CAT 2020 Question Paper with Solution
Slot 2 DILR

1.

|||Common|||

Direction: Read the information carefully and answer the following questions:

A chain of departmental stores has outlets in Delhi, Mumbai, Bengaluru, and Kolkata. The sales are categorized by its three departments – 'Apparel', 'Electronics', and 'Home Decor'. An accountant has been asked to prepare a summary of the 2018 and 2019 sales amounts for an internal report. He has collated partial information and prepared the following table:

Sales Amounts (Crore Rupees)								
	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	-	-	-	-	-	-	-	54
Electronics	78	98	82	102	90	70	80	100
HomeDecor	-	100	-	72	-	80	-	54

The following additional information is known.

1) The sales amounts in the Apparel departments were the same for Delhi and Kolkata in 2018.

2) The sales amounts in the Apparel departments were the same for Mumbai and Bengaluru in 2018. This sales amount matched the sales amount in the Apparel department for Delhi in 2019.

3) The sales amounts in the Home Decor departments were the same for Mumbai and Kolkata in 2018.

4) The sum of the sales amounts of four Electronics departments increased by the same amount as the sum of the sales amounts of four Apparel departments from 2018 to 2019.

5) The total sales amounts of the four Home Decor departments increased by Rs. 70 crores from 2018 to 2019.

6) The sales amounts in the Home Decor departments of Delhi and Bengaluru each increased by Rs. 20 crores from 2018 to 2019.

7) The sales amounts in the Apparel departments of Delhi and Bengaluru each increased by the same amount in 2019 from 2018. The sales amounts in the Apparel departments of Mumbai and Kolkata also each increased by the same amount in 2019 from 2018.

8) The sales amounts in the Apparel departments of Delhi, Kolkata, and Bengaluru in 2019 followed an Arithmetic Progression.

|||End|||
In the Home Decor departments of which cities were the sales amounts the highest in 2018 and 2019, respectively?
A. Bengaluru and Delhi
B. Delhi and Delhi
C. Mumbai and Delhi
D. Mumbai and Mumbai

Answer ||| B

Solution |||

We can create the following table using the given table.

	Sales Amount (in Crore Rupees)					
	Apparels		Electronics		Home Décor	
	2018	2019	2018	2019	2018	2019
Delhi			78	98		100
Mumbai			82	102		72
Bengaluru			90	70		80
Kolkata		54	80	100		54
Total			330	370		306

Using statement 6, we can write the following:

Sale amount in the Home Decor departments of Delhi = 100 – 20 = Rs. 80 crore

Sale amount in the Home Decor departments of Bengaluru= 80 – 20 = Rs. 60 crore

Using statement 5, we can write the following:

The total sales amounts of the four Home Decor departments = 306 – 70 = Rs. 236 crore

Using statement 3, we can write the following:

Let the sale amount in the Home Décor department of Mumbai = x

Then, the sale amount in the Home Décor department of Kolkata = x

Now,

$80 + x + 60 + x = 236$

$\Rightarrow x = 48$

By substituting the above data, we get the following table:

	Sales Amount (in Crore Rupees)					
	Apparels		Electronics		Home Décor	
	2018	2019	2018	2019	2018	2019
Delhi			78	98	80	100
Mumbai			82	102	48	72
Bengaluru			90	70	60	80
Kolkata		54	80	100	48	54
Total			330	370	236	306

From the above table, the highest sales amount in Home Décor was in Delhi in both the given years.

2. What was the increase in sales amount, in crore rupees, in the Apparel department of Mumbai from 2018 to 2019?

A. 5
B. 12
C. 8
D. 10

Answer ||| B

Solution |||

We can create the following table using the given table.

	Sales Amount (in Crore Rupees)					
	Apparels		Electronics		Home Décor	
	2018	2019	2018	2019	2018	2019
Delhi			78	98		100
Mumbai			82	102		72
Bengaluru			90	70		80
Kolkata		54	80	100		54
Total			330	370		306

Using statement 6, we can write the following:

Sale amount in the Home Decor departments of Delhi = 100 – 20 = Rs. 80 crore

Sale amount in the Home Decor departments of Bengaluru= 80 – 20 = Rs. 60 crore

Using statement 5, we can write the following:

The total sales amounts of the four Home Decor departments = 306 – 70 = Rs. 236 crore

Using statement 3, we can write the following:

