CAT 2018 Question Paper with Solution
Slot 1 DILR

1.

|||Common|||

Direction: 1600 satellites were sent up by a country for several purposes. The purposes are classified as broadcasting (B), communication (C), surveillance (S), and others (O). A satellite can serve multiple purposes. However, a satellite serving either B, or C, or S does not serve O.

The following facts are known about the satellites:

(i) The numbers of satellites serving B, C, and S (though maybe not exclusively) are in the ratio 2:1:1.

(ii) The number of satellites serving all three of B, C, and S is 100.

(iii) The number of satellites exclusively serving C is the same as the number of satellites exclusively serving S. This number is 30% of the number of satellites exclusively serving B.

(iv) The number of satellites serving O is the same as the number of satellites serving both C and S but not B.

|||End|||
What best can be said about the number of satellites serving C?
A. Cannot be more than 800
B. Must be at least 100
C. Must be between 450 and 725
D. Must be between 400 and 800

Answer: C

Solution:

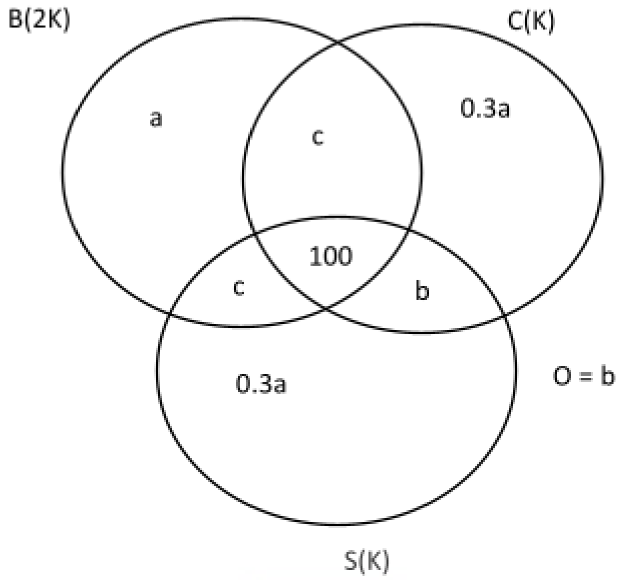
Step 1: It is given that the satellites serving either B, C or S do not serve O. From given point (i), let the number of satellites serving B, C, and S be 2K, K, and K, respectively. Further, let the number of satellites exclusively serving B be a.

Step 2: From given point (iii), the number of satellites exclusively serving C and exclusively serving S will each be 0.3a.

Step 3: From given point (iv), the number of satellites serving O is the same as the number of satellites serving only C and S. Let that number be b.

Step 4: Since the number of satellites serving C is the same as the number of satellites serving S, we can say that (number of satellites serving only B and C) +

$0.3a + 100 + b$ = (number of satellites serving only B and S) + $0.3a + 100 + b$.
Further, let the number of satellites serving only B and C = the number of satellites serving only B and S = c



Step 5: It is given that there are a total of 1600 satellites.

$\Rightarrow a + c + 0.3a + c + 100 + b + 0.3a + b = 1600$

$\Rightarrow 1.6a + 2b + 2c = 1500$ --------------- (a)

Also $K = 0.3a + c + b + 100$

Satellites serving B $= 2K = a + 2c + 100$

$\Rightarrow 2(0.3a + c + b + 100) = a + 2c + 100$

$\Rightarrow 0.4a = 2b + 100$

$a = 5b + 250$ -----------(b)

Substituting (b) in (a), we will get

$1.6(5b + 250) + 2b + 2c = 1500$

$10b + 2c = 1100$

$c = 550 - 5b$ ------------ (c)

Step 1: The number of satellites serving C = c + 0.3a + 100 + b

Substituting the derived values of c and a,

=> (550 – 5b) + 0.3(5b + 250) + 100 + b = 725 – 2.5b

Step 2: This number will be maximum when b is minimum. Minimum value of b is 0, therefore, the maximum number of satellites serving C will be 725.

Step 3: From (c), c = 550 – 5b. Since the number of satellites cannot be negative, the maximum value of b is 110.

Step 4: When b = 110, the number of satellites serving C will be 725 – 2.5 × 110 = 450. This will be the minimum number of satellites serving C.

The number of satellites serving C must be between 450 and 725.

The correct option is C.

2. What is the minimum possible number of satellites serving B exclusively?

A. 100
B. 200
C. 250
D. 500

Answer: C

Solution:

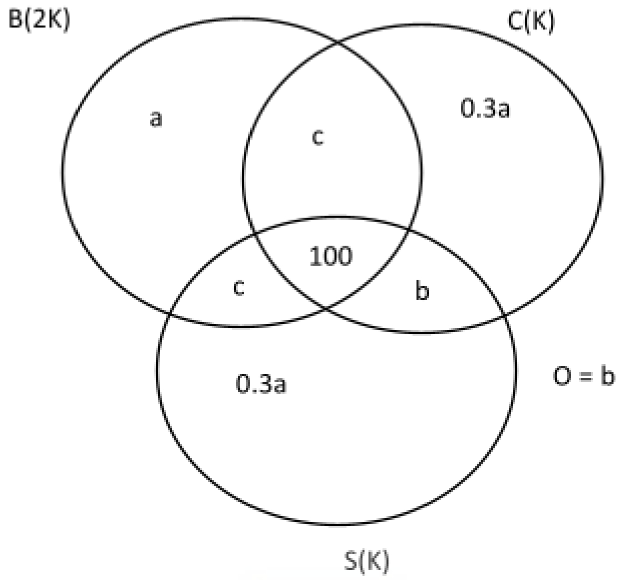
Step 1: It is given that the satellites serving either B, C or S do not serve O. From given point (i), let the number of satellites serving B, C and S be 2K, K, K respectively. Further, let the number of satellites exclusively serving B be a.

Step 2: From given point (iii), the number of satellites exclusively serving C and exclusively serving S will each be 0.3a.

Step 3: From given point (iv), the number of satellites serving O is the same as the number of satellites serving only C and S. Let that number be b.

Step 4: Since the number of satellites serving C is the same as the number of satellites serving S, we can say that (number of satellites serving only B and C) +

0.3 a + 100 + b = (number of satellites serving only B and S) + 0.3 a + 100 + b. Further, let the number of satellites serving only B and C = the number of satellites serving only B and S = c



Step 5: It is given that there are a total of 1600 satellites.

=> a + c + 0.3a + c + 100 + b + 0.3a + b = 1600

=> 1.6a + 2b + 2c = 1500 --------------- (a)

Also K = 0.3a + c + b +100

Satellites serving B = 2K = a + 2c + 100

=> 2(0.3a + c + b + 100) = a + 2c + 100

=> 0.4a = 2b+ 100

a = 5b + 250 -----------(b)

Substituting (b) in (a), we will get

1.6 (5b + 250) + 2b + 2c = 1500

10b + 2c = 1100

c = 550 – 5b ------------ (c)

From (b), the number of satellites serving B exclusively is a = 5b + 250

This is minimum when b is minimum.

Minimum value of b = 0.

The minimum number of satellites serving B exclusively = 5 × 0 + 250 = 250.

The correct option is C.

