70	70	400	40

Profit in 2020 for the four companies:

Company A = 25 crores, Company B = 50 crores, Company C =10 crore, and Company D has no profit.

Employee Strengths for the four companies:

Company A = $\frac{140 + 150}{2} = 145$

Company B = $\frac{240 + 250}{2} = 245$

Company C = $\frac{325 + 325}{2} = 325$

Profit per employee:

Company A = $\frac{25}{145} = \frac{5}{29}$

Company B = $\frac{50}{245} = \frac{10}{49} = \frac{5}{24.5}$

Company C = $\frac{10}{325} = \frac{5}{162.5}$

Clearly, Company B had the highest profit per employee.

Hence, option A has the correct answer.

29. Correct Answer : D

Sol 29. From the two given graphs, we can draw the following table:

All the costs and revenues are in crores.

	2019				2020				2021			
	Cost	Rev	Empl	New	Cost	Rev	Empl	New	Cost	Rev	Empl	New
A	85	90	150	20	65	90	140	35	30	60	150	25
B	75	100	210	35	40	90	240	45	30	30	250	30
C	20	25	325	45	60	70	325	40	30	100	325	35
D	40	50	400	30	50	20	410	35	70	70	400	40

For company A:

Loss of employees in the year 2019: (150 + 20) – 140 = 30

Loss of employees in the year 2020: (140 + 35) – 150 = 25

Overall, 55 employees.

For company B:

Loss of employees in the year 2019: (210 + 35) – 240 = 5

Loss of employees in the year 2020: (240 + 45) – 250 = 35

Overall, 40 employees.

For company C:

Loss of employees in the year 2019: (325 + 45) – 325 = 45

Loss of employees in the year 2020: (325 + 40) – 325 = 40

Overall, 85 employees.

For company D:

Loss of employees in the year 2019: (400 + 30) – 410 = 20

Loss of employees in the year 2020: (410 + 35) – 400 = 45

Overall, 65 employees.

Clearly, Company B lost the least number of employees in the year 2019 and 2020.

Hence, option D is the correct answer.

30. Correct Answer : B

Sol 30. From the two given graphs, we can draw the following table:

All the costs and revenues are in crores.

	2019				2020				2021			
	Cost	Rev	Empl	New	Cost	Rev	Empl	New	Cost	Rev	Empl	New
A	85	90	150	20	65	90	140	35	30	60	150	25
B	75	100	210	35	40	90	240	45	30	30	250	30
C	20	25	325	45	60	70	325	40	30	100	325	35
D	40	50	400	30	50	20	410	35	70	70	400	40

Performance ratio of the four companies for the year 2019:

Company A: $\frac{15}{85} = \frac{3}{17}$

Company B: $\frac{25}{75} = \frac{1}{3}$

Company C: $\frac{5}{20} = \frac{1}{4}$

Company D: $\frac{10}{40} = \frac{1}{4}$

Clearly, Company A has the least performance ratio, nearly $\frac{1}{6}$.

Hence, option B is the correct answer.

31. Correct Answer : B

Sol 31. From the two given graphs, we can draw the following table:

All the costs and revenues are in crores.

	2019				2020				2021			
	Cost	Rev	Empl	New	Cost	Rev	Empl	New	Cost	Rev	Empl	New
A	85	90	150	20	65	90	140	35	30	60	150	25
B	75	100	210	35	40	90	240	45	30	30	250	30
C	20	25	325	45	60	70	325	40	30	100	325	35
D	40	50	400	30	50	20	410	35	70	70	400	40

If we see carefully, there is only one such instance in the year 2020 for Company D when there is a loss, i.e., the cost is more than the revenue.

Hence, option B is the correct answer.

32. Correct Answer : C

Sol 32. From the two given graphs, we can draw the following table:

All the costs and revenues are in crores.