Let the sale amount in the Home Décor department of Mumbai = x

Then, the sale amount in the Home Décor department of Kolkata = x

Now,

$80 + x + 60 + x = 236$

$\Rightarrow x = 48$

By substituting the above data, we get the following table:

	Sales Amount (in Crore Rupees)					
	Apparels		Electronics		Home Décor	
	2018	2019	2018	2019	2018	2019
Delhi			78	98	80	100
Mumbai			82	102	48	72
Bengaluru			90	70	60	80
Kolkata		54	80	100	48	54
Total			330	370	236	306

Let the sales amount of Apparels for Delhi in 2018 = y

and the sales amount of Apparels for Delhi in 2019 = y + k

Using Statement 1, we can write the following:

Sales amount of Apparels for Kolkata in 2018 = y

Using Statement 2, we can write the following:

Sales amount of Apparels for each of Mumbai and Bengaluru in 2018 = y + k

Using statement 7, we can write the following:

Sales amount of Apparels for Bengaluru in 2019 = y + k + (y + k – y) = y + 2k

Sales amount of Apparels for Mumbai in 2019 = y + k + (54 – y) = 54 + k

Substituting the above values, we get the following table:

	Sales amount (in crore rupees)

	Apparels		Electronics		Home decor	
	2018	2019	2018	2019	2018	2019
Delhi	y	y + k	78	98	80	100
Mumbai	y + k	54 + k	82	102	48	72
Bengaluru	y + k	y + 2k	90	70	60	80
Kolkatta	y	54	80	100	48	54
Total	4y + 2k	2y + 4k + 108	330	370	236	306

Using Statement 8, we can write the following:

y + k, 54, and y + 2k are in AP.

$\Rightarrow y + k + y + 2k = 108$

$\Rightarrow 2y + 3k = 108$.....(1)

Using Statement 4, we can write the following:

$(2y + 4k + 108) - (4y + 2k) = 370 - 330$

$\Rightarrow y - k = 34$ .....(2)

Solving Equations (1) and (2), we get the following:

y = 42 and k = 8

By substituting the values of y and k, we can complete the above table.

	Sales Amount (in Crore Rupees)					
	Apparels		Electronics		Home Decor	
	2018	2019	2018	2019	2018	2019
Delhi	42	50	78	98	80	100
Mumbai	50	62	82	102	48	72
Bengaluru	50	58	90	70	60	80
Kolkata	42	54	80	100	48	54
Total	184	224	330	370	236	306

So, the increase in sales amount, in crore rupees, in the Apparel department of Mumbai from 2018 to 2019 = 62 – 50 = Rs. 12 crore

3. Among all the 12 departments (i.e., the 3 departments in each of the 4 cities), what was the maximum percentage increase in sales amount from 2018 to 2019?

A. 28
B. 25
C. 75
D. 50

Answer ||| D

Solution |||

We can create the following table using the given table.

	Sales Amount (in Crore Rupees)					
	Apparels		Electronics		Home Décor	
	2018	2019	2018	2019	2018	2019
Delhi			78	98		100
Mumbai			82	102		72
Bengaluru			90	70		80
Kolkata		54	80	100		54
Total			330	370		306

Using statement 6, we can write the following:

Sale amount in the Home Decor departments of Delhi = 100 – 20 = Rs. 80 crore

Sale amount in the Home Decor departments of Bengaluru= 80 – 20 = Rs. 60 crore

Using statement 5, we can write the following:

The total sales amounts of the four Home Decor departments = 306 – 70 = Rs. 236 crore

Using statement 3, we can write the following:

Let the sale amount in the Home Décor department of Mumbai = x

Then, the sale amount in the Home Décor department of Kolkata = x

Now,

80 + x + 60 + x = 236

$\Rightarrow x = 48$

By substituting the above data, we get the following table:

	Sales Amount (in Crore Rupees)					
	Apparels		Electronics		Home Décor	
	2018	2019	2018	2019	2018	2019
Delhi			78	98	80	100
Mumbai			82	102	48	72
Bengaluru			90	70	60	80
Kolkata		54	80	100	48	54
Total			330	370	236	306

Let the sales amount of Apparels for Delhi in 2018 = y

and the sales amount of Apparels for Delhi in 2019 = y + k

Using Statement 1, we can write the following:

Sales amount of Apparels for Kolkata in 2018 = y

Using Statement 2, we can write the following:

Sales amount of Apparels for each of Mumbai and Bengaluru in 2018 = y + k

Using statement 7, we can write the following:

Sales amount of Apparels for Bengaluru in 2019 = y + k + (y + k – y) = y + 2k

Sales amount of Apparels for Mumbai in 2019 = y + k + (54 – y) = 54 + k

Substituting the above values, we get the following table:

	Sales amount (in crore rupees)					
	Apparels		Electronics		Home decor	
	2018	2019	2018	2019	2018	2019
Delhi	y	y + k	78	98	80	100
Mumbai	y + k	54 + k	82	102	48	72
Bengaluru	y + k	y + 2k	90	70	60	80
Kolkatta	y	54	80	100	48	54
Total	4y + 2k	2y + 4k + 108	330	370	236	306

Using Statement 8, we can write the following:

y + k, 54, and y + 2k are in AP.

$\Rightarrow y + k + y + 2k = 108$

$\Rightarrow 2y + 3k = 108$.....(1)

Using Statement 4, we can write the following:

$(2y + 4k + 108) - (4y + 2k) = 370 - 330$

$\Rightarrow y - k = 34$ .....(2)

Solving Equations (1) and (2), we get the following:

y = 42 and k = 8

By substituting the values of y and k, we can complete the above table.

	Sales Amount (in Crore Rupees)					
	Apparels		Electronics		Home Decor	
	2018	2019	2018	2019	2018	2019
Delhi	42	50	78	98	80	100
Mumbai	50	62	82	102	48	72
Bengaluru	50	58	90	70	60	80
Kolkata	42	54	80	100	48	54
Total	184	224	330	370	236	306

From the table, we can notice that the highest % increase should be in the Home Décor department of Mumbai from 2018 to 2019.

Highest % increase = $\frac{72-48}{48}(100\%) = 50\%$

4. What was the total sales amount, in crore rupees, in 2019 for the chain of departmental stores?

A. 150
B. 900
C. 750
D. 600

Answer ||| B

Solution |||

We can create the following table using the given table.

	Sales Amount (in Crore Rupees)					
	Apparels		Electronics		Home Décor	
	2018	2019	2018	2019	2018	2019
Delhi			78	98		100
Mumbai			82	102		72
Bengaluru			90	70		80
Kolkata		54	80	100		54
Total			330	370		306

Using statement 6, we can write the following:

Sale amount in the Home Decor departments of Delhi = 100 – 20 = Rs. 80 crore

Sale amount in the Home Decor departments of Bengaluru= 80 – 20 = Rs. 60 crore

Using statement 5, we can write the following:

The total sales amounts of the four Home Decor departments = 306 – 70 = Rs. 236 crore

Using statement 3, we can write the following:

Let the sale amount in the Home Décor department of Mumbai = x

Then, the sale amount in the Home Décor department of Kolkata = x

Now,

80 + x + 60 + x = 236

$\Rightarrow x = 48$

By substituting the above data, we get the following table:

	Sales Amount (in Crore Rupees)					
	Apparels		Electronics		Home Décor	
	2018	2019	2018	2019	2018	2019
Delhi			78	98	80	100
Mumbai			82	102	48	72
Bengaluru			90	70	60	80
Kolkata		54	80	100	48	54
Total			330	370	236	306

Let the sales amount of Apparels for Delhi in 2018 = y

and the sales amount of Apparels for Delhi in 2019 = y + k

Using Statement 1, we can write the following:

Sales amount of Apparels for Kolkata in 2018 = y

Using Statement 2, we can write the following:

Sales amount of Apparels for each of Mumbai and Bengaluru in 2018 = y + k

Using statement 7, we can write the following:

Sales amount of Apparels for Bengaluru in 2019 = y + k + (y + k – y) = y + 2k

Sales amount of Apparels for Mumbai in 2019 = y + k + (54 – y) = 54 + k

Substituting the above values, we get the following table:

	Sales amount (in crore rupees)					
	Apparels		Electronics		Home decor	
	2018	2019	2018	2019	2018	2019
Delhi	y	y + k	78	98	80	100
Mumbai	y + k	54 + k	82	102	48	72
Bengaluru	y + k	y + 2k	90	70	60	80
Kolkatta	y	54	80	100	48	54

Total	4y + 2k	2y + 4k + 108	330	370	236	306

Using Statement 8, we can write the following:

y + k, 54, and y + 2k are in AP.