3. If at least 100 of the 1600 satellites were serving O, what can be said about the number of satellites serving S?

A. Exactly 475
B. At most 475
C. At least 475
D. No conclusion is possible based on the given information

Answer: B

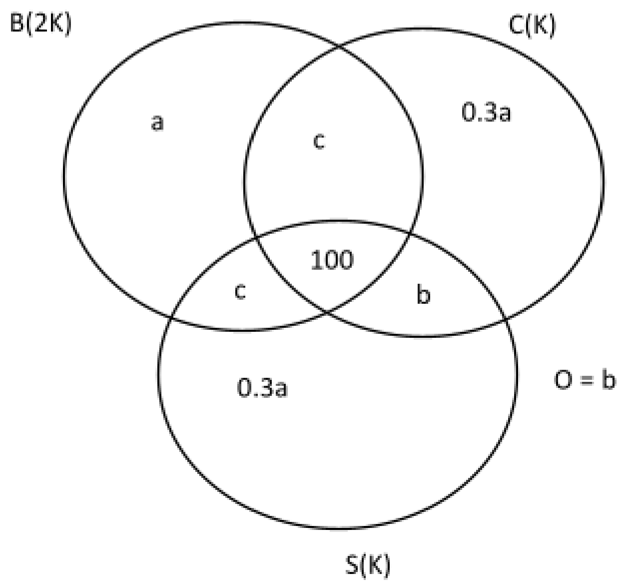
Solution:

Step 1: It is given that the satellites serving either B, C or S do not serve O. From given point (i), let the number of satellites serving B, C and S be 2K, K, K respectively. Further, let the number of satellites exclusively serving B be a.

Step 2: From given point (iii), the number of satellites exclusively serving C and exclusively serving S will each be 0.3a.

Step 3: From given point (iv), the number of satellites serving O is the same as the number of satellites serving only C and S. Let that number be b.

Step 4: Since the number of satellites serving C is the same as the number of satellites serving S, we can say that (number of satellites serving only B and C) + 0.3 a + 100 + b = (number of satellites serving only B and S) + 0.3 a + 100 + b. Further, let the number of satellites serving only B and C = the number of satellites serving only B and S = c



Step 5: We are given that there are a total of 1600 satellites.

=> a + c + 0.3a + c + 100 + b + 0.3a + b = 1600

=> 1.6a + 2b + 2c = 1500 --------------- (a)

Also K = 0.3a + c + b +100

Satellites serving B = 2K = a + 2c + 100

=> 2(0.3a + c + b + 100) = a + 2c + 100

=> 0.4a = 2b+ 100

a = 5b + 250 -----------(b)

Substituting (b) in (a), we will get

1.6 (5b + 250) + 2b + 2c = 1500

10b + 2c = 1100

c = 550 – 5b ------------ (c)

Step 1: Given that at least 100 satellites serve 0; we can say in this case that b ≥ 100. Number of satellites serving s = 0.3a + c +100 + b. Substituting values of a and c from (b) and ©, respectively, we get s => 725 – 2.5b.

Step 2: This is minimum when b is maximum, i.e., 110 (from c). Minimum number of satellites serving = 725 – (2.5 ×110) = 450.

Step 3: This is maximum when b is minimum, i.e., 100 in this case. Maximum number of satellites serving = 725 – (2.5 ×100) = 475

Therefore, the number of satellites serving S is at most 475.

The correct option is B.

4. If the number of satellites serving at least two among B, C, and S is 1200, which of the following MUST be FALSE?

A. All 1600 satellites serve B or C or S.
B. The number of satellites serving B is more than 1000.
C. The number of satellites serving C cannot be uniquely determined.
D. The number of satellites serving B exclusively is exactly 250.

Answer: C

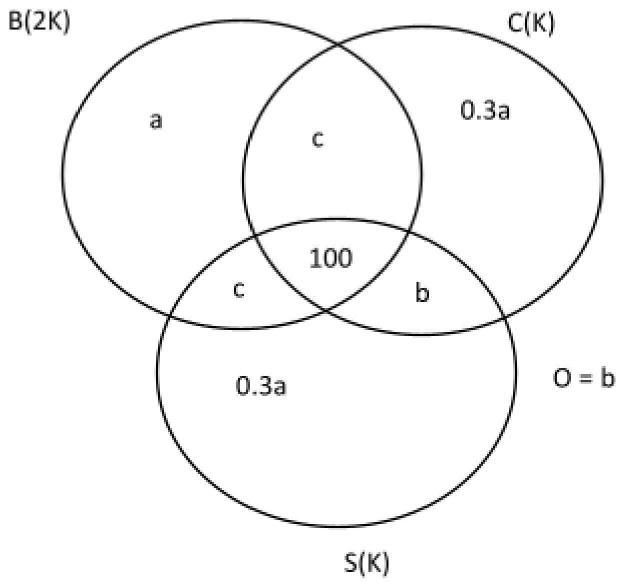
Solution:

Step 1: It is given that the satellites serving either B, C, or S do not serve O. From the given point (i), let the number of satellites serving B, C, and S be 2K, K, and K, respectively. Further, let the number of satellites exclusively serving B be a.

Step 2: From given point (iii), the number of satellites exclusively serving C and exclusively serving S will each be 0.3a.

Step 3: From given point (iv), the number of satellites serving O is the same as the number of satellites serving only C and S. Let that number be b.

Step 4: Since the number of satellites serving C is the same as the number of satellites serving S, we can say that (number of satellites serving only B and C) + 0.3 a + 100 + b = (number of satellites serving only B and S) + 0.3 a + 100 + b. Further, let the number of satellites serving only B and C = the number of satellites serving only B and S = c



Step 5: We are given that there are a total of 1600 satellites.

=> a + c + 0.3a + c + 100 + b + 0.3a + b = 1600

=> 1.6a + 2b + 2c = 1500 --------------- (a)

Also K = 0.3a + c + b +100

Satellites serving B = 2K = a + 2c + 100

=> 2(0.3a + c + b + 100) = a + 2c + 100

=> 0.4a = 2b+ 100

a = 5b + 250 -----------(b)

Substituting (b) in (a), we will get

1.6 (5b + 250) + 2b + 2c = 1500

10b + 2c = 1100

c = 550 – 5b ------------ (c)

Step 1: The number of satellites serving at least two of B, C, or S = Number of satellites serving exactly two of B, C, or S + Number of satellites serving all the three

$= c + c + b + 100$

$= 2(550 - 5y) + b + 100$

$= 1200 - 9y.$

Step 2 - Given that this is equal to 1200

$1200 - 9y = 1200$

$\Rightarrow b = 0$

If $b = 0$, $a = 5y + 250 = 250$ and $c = 550 - 5y = 550$

Step 3 - No. of satellites serving C $= k = c + 0.3x + 100 + b$

$= 550 + 0.3\,(250) + 100 + b$

$= 725$

No. of satellites serving B $= 2k = 2 \times 725 = 1450.$

"The number of satellites serving C cannot be uniquely determined" must be FALSE.

The correct option is C.

###TOPIC###Logical Reasoning||Venn Diagrams||Venn Diagrams###

5.

|||Common|||

Direction: Twenty four people are part of three committees which are to look at research, teaching, and administration respectively. No two committees have any members in common. No two committees are of the same size. Each committee has three types of people: bureaucrats, educationalists, and politicians, with at least one from each of the three types in each committee. The following facts are also known about the committees:

(i) The numbers of bureaucrats in the research and teaching committees are equal, while the number of bureaucrats in the research committee is 75% of the number of bureaucrats in the administration committee.

(ii) The number of educationalists in the teaching committee is less than the number of educationalists in the research committee. The number of educationalists in the research committee is the average of the numbers of educationalists in the other two committees.

(iii) 60% of the politicians are in the administration committee, and 20% are in the teaching committee.

|||End|||
Based on the given information, which of the following statements MUST be FALSE?
A. The size of the research committee is less than the size of the administration committee
B. In the teaching committee the number of educationalists is equal to the number of politicians
C. The size of the research committee is less than the size of the teaching committee
D. In the administration committee the number of bureaucrats is equal to the number of educationalists

Answer: C

Solution:

Step 1: From the given points we get the following table:

	Reserach	Teaching	Administration
Bureaucrats	3x	3x	4x
Educationalists	m (where,m>n)	n	o
Politicians	y	y	3y

Total = 24

Step 2: Since bureaucrats are in the ratio 3:3:4, the only value which suits this ratio along with the total of 24 is 3, 3, 4. So, x = 1

Step 3: From given point (ii), we can say that in educationalist $n < m < o$ and $m = (o + n)/2$

Step 4: Since politicians are in ratio 1:1:3, the only value which suits this ratio taking other factors into consideration is 1, 1, 3.