	2019				2020				2021			
	Cost	Rev	Empl	New	Cost	Rev	Empl	New	Cost	Rev	Empl	New
A	85	90	150	20	65	90	140	35	30	60	150	25
B	75	100	210	35	40	90	240	45	30	30	250	30
C	20	25	325	45	60	70	325	40	30	100	325	35
D	40	50	400	30	50	20	410	35	70	70	400	40

Profit = Revenue – Cost

Company A:

Profit = (90 + 90 + 60) – (85 + 35 + 30) = 240 – 180 = Rs. 60 crores

Company B:

Profit = (100 + 90 + 30) – (75 + 40 + 30) = 220 – 145 = Rs. 75 crores

Company C:

Profit = (25 + 70 + 100) – (20 + 60 + 30) = 195 – 110 = Rs. 85 crores

Company D:

Profit = (50 + 20 + 70) – (40 + 50 + 70) = 140 – 160 = - (Rs. 20 crores)

Clearly, Company A has the highest annual profit.

Hence, option C is the correct answer.

33. Correct Answer : D

Sol 33. Two cases arise:

Case 1:

If the demand at Ahmednagar is 70, then the demand at Chitrachak will be 100, and Ahmednagar will not be the first location.

Thus, 170 is covered from the first two locations.

Therefore, total number of widgets that can be delivered can be:

= 170 + {(30, 40) , (30, 60), (50, 40) , (50, 60)}

Either 240, 260, or 280.

Case 2:

If the demand at Ahmednagar is 50, then it will not be the first location.

Therefore, total number of widgets that can be delivered can be:

= 50 + {(30, 40, 70), (30, 40, 100), (30, 60, 70), (30, 60, 100), (50, 40, 70), (50, 40, 100), (50, 60, 70), (50, 80, 100)}

Either 190 or 210 or 230 or 220

From the given options, the answer can be either 210 or 220.

Let us check the total distances covered in each case.

Sub Case 1: 210: (70 – 60 – 50 – 30)

Total distance covered:

12 km (Warehouse to Chitrachak) + 4 km (Chitrachak to Bikrampore) + 6 km (Bikrampore to Ahmednagar) + 7 km (Ahmednagar to Deccan Park)

= 29 km

Sub Case 2: 220: (100 – 50 – 40 – 30)

Total distance covered:

12 km (Warehouse to Chitrachak) + 17 km (Chitrachak to Ahmednagar) + 6 km (Ahmednagar to Bikrampore) + 12 km (Bikrampore to Deccan Park)

= 47 km

Thus, in only sub case 1, we get a route distance of 29 km.

Hence, option D is the correct answer.

34. Correct Answer : B

Sol 34. Since the first location is Ahmednagar, it must have the highest demand. Thus, it must be 70, otherwise it must have been located at any other location.

Distance travelled = 5 km

After Ahmednagar, the supplier must visit Chitrachak (as its least demand is 70).

Total distance travelled till now = 5 + 17 = 22 km

Now, he needs to cover 18 km while going to the remaining two locations, Bikrampore and Deccan Park.

Different possibilities are as under:

1. 40 (Bikrampore) and 30 (Deccan Park)

Total distance travelled = 22 + 4 + 12 = 38 km

2. 40 (Bikrampore) and 50 (Deccan Park)

Total distance travelled = 22 + 6 + 12 = 40 km

3. 60 (Bikrampore) and 30 (Deccan Park)

Total distance travelled = 22 + 4 + 12 = 38 km

4. 60 (Bikrampore) and 50 (Deccan Park)

Total distance travelled = 22 + 4 + 12 = 38 km

Only in the second case, the total distance travelled is 40 km.

Thus, desired probability, by Bayes theorem, is:

0.6 x 0.3 = 0.18 or 18%

Hence, option B is the desired answer.

35. Correct Answer : A

Sol 35. Highest possible demand is 70 + 50 + 60 + 100 = 280

The different ways of getting a demand of 260 (i.e.,reducing 20 at any one location) are:

1. Decreasing 20 at Ahmednagar (50 + 60 + 50 + 100)

2. Decreasing 20 at Chitrachak (70 + 60 + 30 + 100)

3. Decreasing 20 at Bikrampore (70 + 40 + 50 + 100)

Since the last location shall be Bikrampore, only the 3rd case is feasible as it must have the least demand.

Thus, the desired chances are:

0.6 x 0.6 x 0.3 x 0.7 = 0.0756 or 7.56%

Hence, option A is the correct answer.