$\Rightarrow y + k + y + 2k = 108$

$\Rightarrow 2y + 3k = 108$.....(1)

Using Statement 4, we can write the following:

(2y + 4k + 108) – (4y + 2k) = 370 – 330

$\Rightarrow y - k = 34$ .....(2)

Solving Equations (1) and (2), we get the following:

y = 42 and k = 8

By substituting the values of y and k, we can complete the above table.

	Sales Amount (in Crore Rupees)					
	Apparels		Electronics		Home Decor	
	2018	2019	2018	2019	2018	2019
Delhi	42	50	78	98	80	100
Mumbai	50	62	82	102	48	72
Bengaluru	50	58	90	70	60	80
Kolkata	42	54	80	100	48	54
Total	184	224	330	370	236	306

Total sales amount in 2019 for the chain of departmental stores = 224 + 370 + 306 = Rs. 900 crore

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

5.

|||Common|||

Direction: Read the information carefully and answer the following questions:

In an election several candidates contested for a constituency. In any constituency, the winning candidate was the one who polled the highest number of votes, the first runner up was the one who polled the second highest number of votes, the second runner up was the one who polled the third highest number of votes, and so on. There were no ties (in terms of number of votes polled by the candidates) in any of the constituencies in this election. In an electoral system, a security deposit is the sum of money that a candidate is required to pay to the election commission before he or she is permitted to contest. Only the defeated candidates (i.e., one who is not the winning candidate) who fail to secure more than one sixth of the valid votes polled in the constituency, lose their security deposits. The following table provides some incomplete information about votes polled in four constituencies: A, B, C, and D, in this election

	Constituency			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total No. of valid votes polled	5,00,000	3,25,000	6,00,030	
No. of votes polled by the winning candidate	2,75,000	48,750		
No. of votes polled by the first runner up	95,000			37,500
No. of votes polled by the second runner up				30,000
% of valid votes polled by the third runner up				10%

The following additional facts are known.

1) The first runner up polled 10,000 more votes than the second runner up in constituency A.

2) None of the candidates who contested in constituency C lost their security deposit. The difference in votes polled by any pair of candidates in this constituency was at least 10,000.

3) The winning candidate in constituency D polled 5% of valid votes more than that of the first runner up. All the candidates who lost their security deposits while contesting for this constituency, put together, polled 35% of the valid votes.

|||End|||
What is the percentage of votes polled in total by all the candidates who lost their security deposits while contesting for constituency A?

Answer ||| 9

Solution |||

We can find the following information for constituency A from the given table and statements.

Number of votes polled by the second runner up = 95000 – 10000 = 85000

Total number of votes scored by the remaining 13 candidates = 500000 – 275000 – 95000 – 85000 = 45000 = 9% of valid votes

This is less than $1/6^{th}$ of the valid votes. Hence, all 13 candidates lost their security deposit and they polled 9% of the valid votes together.

6. How many candidates who contested in constituency B lost their security deposit?

Answer ||| 11

Solution |||

Total number of valid votes = 325,000

Number of votes polled by the winner = 48750

Maximum possible number of votes polled by first runner-up = 48749

So, the first runner up lost his security deposit and all the remaining 10 contestants who polled less than the first runner-up also lost their security deposit.

Hence, a total of 11 candidates (except the winning candidate) lost their security deposit in constituency B.

7. What BEST can be concluded about the number of votes polled by the winning candidate in constituency C?

A. 1,40,010
B. Less than 2,00,010

C. 1,40,006
D. Between 1,40,005 and 1,40,010

Answer ||| C

Solution |||

None of the 5 candidates lost the security deposit in constituency C.

We can say that every candidate secured more than 1/6th of the valid votes.

Least possible number of votes polled by the 4th runner-up in constituency C = $\frac{600030}{6} + 1 = 100006$

Now from statement 2, the least possible number of votes polled by the 3rd runner-up, 2nd runner-up, 1st runner-up, and winner are 110006, 120006, 130006, and 140006, respectively.

The sum of the least possible number of votes polled is equal to the total number of valid votes.