Step 5: After obtaining the values of politicians and bureaucrats, the possible values of m, n, o are 3, 2, 4 and 3, 1, 5.

Case 1:

	Reserach	Teaching	Administration	
Bureaucrats	3	3	4	10
Educationalists	3	2	4	9
Politicians	1	1	3	5
	7	6	11	24

Case 2:

	Reserach	Teaching	Administration	
Bureaucrats	3	3	4	10
Educationalists	3	1	5	9
Politicians	1	1	3	5
	7	5	12	24

"Size of the research committee is less than the size of the teaching committee" must be false.

The correct option is C.

6. What is the number of bureaucrats in the administration committee?

Answer: 4

Solution:

Step 1: From the given points, we get the following table:

	Reserach	Teaching	Administration
Bureaucrats	3x	3x	4x
Educationalists	m (where,m>n)	n	o
Politicians	y	y	3y

Total = 24

Step 2: Since bureaucrats are in the ratio 3:3:4, the only value which suits this ratio along with the total of 24 is 3, 3, 4. So, x = 1.

Step 3: From the given point (ii), we can say that in educationalist n < m < o and m = (o + n)/2

Step 4: Since politicians are in ratio 1:1:3, the only value which suits this ratio taking other factors into consideration is 1, 1, 3.

Step 5: After obtaining the values of politicians and bureaucrats, the possible values of m, n, o are 3, 2, 4 and 3, 1, 5.

Case 1:

	Reserach	Teaching	Administration	
Bureaucrats	3	3	4	10
Educationalists	3	2	4	9
Politicians	1	1	3	5
	7	6	11	24

Case 2:

	Reserach	Teaching	Administration	
Bureaucrats	3	3	4	10
Educationalists	3	1	5	9
Politicians	1	1	3	5
	7	5	12	24

In both the obtained cases, there are 4 bureaucrats in the administration committee.

The correct answer is 4.

7. What is the number of educationalists in the research committee?

Answer: 3

Solution:

Step 1: From the given points, we get the following table:

	Reserach	Teaching	Administration
Bureaucrats	3x	3x	4x
Educationalists	m (where,m>n)	n	o
Politicians	y	y	3y

Total = 24

Step 2: Since bureaucrats are in the ratio 3:3:4, the only value which suits this ratio along with the total of 24 is 3, 3, 4. So, x = 1.

Step 3: From the given point (ii), we can say that among educationalists n < m < o and m = (o + n)/2.

Step 4: Since politicians are in ratio 1:1:3, the only value which suits this ratio taking other factors into consideration is 1, 1, 3.

Step 5: After obtaining the values of politicians and bureaucrats, the possible values of m, n, o are 3, 2, 4 and 3, 1, 5.

Case 1:

	Reserach	Teaching	Administration	
Bureaucrats	3	3	4	10
Educationalists	3	2	4	9
Politicians	1	1	3	5
	7	6	11	24

Case 2:

	Reserach	Teaching	Administration	
Bureaucrats	3	3	4	10
Educationalists	3	1	5	9
Politicians	1	1	3	5
	7	5	12	24

In both the obtained cases, there are 3 educationalists in the research committee.

The correct answer is 3.

8. Which of the following CANNOT be determined uniquely based on the given information?

A. The size of the teaching committee
B. The size of the research committee
C. The total number of educationalists in the three committees
D. The total number of bureaucrats in the three committees

Answer: A

Solution:

Step 1: From the given points, we getthe following table:

	Reserach	Teaching	Administration
Bureaucrats	3x	3x	4x
Educationalists	m (where,m>n)	n	o
Politicians	y	y	3y

Total = 24

Step 2: – Since bureaucrats are in the ratio 3:3:4, the only value which suits this ratio along with the total of 24 is 3, 3, 4. So, x = 1.

Step 3: From the given point (ii), we can say that in educationalists n < m < o and m = (o + n)/2

Step 4: Since politicians are in the ratio 1:1:3, the only value which suits this ratio taking other factors into consideration is 1, 1, 3.

Step 5: After obtaining the values of politicians and bureaucrats, the possible values of m, n, o are 3, 2, 4 and 3, 1, 5.

Case 1:

	Reserach	Teaching	Administration	
Bureaucrats	3	3	4	10
Educationalists	3	2	4	9
Politicians	1	1	3	5
	7	6	11	24

Case 2:

	Reserach	Teaching	Administration	
Bureaucrats	3	3	4	10
Educationalists	3	1	5	9
Politicians	1	1	3	5
	7	5	12	24

We cannot uniquely determine the size of the teaching committee.

The correct option is A.

###TOPIC###Data Interpretation||Caselets||Caselets###

9.

|||Common|||

Direction: A company administers a written test comprising of three sections of 20 marks each – Data Interpretation (DI), Written English (WE) and General Awareness (GA) for recruitment. A composite score for a candidate (out of 80) is calculated by doubling her marks in DI and adding it to the sum of her marks in the other two sections. Candidates who score less than 70% marks in two or more sections are disqualified. From among the rest, the four with the highest composite scores are recruited. If four or less candidates qualify, all who qualify are recruited.

Ten candidates appeared for the written test. Their marks in the test are given in the table below. Some marks in the table are missing, but the following facts are known:

(i) No two candidates had the same composite score.

(ii) Ajay was the unique highest scorer in WE.

(iii) Among the four recruited, Geeta had the lowest composite score.

(iv) Indu was recruited.

(v) Danish, Harini, and Indu had scored the same marks in GA.

(vi) Indu and Jatin both scored 100% in exactly one section and Jatin's composite score was 10 more than Indu's.

Candidate	Marks out of 20		
	DI	WE	GA
Ajay	8		16
Bala		9	11
Chetan	19	4	12
Danish	8	15	
Ester	12	18	16
Falak	15	7	10
Geeta	14		6
Harini	5		
Indu		8	
Jatin		16	14

|||End|||
Which of the following statements MUST be true?

1) Jatin's composite score was more than that of Danish.

2) Indu scored less than Chetna in DI.

3) Jatin scored more than Indu in GA

A. Both 1 and 2
B. Both 2 and 3
C. Only 1
D. Only 2

Answer: A

Solution:

Step 1: From (vi), Jatin scored 20 in DI. Hence, the composite score of Jatin = (20*2) + 16 + 14 = 70

DI	WE	GA
20	16	14

Step 2: From (vi), the composite score of Indu = 70 - 10 = 60.

Step 3: Indu scored 100% in exactly one subject. Hence, if Indu scores 20 in DI, Indu's score in GA = 60 – 40 – 8 = 12. Indu will not qualify. Hence, Indu did not score 12 in GA.

Therefore, Indu's score in GA = 20.

Therefore, her score in DI = (60 – 20 – 8)/2 = 32/2 = 16

Step 4: From (v) Danish, Harini and Indu scored 20 in GA.

Step 5: Composite score of Danish = 2(8) + 15 + 20 = 51

Step 6: From (ii), the composite score of Ajay = 2(8) + 20 + 16 = 52

Step 7: We know that Geeta had the lowest score among four recruited students. The top three recruited people are Indu, Ester, and Ajay and among them Ajay had the lowest composite score of 52. Since Geeta got recruited, therefore, she must have scored more than Ajay whose score is 52.