36. Correct Answer : 38

Sol 36. Smallest possible demand is 50 + 30 + 40 + 70 = 190

Highest possible demand is 70 + 50 + 60 + 100 = 280

Well, the demand of 250 is only possible if the demand at C is taken as 70 instead of 100 (in the highest demand).

So, the route will be:

Ahmednagar - Chitrachak - Bikrampore - Deccan Park

(Though the demands at Ahmednagar and Chitrachak are the same, the supplier will go to Ahmednagar first, as it is closest to the warehouse.)

The total distance travelled will be:

5 km (Warehouse to Ahmednagar) + 17 km (Ahmednagar to Chitrachak) + 4 km (Chitrachak to Bikrampore) + 12 km (Bikrampore to Deccan Park)

= 38 km

Hence, 38 is the correct answer.

37. Correct Answer : 35

Sol 37. Since the last location visited is Ahmednagar, the demand at Ahmednagar should be least, i.e., 50 (smaller of 50 and 70).

Thus, the demand at the other locations should be greater than or equal to 50.

Now, the demand for Deccan Park should be at least 50. From the given possibilities, it should be 50 (higher of 50 and 50).

Similarly, the demand for Bikrampore should be 70 (higher of 40 and 60).

So, the first location is Chitrachak, whatever be the demand as both the possibilities are more than 50.

So, the route will be:

Chitrachak - Bikrampore - Deccan Park – Ahmednagar

The total distance travelled will be:

12 km (Warehouse to Chitrachak) + 4 km (Chitrachak to Bikrampore) + 12 km (Bikrampore to Deccan Park) + 7 km (Deccan Park to Ahmednagar)

= 35 km

Hence, 35 is the correct answer.

38. Correct Answer : C

Sol 38. **Using statements 1 and 2:**

Let the number of households Lahur visited each day be ‘x’.

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri					100	2x
Hokli					100	2x
Lahur	50	x	50	x	100	2x

Using statement 3:

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri					100	2x
Hokli	100	2x-1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Using statement 4:

Let the number of households Tohri visited on the first day be y. Thus, he visited y + 30 households on the second day.

Thus, 2y + 30 = 2x or y = x -15

Therefore, Tohri visited x -15 and x + 15 households on day 1 and day 2, respectively.

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri		x - 15		x + 15	100	2x
Hokli	100	2x -1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Using statement 5:

Lahur's success rate on day 1 = $\frac{50}{x}$. Thus, Tahur's success rate on day 1= $\frac{100}{x}$

Lahur's success rate on day 2 = $\frac{50}{x}$. Thus, Tahur's success rate on day 1= $\frac{75}{2x}$

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri	(x - 15). $\frac{100}{x}$	x - 15	(x + 15). $\frac{75}{2x}$	x + 15	100	2x
Hokli	100	2x -1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Now, (x - 15). $\frac{100}{x}$ + (x + 15). $\frac{75}{2x}$ = 100

(x - 15). $\frac{4}{x}$ + (x + 15). $\frac{3}{2x}$ = 4

8(x – 15) + 3(x + 15) = 8x or x = 25

We can prepare the final table as under:

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri	40	10	60	40	100	50
Hokli	100	49	0	1	100	50
Lahur	50	25	50	25	100	50

Success rates of the three persons on day 1 and day 2 is as under:

	Day 1			Day 2		
	Item	Household	Success Rate	Item	Household	Success Rate
Tohri	40	10	4	60	40	1.5
Hokli	100	49	2.04	0	1	0
Lahur	50	25	2	50	25	2

Clearly, on the second day, Lahur has the highest success rate, not Tohri.

Hence, option C is the correct answer.

39. Correct Answer : B

Sol 39. **Using statements 1 and 2:**

Let the number of households Lahur visited each day be ‘x’.

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri					100	2x
Hokli					100	2x
Lahur	50	x	50	x	100	2x

Using statement 3:

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri					100	2x
Hokli	100	2x-1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Using statement 4:

Let the number of households Tohri visited on the first day be y. Thus, he visited y + 30 households on the second day.

Thus, 2y + 30 = 2x or y = x -15

Therefore, Tohri visited x -15 and x + 15 households on day 1 and day 2, respectively.

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri		x - 15		x + 15	100	2x
Hokli	100	2x -1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Using statement 5:

Lahur’s success rate on day 1 = $\frac{50}{x}$. Thus, Tahur’s success rate on day 1= $\frac{100}{x}$

Lahur’s success rate on day 2 = $\frac{50}{x}$. Thus, Tahur’s success rate on day 1= $\frac{75}{2x}$

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri	(x - 15). $\frac{100}{x}$	x - 15	(x + 15). $\frac{75}{2x}$	x + 15	100	2x
Hokli	100	2x -1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Now, (x - 15). $\frac{100}{x}$ + (x + 15). $\frac{75}{2x}$ = 100

(x - 15). $\frac{4}{x}$ + (x + 15). $\frac{3}{2x}$ = 4

8(x – 15) + 3(x + 15) = 8x or x = 25

We can prepare the final table as under:

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri	40	10	60	40	100	50
Hokli	100	49	0	1	100	50
Lahur	50	25	50	25	100	50

From the final table, the number of households met by Tohri on the first day was 10, which is satisfied by option B only.

Hence, option B is the correct answer.

40. Correct Answer : D

Sol 40. **Using statements 1 and 2:**

Let the number of households Lahur visited each day be ‘x’.

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri					100	2x
Hokli					100	2x
Lahur	50	x	50	x	100	2x

Using statement 3:

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri					100	2x
Hokli	100	2x-1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Using statement 4:

Let the number of households Tohri visited on the first day be y. Thus, he visited y + 30 households on the second day.

Thus, 2y + 30 = 2x or y = x -15

Therefore, Tohri visited x -15 and x + 15 households on day 1 and day 2, respectively.

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri		x - 15		x + 15	100	2x
Hokli	100	2x -1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Using statement 5:

Lahur's success rate on day 1 = $\frac{50}{x}$. Thus, Tahur's success rate on day 1= $\frac{100}{x}$

Lahur's success rate on day 2 = $\frac{50}{x}$. Thus, Tahur's success rate on day 1= $\frac{75}{2x}$

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri	(x - 15). $\frac{100}{x}$	x - 15	(x + 15). $\frac{75}{2x}$	x + 15	100	2x
Hokli	100	2x -1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Now, (x - 15). $\frac{100}{x}$ + (x + 15). $\frac{75}{2x}$ = 100

(x - 15). $\frac{4}{x}$ + (x + 15). $\frac{3}{2x}$ = 4

8(x – 15) + 3(x + 15) = 8x or x = 25

We can prepare the final table as under:

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri	40	10	60	40	100	50
Hokli	100	49	0	1	100	50
Lahur	50	25	50	25	100	50

From the final table, the number of households met by Lahur on the second day was 25, which is satisfied by option D only.

Hence, option D is the correct answer.

41. Correct Answer : 40

Sol 41. **Using statements 1 and 2:**

Let the number of households Lahur visited each day be 'x'.

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri					100	2x
Hokli					100	2x
Lahur	50	x	50	x	100	2x

Using statement 3:

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri					100	2x
Hokli	100	2x-1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Using statement 4:

Let the number of households Tohri visited on the first day be y. Thus, he visited y + 30 households on the second day.

Thus, 2y + 30 = 2x or y = x -15

Therefore, Tohri visited x -15 and x + 15 households on day 1 and day 2, respectively.

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri		x - 15		x + 15	100	2x
Hokli	100	2x -1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Using statement 5:

Lahur's success rate on day 1 = $\frac{50}{x}$. Thus, Tahur's success rate on day 1= $\frac{100}{x}$

Lahur's success rate on day 2 = $\frac{50}{x}$. Thus, Tahur's success rate on day 1= $\frac{75}{2x}$

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri	(x - 15). $\frac{100}{x}$	x - 15	(x + 15). $\frac{75}{2x}$	x + 15	100	2x
Hokli	100	2x -1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Now, (x - 15). $\frac{100}{x}$ + (x + 15). $\frac{75}{2x}$ = 100

(x - 15). $\frac{4}{x}$ + (x + 15). $\frac{3}{2x}$ = 4

8(x – 15) + 3(x + 15) = 8x or x = 25

We can prepare the final table as under:

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri	40	10	60	40	100	50
Hokli	100	49	0	1	100	50
Lahur	50	25	50	25	100	50

From the final table, the number of TRICCEK items sold by Tohri on the first day was 40.