Step 8: If Geeta scored 20 in WE, then her composite score would become 54 which is not possible as it is the same as Chetna. Therefore, Geeta scored 19 in WE and her composite score = 53.

Candidate	DI	WE	GA	Total
Ajay	8	20	16	52
Bala		9	11	
Chetna	19	4	12	54
Danish	8	15	20	51
Ester	12	18	16	58
Falak	15	7	10	47
Geeta	14	19	6	53
Harini	5		20	
Indu	16	8	20	60
Jatin	20	16	14	70

From the derived table, we can see that Jatin's composite score was more than Danish's score and Indu scored less than Chetna in DI. Therefore, both statements 1 and 2 are correct.

The correct option is A.

10. Which of the following statements MUST be FALSE?

A. Harini's composite score was less than that of Falak.
B. Bala scored the same as Jatin in DI.
C. Bala's composite score was less than that of Ester.
D. Chetna scored more than Bala in DI.

Answer: B

Solution:

Step 1: From (vi), Jatin scored 20 in DI. Hence, the composite score of Jatin = (20*2) + 16 + 14 = 70

DI	WE	GA
20	16	14

Step 2: From (vi), the composite score of Indu = 70 - 10 = 60.

Step 3: Indu scored 100% in exactly one subject. Hence, if Indu scores 20 in DI, Indu's score in GA = 60 – 40 – 8 = 12. Indu will not qualify. Hence, Indu did not score 12 in GA.

Therefore, Indu's score in GA = 20.

Therefore, her score in DI = (60 – 20 − 8)/2 = 32/2 = 16

Step 4: From (v), Danish, Harini, and Indu scored 20 in GA.

Step 5: Composite score of Danish = 2(8) + 15 + 20 = 51

Step 6: From (ii), the composite score of Ajay = 2(8) + 20 + 16 = 52

Step 7: We know that Geeta had the lowest score among the four recruited students. The top three recruited people are Indu, Ester, and Ajay and among them Ajay had a lowest composite score of 52. Since Geeta got recruited, therefore, she must have scored more than Ajay whose score is 52.

Step 8: If Geeta scored 20 in WE, then her composite score would become 54 which is not possible as it is the same as Chetna. Therefore, Geeta scored 19 in WE and composite score = 53.

Candidate	DI	WE	GA	Total
Ajay	8	20	16	52
Bala		9	11	
Chetna	19	4	12	54
Danish	8	15	20	51
Ester	12	18	16	58
Falak	15	7	10	47
Geeta	14	19	6	53
Harini	5		20	
Indu	16	8	20	60
Jatin	20	16	14	70

From the derived table, we can say that if Bala scores 20 (same as Jatin) in DI then his score would be 2(20) + 9 + 11 = 60, which is the same as that of Indu which is not possible.

Hence, Bala scoring the same as Jatin in DI must be false.

The correct option is B.

11. If all the candidates except Ajay and Danish had different marks in DI, and Bala's composite score was less than Chetna's composite score, then what is the maximum marks that Bala could have scored in DI?

Answer: 13

Solution:

Step 1: From (vi), Jatin scored 20 in DI. Hence, the composite score of Jatin = (20*2) + 16 + 14 = 70

DI	WE	GA
20	16	14

Step 2: From (vi), the composite score of Indu = 70 - 10 = 60.

Step 3: Indu scored 100% in exactly one subject. Hence, if Indu scores 20 in DI, Indu's score in GA = 60 – 40 – 8 = 12. Indu will not qualify. Hence, Indu did not score 12 in GA.

Therefore, Indu's score in GA = 20.

Therefore, her score in DI = (60 – 20 − 8)/2 = 32/2 = 16

Step 4: From (v), Danish, Harini, and Indu scored 20 in GA.

Step 5: Composite score of Danish = 2(8) + 15 + 20 = 51

Step 6: From (ii), the composite score of Ajay = 2(8) + 20 + 16 = 52

Step 7: We know that Geeta had the lowest score among four recruited students. The top three recruited people are Indu, Ester and Ajay and among them Ajay had a lowest composite score of 52. Since Geeta got recruited, therefore, she must have scored more than Ajay whose score is 52.

Step 8: If Geeta scored 20 in WE, then her composite score would become 54 which is not possible as it is the same as Chetna). Therefore, Geeta scored 19 in WE and her composite score = 53.

Candidate	DI	WE	GA	Total
Ajay	8	20	16	52
Bala		9	11	
Chetna	19	4	12	54
Danish	8	15	20	51
Ester	12	18	16	58
Falak	15	7	10	47
Geeta	14	19	6	53
Harini	5		20	
Indu	16	8	20	60
Jatin	20	16	14	70

The sum of Bala's score without DI is 20. Therefore, Bala could score a maximum of 16 marks in DI and his composite score will be 52, but 16,15 and 14 have already been scored by other candidates in DI. Hence, Bala could have scored a maximum of 13 in DI.

The correct answer is 13.

12. If all the candidates scored different marks in WE, then what is the maximum marks that Harini could have scored in WE?

Answer:

Solution: 14

Solution:

Step 1: From (vi), Jatin scored 20 in DI. Hence, the composite score of Jatin = (20*2) + 16 + 14 = 70

DI	WE	GA
20	16	14

Step 2: From (vi), the composite score of Indu = 70 - 10 = 60.

Step 3: Indu scored 100% in exactly one subject. Hence, if Indu scores 20 in DI, Indu's score in GA = 60 – 40 – 8 = 12. Indu will not qualify. Hence, Indu did not score 12 in GA.

Therefore, Indu's score in GA = 20.

Therefore, her score in DI = (60 – 20 − 8)/2 = 32/2 = 16

Step 4: From (v), Danish, Harini, and Indu scored 20 in GA.

Step 5: Composite score of Danish = 2(8) + 15 + 20 = 51

Step 6: From (ii), the composite score of Ajay = 2(8) + 20 + 16 = 52

Step 7: We know that Geeta had the lowest score among the four recruited students. The top three recruited people are Indu, Ester and Ajay and among them Ajay had a lowest composite score of 52. Since Geeta got recruited, therefore, she must have scored more than Ajay whose score is 52.

Step 8: If Geeta scored 20 in WE, then her composite score would become 54 which is not possible as it is the same as Chetna). Therefore, Geeta scored 19 in WE and composite score = 53.

Candidate	DI	WE	GA	Total
Ajay	8	20	16	52
Bala		9	11	
Chetna	19	4	12	54
Danish	8	15	20	51
Ester	12	18	16	58
Falak	15	7	10	47
Geeta	14	19	6	53
Harini	5		20	
Indu	16	8	20	60
Jatin	20	16	14	70

If all the candidates scored different marks in WE, then the maximum marks left for Harini is 17 in WE but that would make her composite score 47 which is the same as Falak. Hence, Harini scored the next maximum mark in WE which is 14.

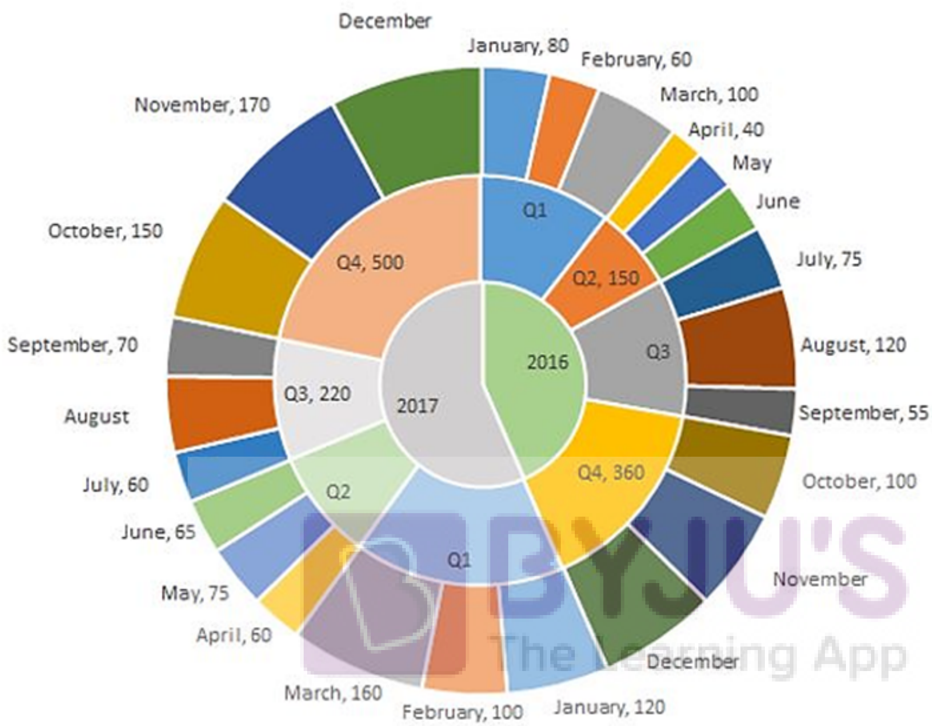
The correct answer is 14.

###TOPIC###Data Interpretation||Tables||Tables###

13.

|||Common|||

Direction: The multi-layered pie-chart below shows the sales of LED television sets for a big retail electronics outlet during 2016 and 2017 . The outer layer shows the monthly sales during this period, with each label showing the month followed by the sales figure of that month. For some months, the sales figures are not given in the chart. The middle-layer shows quarter-wise aggregate sales figures (in some cases, aggregate quarter-wise sales numbers are not given next to the quarter). The innermost layer shows annual sales. It is known that the sales figures during the three months of the second quarter (April, May, June) of 2016 form an arithmetic progression, as do the three monthly sales figures in the fourth quarter (October, November, December) of that year.



|||End|||
What is the percentage increase in sales in December 2017 as compared to the sales in December 2016?
A. 22.22
B. 28.57
C. 38.46
D. 50.00

Answer: B

Solution:

It is given that the sales figures during the three months of the second quarter (April, May, June) of 2016 form an arithmetic progression. So, 40 + (40 + a) + (40 + 2a) = 150

Hence, a = 10.

Sales: April 2016 = 40, May 2016 = 50, June 2016 = 60

The same case holds for October, November, and December of 2016. 100 + (100 + b) + (100 + 2b) = 360

Or b = 20

Sales: October 2016 = 100, November 2016 = 120, December 2016 = 140
August 2017 = 220 – 130 = 90.

Similarly, sales for December 2017 = 500 - 320 = 180

We can obtain the following table:

2016			2017		
Quarter	Month	Sales Figure	Quarter	Month	Sales Figure
Q1(240)	January	80	Q1(240)	January	120
	February	60		February	100
	March	100		March	160
Q2(150)	April	40	Q2(150)	April	60
	May	50		May	75
	June	60		June	65
Q3(250)	July	75	Q3(250)	July	60
	August	120		August	90
	September	55		September	70
Q4(360)	October	100	Q4(360)	October	150
	November	120		November	170
	December	140		December	180

Sales in December 2017 = 180

Sales in December 2016 = 140

Required percentage increase = (40/140)×100 = 28.57%

The correct option is B.

14. In which quarter of 2017, was the percentage increase in sales from the same quarter of 2016 the highest?

A. Q1
B. Q2
C. Q3
D. Q4

Answer: A

Solution:

It is given that the sales figures during the three months of the second quarter (April, May, June) of 2016 form an arithmetic progression. So 40 + (40 + a) + (40 + 2a) = 150

Hence, a = 10.

Sales: April 2016 = 40, May 2016 = 50, June 2016 = 60

The same case holds for October, November, and December of 2016. 100 + (100 + b) + (100 + 2b) = 360

Or b = 20

Sales: October 2016 = 100, November 2016 = 120, December 2016 = 140
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Similarly, sales of December 2017 = 500 - 320 = 180

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	May	50		May	75
	June	60		June	65
Q3(250)	July	75	Q3(250)	July	60
	August	120		August	90
	September	55		September	70
Q4(360)	October	100	Q4(360)	October	150
	November	120		November	170
	December	140		December	180

The following table shows the percentage increase in sales in 2017 for the same quarter of 2016.

	2017	2016	Percentage increase
Q1	380	240	(140/240)*100 = 58.33
Q2	200	150	(50/150)*100 = 33.33
Q3	220	250	(-30/250)*100 = -12
Q4	500	360	(140/560)*100 = 38.88

Hence, we can say that in Q1 the percentage increase in sales was the highest.

The correct option is A.

15. During which quarter was the percentage decrease in sales from the previous quarter's sales the highest?

A. Q2 of 2016
B. Q1 of 2017
C. Q2 of 2017
D. Q4 of 2017

Answer: C

Solution:

It is given that the sales figures during the three months of the second quarter (April, May, June) of 2016 form an arithmetic progression. So 40 + (40 + a) + (40 + 2a) = 150

Hence, a = 10.

Sales: April 2016 = 40, May 2016 = 50, June 2016 = 60

The same case holds for October, November, and December of 2016. 100 + (100 + b) + (100 + 2b) = 360

Or b = 20

Sales: October 2016 = 100, November 2016 = 120, December 2016 = 140
August 2017 = 220 – 130 = 90.

Similarly, sales of December 2017 = 500 - 320 = 180

We can obtain the following table:

2016			2017		
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	May	50		May	75
	June	60		June	65
Q3(250)	July	75	Q3(250)	July	60
	August	120		August	90
	September	55		September	70
Q4(360)	October	100	Q4(360)	October	150
	November	120		November	170
	December	140		December	180

Solving the question by calculating the options, we get:

→Q2 of 2016

=((150−240)/240) ×100= −37.5% increase or 37.5%% decrease

→Q1 of 2017

=((380−360)/360)×100= 5.55% increase.

→Q2 of 2017

=((200−380)/380)×100 = −47.36 or 47.36%% decrease

→Q4 of 2017

There is an increase from 220 to 500.

So, sales of Q2 of 2017, had the highest percentage decrease compared with Q1 of 2017.

The correct option is C .

16. During which month was the percentage increase in sales from the previous month's sales the highest?

A. March of 2016
B. October of 2016
C. March of 2017
D. October of 2017

Answer: D

Solution:

It is given that the sales figures during the three months of the second quarter (April, May, June) of 2016 form an arithmetic progression. So 40 + (40 + a) + (40 + 2a) = 150

Hence, a = 10.

Sales: April 2016 = 40, May 2016 = 50, June 2016 = 60

The same case holds for October, November, and December of 2016. 100 + (100 + b) + (100 + 2b) = 360

Or b = 20

Sales: October 2016 = 100, November 2016 = 120, December 2016 = 140
August 2017 = 220 – 130 = 90.

Similarly, sales of December 2017 = 500 - 320 = 180

We can obtain the following table:

2016			2017		
Quarter	Month	Sales Figure	Quarter	Month	Sales Figure
Q1(240)	January	80	Q1(240)	January	120
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Q2(150)	April	40	Q2(150)	April	60
	May	50		May	75
	June	60		June	65
Q3(250)	July	75	Q3(250)	July	60
	August	120		August	90
	September	55		September	70
Q4(360)	October	100	Q4(360)	October	150
	November	120		November	170
	December	140		December	180

Solving the question by calculating the options, we get:

→ March 2016

=((100−60)/60) ×100= 66.67% increase

→October 2016

$=((100-55)/55)\times100=$ 81.81% increase.