Hence, 40 is the correct answer.

42. Correct Answer : 84

Sol 42. **Using statements 1 and 2:**

Let the number of households Lahur visited each day be ‘x’.

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri					100	2x
Hokli					100	2x
Lahur	50	x	50	x	100	2x

Using statement 3:

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri					100	2x
Hokli	100	2x-1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Using statement 4:

Let the number of households Tohri visited on the first day be y. Thus, he visited y + 30 households on the second day.

Thus, 2y + 30 = 2x or y = x -15

Therefore, Tohri visited x -15 and x + 15 households on day 1 and day 2, respectively.

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri		x - 15		x + 15	100	2x
Hokli	100	2x -1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Using statement 5:

Lahur’s success rate on day 1 = $\frac{50}{x}$. Thus, Tahur’s success rate on day 1= $\frac{100}{x}$

Lahur’s success rate on day 2 = $\frac{50}{x}$. Thus, Tahur’s success rate on day 1= $\frac{75}{2x}$

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri	(x - 15). $\frac{100}{x}$	x - 15	(x + 15). $\frac{75}{2x}$	x + 15	100	2x
Hokli	100	2x -1	0	1	100	2x
Lahur	50	x	50	x	100	2x

Now, (x - 15). $\frac{100}{x}$ + (x + 15). $\frac{75}{2x}$ = 100

(x - 15). $\frac{4}{x}$ + (x + 15). $\frac{3}{2x}$ = 4

8(x – 15) + 3(x + 15) = 8x or x = 25

We can prepare the final table as under:

	Day 1		Day 2		Total Items	Total Households
	Item	Household	Item	Household		
Tohri	40	10	60	40	100	50
Hokli	100	49	0	1	100	50
Lahur	50	25	50	25	100	50

From the final table, total number of households visited by Tohri, Hokli, and Lahur on the first day = 10 + 49 + 25 = 84

Hence, 84 is the correct answer.

43. Correct Answer : 2143

Sol 43. 21 is a mandatory pair as 2 talks about ‘myriad and diverse reasons’ and 1 elaborates upon these reasons. 4 follows 1 as 1 mentions that ‘no single tech solution can solve this crisis’ and 4 deduces that ‘clearly, our environmental crisis requires large political solutions’. 3 follows 4 as 3 mentions ‘this would require legislation’. This refers to 4 . Hence, the correct sequence is 2143 .

44. Correct Answer : 3142

Sol 44. Let’s first look at the clues. 1 introduces the word cheer and should therefore come before the other two sentences talking about the word. 4 follows 1 as it further explains the word ‘cheer’. 2 follows 4 as it carries forward the idea in 4. Look at the phrase ‘more abstract cheerfulness’ in 4. 3 should come before 1 because 3 introduces the idea of cheerfulness and talks about ‘cheerfulness moving into the self’. The same idea is carried forward in 1. Hence, the correct sequence is 3142.

45. Correct Answer : 2431

Sol 45. The first thing we see is that 2 and 4 form a pair as 2 talks about individual choice and 4 talks about ‘the individualised framing of choice’. 3 follows 2 as ‘this’ in 3 refers to 2. 1 follows 2 as 3 talks about transfer or responsibility and 1 talks about the shift of the responsibility to women. Hence, the correct sequence is 2431.

46. Correct Answer : D

Sol 46. The given sentence is in the past tense. Therefore, it can only come in the fourth blank because the sentences before and after option 4 are in past tense. Also, ‘most’ in the given sentence refers to the ‘400 women’ mentioned in the sentence before option D.

47. Correct Answer : C

Sol 47. This is an easy question as we can see a clue in the given sentence. It mentions ‘he explained’, which refers to Karmakar mentioned in the sentence before option C. Hence, the correct answer is C.