→March 2017

$=((160-100)/100)\times100$ = 60% increase

→October 2017

$=((150-70)/70)\times100$ = 114.2% increase

So, sales of October 2017 compared with September 2017, had the highest percentage increase of 114.2%.

The correct option is D.

###TOPIC###Data Interpretation||Mixed Charts and Graphs||Mixed Charts and Graphs###

17.

|||Common|||

Direction: You are given an n×n square matrix to be filled with numerals so that no two adjacent cells have the same numeral. Two cells are called adjacent if they touch each other horizontally, vertically or diagonally. So a cell in one of the four corners has three cells adjacent to it, and a cell in the first or last row or column which is not in the corner has five cells adjacent to it. Any other cell has eight cells adjacent to it.

|||End|||
What is the minimum number of different numerals needed to fill a 2×2 square matrix?

Answer: 4

Solution:

Given that n × n square matrix to be filled with numerals so that no two adjacent cells have the same numeral.

Also, two cells are called adjacent if they touch each other horizontally, vertically, or diagonally.

The following cases can be obtained.

A1	A2	

A1		
A2		

A1		
	A2	

The diagram for a 2×2 matrix to have minimum number of numerals is as shown.

1	2
3	4

So, we require 4 elements to have all different numerals.

The correct answer is 4.

18. What is the minimum number of different numerals needed to fill a 3×3 and 5×5 square matrix?

A. 2 and 4
B. 4 and 6
C. 4 and 4
D. 2 and 6

Answer: C

Solution:

Given that n × n square matrix to be filled with numerals so that no two adjacent cells have the same numeral.

Also, two cells are called adjacent if they touch each other horizontally, vertically, or diagonally.

As per the given definition, in the following matrix, the following are the cases of adjacent cells.

A1	A2	

A1		
A2		

A1		
	A2	

The diagram for a 3 by 3 matrix to have a minimum number of numerals is as shown.

1	2	1
3	4	3
1	2	1

The following diagram for a 5 by 5 matrix to have a minimum number of numerals is as shown.

1	2	1	2	1
4	3	4	3	4
1	2	1	2	1
4	3	4	3	4
1	2	1	2	1

So, we require 4 elements to have all different numerals in both 3 × 3 and 5 × 5 matrix.

The correct option is C.

19. Suppose you are allowed to make one mistake, that is, one pair of adjacent cells can have the same numeral. What is the minimum number of different numerals required to fill a 3 × 3 matrix?

A. 9
B. 16
C. 25
D. 4

Answer: D

Solution:

Given that the n × n square matrix is to be filled with numerals so that no two adjacent cells have the same numeral.

Also, two cells are called adjacent if they touch each other horizontally, vertically, or diagonally.

As per the given definition, in the following matrix, the following are the cases of adjacent cells.

A1	A2	

A1		
A2		

A1		
	A2	

Even if one mistake is allowed, we require 4 elements to have all different numerals in both 3 × 3 and 5 × 5 matrix.

The correct option is D.

20. Suppose that all the cells adjacent to any particular cell must have different numerals. What is the minimum number of different numerals needed to fill a 3*3 square matrix?

A. 25
B. 16
C. 9
D. 4

Answer: C

Solution:

Given that n × n square matrix to be filled with numerals so that no two adjacent cells have the same numeral.

Also, two cells are called adjacent if they touch each other horizontally, vertically, or diagonally.

As per the given definition, in the following matrix, the following are the cases of adjacent cells.

A1	A2	

A1		
A2		

A1		
	A2	

According to the given question, if there is one number, then that needs to have different numbers in all the 8 adjacent cells.

2	3	4
9	1	5
8	7	6

From the above table in a 3 × 3 matrix, we get that there should be at least 9 numerals to fill the matrix.

The correct option is C.

###TOPIC###Data Interpretation||Caselets||Caselets###

21.

|||Common|||

Direction: An ATM dispenses exactly Rs. 5000 per withdrawal using 100, 200 and 500 rupee notes. The ATM requires every customer to give her preference for one of the three denominations of notes. It then dispenses notes such that the number of notes of the customer's preferred denomination exceeds the total number of notes of other denominations dispensed to her.

|||End|||
A customer prefers 500 rupee notes. In how many different ways, can the ATM serve a customer with nine 500 rupee notes?

Answer: 3

Solution:

The ATM dispenses only 500, 200 and 100 notes and since 500 rupee notes is the preference, it has to dispense more 500 rupee notes than the other two notes combined. The following are the possible ways:

500 rupee notes	200 rupee notes	100 rupee notes
9	2	1
9	1	3
9	0	5

Hence, if a customer prefers 500-rupee notes, then a total of three ways are possible for an ATM to serve a customer with nine 500-rupee notes.

The correct answer is 3.

22. If the ATM could serve only 10 customers with a stock of fifty 500-rupee notes and a sufficient number of notes of other denominations, what is the maximum number of customers among these 10 who could have given 500-rupee notes as their preferences?

Answer: 6

Solution:

To serve the maximum number of customers with 500-rupee notes as preference, we need to minimize the number of 500-rupee notes that can be given to any person.

From the previous solution, the minimum number of 500-rupee notes that the ATM can dispense to any person with 500-rupee notes as his/her preference is 8. Hence, with fifty 500-rupee notes, a total of 6 persons can be served.

The correct answer is 6.

23. What is the maximum number of customers that the ATM can serve with a stock of fifty 500-rupee notes and a sufficient number of notes of other denominations, if all the customers are to be served with at most 20 notes per withdrawal?

A. 10
B. 16
C. 12
D. 13

Answer: C

Solution:

Since there are a limited number of 500-rupee notes, we have to minimize the number of 500-rupee notes dispensed to each customer, while ensuring that each customer is served a maximum of 20 notes.

If no 500-rupee note is dispensed, then the minimum number of notes that must be dispensed = 25 (in 200-rupee notes). This is not possible.

If one 500-rupee note is dispensed, the minimum number of notes is 14 (one 500-rupee note, twelve 200-rupee notes and one 100-rupees note) which is also not possible.

If two 500-rupee notes are dispensed, the minimum number of notes is 22 (two 500-rupee notes and twenty 200-rupee notes).

If three 500-rupee notes are dispensed, the minimum number of notes is 21 (three 500-rupee notes, seventeen 200-rupee notes and one 100 rupees note).

If four 500-rupee notes are dispensed, the minimum number of notes = 19 (four 500-rupee notes and fifteen 200-rupee notes).
Hence, the minimum number of 500-rupee notes that can be dispensed to any person is 4. With fifty 500-rupee notes, a maximum of 12 persons can be served.

The correct option is C.

24. What is the number of 500-rupee notes required to serve 50 customers with 500-rupee notes as their preferences and another 50 customers with 100 rupee notes as their preferences, if the total number of notes to be dispensed is the smallest possible?

A. 800
B. 750
C. 900
D. 1400

Answer: C

Solution:

Step 1: To dispense the smallest possible number of notes to a person with 500-rupee notes as his/her preference, the ATM should dispense all 500-rupee notes. Hence, minimum number of notes required to serve any person with 500-rupee notes as his/her preference = 10

Total number of 500-rupee notes required to serve 50 = 10 × 50 = 500

Step 2: To minimize the number of notes to be served to a person with 100-rupee notes as his/her preference, we can maximize the number of 500-rupee notes served to him, keeping the 100-rupee notes more than the sum of the other two denominations.

Hence, the machine serves eight 500-rupee notes and ten 100-rupee notes, i.e., the total number of 500-rupee notes required to serve 50 customers with 100-rupee notes as his/her preference = 8 × 50 = 400

Total number of 500-rupee notes required in the given scenario = 500 + 400 = 900

The correct answer is C.

###TOPIC###Data Interpretation||Caselets||Caselets###

25.

|||Common|||

Direction: Adriana, Bandita, Chitra, and Daisy are four female students, and Amit, Barun, Chetan, and Deb are four male students. Each of them studies in one of three institutes - X, Y, and Z. Each student majors in one subject among Marketing, Operations, and Finance, and minors in a different one among these three subjects. The following facts are known about the eight students:

i) Three students are from X, three are from Y, and the remaining two students, both female, are from Z.

ii) Both the male students from Y minor in Finance, while the female student from Y majors in Operations.

iii) Only one male student majors in Operations, while three female students minor in Marketing.

iv) One female and two male students major in Finance.

v) Adriana and Deb are from the same institute. Daisy and Amit are from the same institute.

vi) Barun is from Y and majors in Operations. Chetan is from X and majors in Finance.

vii) Daisy minors in Operations.

|||End|||
From which institute does Chitra come from?
A. X
B. Y
C. Z
D. Cannot be determined

Answer: C

Solution:

From (vii), Daisy minors in operations (O) and from (iii), other three girls must have minored in Marketing (M).

From (vi), Barun is from Y and majors in Operations. Chetan is from X and majors in Finance.

Z consists of both females. Hence, from(v) Bandita and Chitra are from institute Z.

From (ii), Barun minored in Finance.

Name	Gender	Institute	Major	Minor
Adriana	F			M
Bandita	F	Z		M
Chitra	F	Z		M
Daisy	F			O
Amit	M			
Barun	M	Y	O	F
Chetan	M	X	F	
Deb	M			

We know that Amit and Daisy are from the same institute.
From (ii), female students from Y majors in Operations.
Daisy minored in Operations and cannot major in the same stream and from point (v), Adriana and Deb are from Y. Hence, Amit and Daisy are from X.

From (ii), Deb also minored in Finance.
From (iii), we know that in males category only Barun majored in Operations. Hence, Deb majored in Marketing.

From (iv), the remaining male Amit majored in Finance.

We can reach to the following table:

Name	Gender	Institute	Major	Minor
Adriana	F	Y	O	M
Bandita	F	Z		M
Chitra	F	Z		M
Daisy	F	X		O
Amit	M	X	F	
Barun	M	Y	O	F
Chetan	M	X	F	
Deb	M	Y	M	F

Chitra is a student of institute Z.

The correct option is C.

26. Which subject does Amit minor in?

A. Finance
B. Marketing
C. Operations
D. Cannot be determined uniquely from the given information

Answer: D

Solution:

From (vii), Daisy minors in Operations (O) and from (iii), other three girls must have minored in Marketing (M).

From (vi), Barun is from Y and majors in Operations. Chetan is from X and majors in Finance.

Z consists of both females. Hence, from (v), Bandita and Chitra are from institute Z.

From (ii), Barun minored in Finance.

Name	Gender	Institute	Major	Minor
Adriana	F			M
Bandita	F	Z		M
Chitra	F	Z		M
Daisy	F			O
Amit	M			
Barun	M	Y	O	F
Chetan	M	X	F	
Deb	M			

We know that Amit and Daisy are from the same institute.
From (ii), female student from Y majors in Operations.
Daisy minored in operations and cannot major in the same stream and from point (v), Adriana and Deb are from Y. Hence, Amit and Daisy are from X.

From (ii), Deb also minored in Finance.
From (iii), we know that in males category only Barun majored in Operations.
Hence, Deb majored in Marketing.

From (iv), the remaining male Amit majored in Finance.

We can reach to the following table:

Name	Gender	Institute	Major	Minor
Adriana	F	Y	O	M
Bandita	F	Z		M
Chitra	F	Z		M
Daisy	F	X		O
Amit	M	X	F	
Barun	M	Y	O	F
Chetan	M	X	F	
Deb	M	Y	M	F

We cannot uniquely determine the subject in which Amit minored.

The correct option is D.

27. Which of the given combinations must be true?

A. Bandita – Z(institute) – Operations(major) – Marketing(minor)
B. Chitra – Z(institute) – Finance(major) – Marketing(minor)
C. Barun – X(institute) – Operations(major) – F(minor)
D. Deb – Y(institute) – Marketing(major) – Finance(minor)

Answer: D

Solution:

From (vii), Daisy minors in operations (O) and from (iii), other three girls must have minored in Marketing (M).

From (vi), Barun is from Y and majors in Operations. Chetan is from X and majors in Finance.

Z consists of both females. Hence, from (v), Bandita and Chitra are from institute Z.

From (ii), Barun minored in Finance.

Name	Gender	Institute	Major	Minor
Adriana	F			M
Bandita	F	Z		M
Chitra	F	Z		M
Daisy	F			O
Amit	M			
Barun	M	Y	O	F
Chetan	M	X	F	
Deb	M			

We know that Amit and Daisy are from the same institute.
From (ii), female student from Y majors in Operations.
Daisy minored in Operations and cannot major in the same stream and from point (v), Adriana and Deb are from Y. Hence, Amit and Daisy are from X.

From (ii), Deb also minored in Finance.
From (iii), we know that in males category only Barun majored in Operations. Hence, Deb majored in Marketing.

From (iv), the remaining male Amit majored in Finance.

We can reach to the following table:

Name	Gender	Institute	Major	Minor
Adriana	F	Y	O	M
Bandita	F	Z		M
Chitra	F	Z		M
Daisy	F	X		O
Amit	M	X	F	
Barun	M	Y	O	F
Chetan	M	X	F	
Deb	M	Y	M	F

Deb is from institute Y, majored in Marketing, and minored in Finance.

The correct option is D.

28. If Bandita majors in Finance, which subject does Daisy major in?

A. Finance
B. Marketing
C. Operations
D. Cannot be determined uniquely from the given information

Answer: B

Solution:

From (vii), Daisy minors in Operations (O) and from (iii), other three girls must have minored in Marketing (M).

From (vi), Barun is from Y and majors in Operations. Chetan is from X and majors in Finance.

Z consists of both females. Hence, from (v), Bandita and Chitra are from institute Z.

From (ii), Barun minored in Finance.

Name	Gender	Institute	Major	Minor
Adriana	F			M
Bandita	F	Z		M
Chitra	F	Z		M
Daisy	F			O
Amit	M			
Barun	M	Y	O	F
Chetan	M	X	F	
Deb	M			

We know that Amit and Daisy are from the same institute.
From (ii), female student from Y majors in Operations.
Daisy minored in Operations and cannot major in the same stream and from point (v), Adriana and Deb are from Y. Hence, Amit and Daisy are from X.

From (ii), Deb also minored in Finance.
From (iii), we know that in the males category only Barun majored in Operations. Hence, Deb majored in Marketing.

From (iv), the remaining male Amit majored in Finance.

We can reach to the following table:

Name	Gender	Institute	Major	Minor
Adriana	F	Y	O	M
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Chitra	F	Z		M
Daisy	F	X		O
Amit	M	X	F	
Barun	M	Y	O	F
Chetan	M	X	F	
Deb	M	Y	M	F

If Bandita majors in finance, Daisy must have majored in marketing

The correct option is B.

###TOPIC###Logical Reasoning||Logical Matching||Logical Matching###

29.

|||Common|||

Direction: Fuel contamination levels at each of 20 petrol pumps P1, P2, …, P20 were recorded as either high, medium, or low.

i) Contamination levels at three pumps among P1 – P5 were recorded as high.

ii) P6 was the only pump among P1 – P10 where the contamination level was recorded as low.

iii) P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded.

iv) High contamination levels were not recorded at any of the pumps P16 – P20.

v) The number of pumps where high contamination levels were recorded was twice the number of pumps where low contamination levels were recorded.

|||End|||
Which of the following MUST be false?
A. The contamination level at P10 was recorded as low.
B. The contamination level at P12 was recorded as high.
C. The contamination level at P13 was recorded as low.
D. The contamination level at P20 was recorded as medium.