48. Correct Answer : B

Sol 48. The main points of the paragraph are as follows:

- Several ancient cities were egalitarian.

- Urban life never implied any particular form of political organisation.

- Existence of egalitarian urban life in some ancient cities.

These ideas have been captured correctly in the second option.

Option A talks about the emergence of hierarchical civil organisations/administrations, which is not in line with the passage. Option C is incomplete. Option D is incorrect because it incorrectly deduces that ancient cities were not at all organised on hierarchical political and administrative structures.

49. Correct Answer : B

Sol 49. This is a very easy summary question. The main idea of the passage is that unlike general belief, artworks decay over time. This idea has been correctly captured in option B. All the other options are about what the museums should do to preserve artworks.

50. Correct Answer : B

Sol 50. The main points of the paragraph ar as follows:

- Behavioural control in the age of big data echoing Cold War-era anxieties.

- Digital age is exposing us by offering up our private lives to machine-learning algorithms that can process masses of personal and behavioural data.

Option A is incorrect because it is not mentioned in the paragraph that technology was manipulated during the Cold War. Option C is incorrect because it talks about artificial intelligence, which is not talked about in the passage. Option D talks about digital technology enslaving us but the paragraph talks about the digital age ‘exposing us’. Option B is the correct answer because it summarises the paragraph correctly.

51. Correct Answer : D

Sol 51. Paragraphs 3 and 4 give examples of the similarities between the camouflaging actions of octopuses and squids and that of cuttlefish and polar bears.

Sea snails have not been mentioned.

Hence, D is the correct answer.

52. Correct Answer : A

Sol 52. The passage mentions temperature, hydrostatic pressure, and depth as factors that affect the camouflaging adeptness. So, a change in any one of the factors would affect the camouflaging adeptness.

The varying number of the catalysis would not affect the camouflaging adeptness based on the information given in the passage.

Hence, A is the correct answer.

53. Correct Answer : C

Sol 53. Option A has been mentioned regarding the camouflaging ability: It actually matches the texture of the substrate it chooses

Option B has been mentioned regarding the camouflaging ability: When the cephalopod wants to change colour, the brain carries an electrical impulse through the nerve to the muscles that expand outwards, pulling open the sacs to display the colours on the skin.

Option D has been mentioned in the following lines: Leucophores will also reflect any filtered light shown on them . . . If the water appears blue at a certain depth, the octopuses and cuttlefish can appear blue; if the water appears green, they appear green, and so on and so forth.

Option C has not been mentioned.

Hence, C is the correct answer.

54. Correct Answer : C

Sol 54. Refer to the following lines of the passage: But they don't look like their cousins at all. Other molluscs … are shelled invertebrates with a dorsal foot. Cephalopods are all arms, and can be as tiny as 1 centimetre and as large as 30 feet. Some of them have brains the size of a walnut, which is large for an invertebrate. . . .It makes sense for these molluscs to have added protection in the form of a higher cognition; they don't have a shell covering them, and pretty much everything feeds on cephalopods, including humans

From this, we can see that octopuses are misfits as they don't look like other molluscs, they have several arms, they have large brains, and don't have a shell covering them.

The point about humans eating them has not been mentioned as a point of difference but as a reason for providing them with a shell cover (which they do not have).

Hence C is the correct answer

55. Correct Answer : C

Sol 55. Refer to the following lines of paragraphs A and B, which capture the author's main claim: teaching prime students to believe that their decision-making is purely objective, as it is grounded in maths and science. This is known as technical-social dualism, the idea that the technical and social dimensions of engineering problems are readily separable and remain distinct throughout the problem-definition and solution process.

Read the above along with the following lines of paragraph 2: By choosing to downplay public welfare as a critical parameter for engineering design, we risk creating a culture of disengagement from societal concerns amongst engineers that is antithetical to the ethical code of engineering.

Hence, we can say that the author's main claim is that engineering students today are taught to focus on objective technical outcomes, independent of the social dimensions of their work.

Hence, option C is the answer.

56. Correct Answer : A

Sol 56. B, C, and D all mention the reasons for discrimination against marginalised people.

B mentions how racial differences were seen as biologically determined, and hence gave rise to racially based adjustments.

C mentions how subjective beliefs treated as facts lead to social inequities.

D mentions that the dominant culture forces decisions in favour of the privileged class.

Option A does not give a reason for why marginalised people are systematically discriminated against. It gives the consequences of such discrimination.

Hence, D is the correct answer.

57. Correct Answer : C

Sol 57. The author mentions neglect of marginalised communities in research and development of medical technologies, inadequate representation of non privileged groups in clinical trials, and inaccurate calibration of medical devices due to racial prejudices as negative outcomes of focussing on technical ideals in the medical sphere. So, A, B, and D have been mentioned.

Reading option C, we see that the option says that people have been incorrectly called female at birth, which has not been mentioned by the author.

Hence, C is the answer.

58. Correct Answer : B

Sol 58. The first two paragraphs reveal that the author is against technical-social dualism. Hence, B is the correct answer.

59. Correct Answer : D

Sol 59. The main point of the passage is that institutions are all those social entities that organise action. They link acting individuals into social structures.

The author explains why he believes so in the passage.

This point is best captured in option D.

Hence, D is the correct answer.

60. Correct Answer : C

Sol 60. The given statement mentions the stock exchange and the black market as two different institutions in terms of one being formal and one being informal.

A misrepresents by mentioning formal trading and informal trading.

B does not bring out the difference in formal and informal structures of the two.

D is irrelevant.

C is correct. The stock market and black market are different even though they belong to the same domain.

Hence, C is the correct answer.

61. Correct Answer : C

Sol 61. Refer to the following lines: social sciences as an arena of thought and as a set of social institutions."

So the two characteristics are social sciences as an arena of thought, in other words, as an academic discipline and social institutions.

Hence, C is the correct answer.

62. Correct Answer : B

Sol 62. A is false as it contradicts the following lines of the passage: Culture and tradition are subsets of institutions analytically isolated for explanatory or expository purposes.

C is false as it contradicts the following lines of the passage: However, they are very much the product of conscious attempts to mould and plan them. We have family law, established and disestablished churches, constitutions and laws, including those governing the economy and the military...

D is false. It misrepresents the following lines of the passage: Institutions deriving from statute, like joint-stock companies, are formal by contrast with informal ones such as friendships.

The author nowhere mentions that friendship cannot be found in institutions derived from statutes.

Option B is correct. Refer to the following lines of the concluding paragraph: Natural languages are typical examples of what Ferguson called 'the result of human action, but not the execution of any human design'.

In other words, natural language does not involve any intent or design on the part of humans.

Hence, B is the correct answer.

63. Correct Answer : A

Sol 63. According to the author, human beings are musicking creatures and musicking is among the fundamental human commonalities.

This argument can be weakened if it were true that music is not as common as the author asserts and is based on other factors as well.

So, if we say that musical capacities are not innate but socio-cultural, it weakens the author's argument.

Hence, A is the correct answer.

64. Correct Answer : C

Sol 64. This is a simple vocabulary-based question, which requires just simplifying the given statement.

According to the given statement, there may be qualifications or conditions or caveats attached to the statement but one should look beyond them and accept the statement as true.

This point is best explained in option C. Hence, C is the correct answer.

65. Correct Answer : A

Sol 65. Refer to the following lines of paragraph 4: If we look back 20,000 years, a small portion of this long period, we reach the lives of humans whose musical capacities were probably little different from our own.

So we can say that 20,000 years ago, human musical capacities were quite similar (not very different) from what they are today.

Hence, A is the correct answer.

66. Correct Answer : A

Sol 66. Reading the passage and summarising each paragraph for the main point, we can see that the first key point is that human beings are musicking creatures. The next key point is that musicking capacities overlap linguistic capacities. The next key point is that human beings are symbol makers too. But in fundamental features, musicking is neither language-like nor symbol-like, and these differences give many clues to its music's ancient emergence. In the last part, the author asserts that if musicking is a primary, shared trait of modern humans, then to describe its emergence must be to detail the coalescence of that modernity.

This flow of keywords is best represented in option A, that is Humans; Musicking; Linguistic capacities; Symbol-making; Modern humanity.

Hence, option A is the correct answer.