Answer: A

Solution:

From (iii), no level of contamination can appear for more than 10 times.

From (i) and (ii), we get

P1	P2	P3	P4	P5	P6
H	M	H	M	H	L

From (iv), we get 2 cases:

P16	P17	P18	P19	P20
L	M	L	M	L
M	L	M	L	M

Since no same level of contamination can be recorded for consecutive numbered pumps, the total number of high pipes cannot be equal to 10.

Let's take the number of high pipes as 4, 6, and 8.

According to point (v):

High	Low	Medium	

4	2	14	Not possible
6	3	11	Not possible
8	4	18	Possible

P7 and P8 can be either HH or MM. Therefore, two cases arise for P1 – P10.

	1	2	3	4	5	6	7	8	9	10
Case 1	H	M	H	M	H	L	M	M	H	M
Case 2	H	M	H	M	H	L	H	H	M	H

Case 1 is not possible as we need to have at least 5 high from the first 10 pipes because the total number of high are 8 and from pipes 15 to 20 we cannot have high contamination.

From Case 2, we can further derive 4 cases for P1 – P 20.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Case 1	H	M	H	M	H	L	H	H	M	H	M	H	M	H	M	L	M	L	M	L
Case 2	H	M	H	M	H	L	H	H	M	H	L	M	H	M	H	M	L	M	L	M
Case 3	H	M	H	M	H	L	H	H	M	H	M	L	H	M	H	M	L	M	L	M
Case 4	H	M	H	M	H	L	H	H	M	H	M	H	L	M	H	M	L	M	L	M

No. (L) = 4, No. (H) = 8, No. (M) = 8

P10 was recorded high in every case.

The correct answer is A.

30. What best can be said about the number of pumps at which the contamination levels were recorded as medium?

A. More than 2
B. At most 4
C. Exactly 8
D. At least 8

Answer: C

Solution:

From (iii), no level of contamination can appear for more than 10 times.

From (i) and (ii), we get

P1	P2	P3	P4	P5	P6
H	M	H	M	H	L

From (iv), we get 2 cases:

P16	P17	P18	P19	P20
L	M	L	M	L
M	L	M	L	M

Since no same level of contamination can be recorded for consecutive numbered pumps, the total number of high pipes cannot be equal to 10.

Let's take the number of high pipes as 4, 6, and 8.

According to point (v):

High	Low	Medium	
4	2	14	Not possible
6	3	11	Not possible
8	4	18	Possible

P7 and P8 can be either HH or MM. Therefore, two cases arise for P1 – P10.

	1	2	3	4	5	6	7	8	9	10
Case 1	H	M	H	M	H	L	M	M	H	M
Case 2	H	M	H	M	H	L	H	H	M	H

Case 1 is not possible as we need to have at least 5 high from the first 10 pipes because the total number of high are 8 and from pipes 15 to 20 we cannot have high contamination.

From Case 2, we can further derive 4 cases for P1 – P 20.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Case 1	H	M	H	M	H	L	H	H	M	H	M	H	M	H	M	L	M	L	M	L
Case 2	H	M	H	M	H	L	H	H	M	H	L	M	H	M	H	M	L	M	L	M
Case 3	H	M	H	M	H	L	H	H	M	H	M	L	H	M	H	M	L	M	L	M
Case 4	H	M	H	M	H	L	H	H	M	H	M	H	L	M	H	M	L	M	L	M

No. (L) = 4, No. (H) = 8, No. (M) = 8

There were exactly 8 pumps at which the contamination levels were recorded as medium.

The correct answer is C.

31. If the contamination level at P11 was recorded as low, then which of the following MUST be true?

A. The contamination level at P18 was recorded as low.
B. The contamination level at P12 was recorded as high.
C. The contamination level at P15 was recorded as medium.
D. The contamination level at P14 was recorded as medium.

Answer: D

Solution:

From (iii), no level of contamination can appear for more than 10 times.

From (i) and (ii), we get

P1	P2	P3	P4	P5	P6
H	M	H	M	H	L

From (iv), we get 2 cases:

P16	P17	P18	P19	P20
L	M	L	M	L
M	L	M	L	M

Since no same level of contamination can be recorded for consecutive numbered pumps, the total number of high pipes cannot be equal to 10.

Let's take the number of high pipes as 4, 6, and 8.

According to point (v):

High	Low	Medium	
4	2	14	Not possible
6	3	11	Not possible
8	4	18	Possible

P7 and P8 can be either HH or MM. Therefore, two cases arise for P1 – P10.

	1	2	3	4	5	6	7	8	9	10
Case 1	H	M	H	M	H	L	M	M	H	M
Case 2	H	M	H	M	H	L	H	H	M	H

Case 1 is not possible as we need to have at least 5 high from the first 10 pipes because the total number of high are 8 and from pipes 15 to 20 we cannot have high contamination.

From Case 2, we can further derive 4 cases for P1 – P 20.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Case 1	H	M	H	M	H	L	H	H	M	H	M	H	M	H	M	L	M	L	M	L
Case 2	H	M	H	M	H	L	H	H	M	H	L	M	H	M	H	M	L	M	L	M
Case 3	H	M	H	M	H	L	H	H	M	H	M	L	H	M	H	M	L	M	L	M
Case 4	H	M	H	M	H	L	H	H	M	H	M	H	L	M	H	M	L	M	L	M

No. (L) = 4, No. (H) = 8, No. (M) = 8

The given condition is of case 2, therefore, we can say that if the contamination level at P11 was recorded as low, then the contamination level at P14 was recorded as medium.

The correct option is D.

32.If contamination level at P15 was recorded as medium, then which of the following MUST be FALSE?

A. Contamination levels at P13 and P17 were recorded as the same.
B. Contamination levels at P11 and P16 were recorded as the same.
C. Contamination levels at P10 and P14 were recorded as the same.
D. Contamination level at P14 was recorded to be higher than that at P15

Answer: B

Solution:

From (iii), no level of contamination can appear for more than 10 times.

From (i) and (ii), we get

P1	P2	P3	P4	P5	P6
H	M	H	M	H	L

From (iv), we get 2 cases:

P16	P17	P18	P19	P20
L	M	L	M	L
M	L	M	L	M

Since no same level of contamination can be recorded for consecutive numbered pumps, the total number of high pipes cannot be equal to 10.

Let's take the number of high pipes as 4, 6, and 8.

According to point (v):

High	Low	Medium	
4	2	14	Not possible
6	3	11	Not possible
8	4	18	Possible

P7 and P8 can be either HH or MM. Therefore, two cases arise for P1 – P10.

	1	2	3	4	5	6	7	8	9	10
Case 1	H	M	H	M	H	L	M	M	H	M
Case 2	H	M	H	M	H	L	H	H	M	H

Case 1 is not possible as we need to have at least 5 high from the first 10 pipes because the total number of high are 8 and from pipes 15 to 20, we cannot have high contamination.

From Case 2, we can further derive 4 cases for P1 – P 20.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Case 1	H	M	H	M	H	L	H	H	M	H	M	H	M	H	M	L	M	L	M	L
Case 2	H	M	H	M	H	L	H	H	M	H	L	M	H	M	H	M	L	M	L	M
Case 3	H	M	H	M	H	L	H	H	M	H	M	L	H	M	H	M	L	M	L	M
Case 4	H	M	H	M	H	L	H	H	M	H	M	H	L	M	H	M	L	M	L	M

No. (L) = 4, No. (H) = 8, No. (M) = 8

The given condition is of the case 1 from the derived table. We can say that the statement "Contamination levels at P11 and P16 were recorded as the same" is definitely false.

The correct option is B.

###TOPIC###Logical Reasoning||Logical Matching||Logical Matching###