Hence, the only possibility is that all the candidates scored their least possible number of votes polled.
Number of votes polled by the winning candidate in constituency C = 140006

8. What was the number of valid votes polled in constituency D?

A. 62,500
B. 1,75,000
C. 1,25,000
D. 1,50,000

Answer ||| B

Solution |||

Let the total number of votes polled = 100a

Number of votes polled by the winning candidate = 37500 + 5a

Total number of votes polled by the candidates who lost their security deposit = 35a

Now, let us consider two cases.

Case 1: The second runner-up lost the security deposit (polled in less than or equal to 1/6th of the votes).

In this case, the total number of votes polled in by the winner, 1st runner-up and the total votes polled by the candidates who lost their security deposit should be equal to the total number of valid votes.

$\Rightarrow 100a = 37500 + 5a + 37500 + 35a$

$\Rightarrow 60a = 75000$

$\Rightarrow a = 1250$

Total number of valid votes = 100a = 125000

% of valid votes polled in by the 2nd runner up = $\frac{30000}{125000}(100\%) = 24\%$

It contradicts with the assumption that the 2nd runner-up lost the security deposit. So, we can eliminate this possibility.

Case 2: The second runner-up did not lose the security deposit (polled in more than 1/6th of the votes).

In this case, the total number of votes polled by the winner, 1st runner-up, 2nd runner-up and the total votes polled by the candidates who lost their security deposit should be equal to the total number of valid votes.

$\Rightarrow 100a = 37500 + 5a + 37500 + 30000 + 35a$

$\Rightarrow 60a = 105000$

$\Rightarrow a = 1750$

Total number of valid votes = 100a = 175000

% of valid votes polled by the 2nd runner-up = $\frac{30000}{175000}(100\%) = 17.14\%$

This case satisfies all given conditions.

Hence, the total number of votes polled in constituency D = 175000

9. The winning margin of a constituency is defined as the difference of votes polled by the winner and that of the first runner-up. Which of the following CANNOT be the list of constituencies in increasing order of winning margin?

A. B, D, C, A
B. D, B, C, A
C. D, C, B, A
D. B, C, D, A

Answer ||| D

Solution |||

For Constituency A, we can write the following:

Number of votes polled by the second runner-up = 95000 – 10000 = 85000

Total number of votes scored by the remaining 13 candidates = 500000 – 275000 – 95000 – 85000 = 45000 = 9% of valid votes

For Constituency B, we can write the following:

Total number of valid votes = 325,000

Number of votes polled by the winner = 48750

Maximum possible number of votes polled by first runner-up = 48749

So, the first-runner up lost his security deposit and all the remaining 10 contestants who polled less than the first runner-up also lost their security deposit.

For Constituency C, we can write the following:

Since none of the 5 candidates lost the security deposit in constituency C, we can say that every candidate scored more than $1/6^{th}$ of the valid votes.

Least possible number of votes polled by the 4^{th} runner-up in Constituency C = $\frac{600030}{6} + 1 = 100006$

Now, using statement 2, the least possible number of votes polled by 3^{rd} runner-up, 2^{nd} runner-up, 1^{st} runner-up, and winner are 110006, 120006, 130006, and 140006, respectively.

We can notice that the sum of the least possible number of votes polled is equal to the total number of valid votes; so, the only possibility is that all the candidates scored their least possible number of votes polled.

For Constituency D, we can write the following:

Let the total number of votes polled = 100a

Number of votes polled by the winning candidate = 37500 + 5a

Total number of votes polled in by the candidates who lost their security deposit = 35a

Now, let us consider two cases.

Case 1: The second runner-up lost the security deposit (polled in less than or equal to $1/6^{th}$ of the votes).

In this case, the total number of votes polled in by the winner, 1^{st} runner-up and the total votes polled by the candidates who lost their security deposit should be equal to the total number of valid votes.

$\Rightarrow 100a = 37500 + 5a + 37500 + 35a$

$\Rightarrow 60a = 75000$

$\Rightarrow a = 1250$

Total number of valid votes = 100a = 125000

% of valid votes polled in by the 2^{nd} runner up = $\frac{30000}{125000}(100\%) = 24\%$

It contradicts with the assumption that the 2^{nd} runner-up lost the security deposit. So, we can eliminate this possibility.

Case 2: The second runner-up did not lose the security deposit (polled in more than $1/6^{th}$ of the votes).

In this case, the total number of votes polled by the winner, 1^{st} runner-up, 2^{nd} runner-up and the total votes polled by the candidates who lost their security deposit should be equal to the total number of valid votes.

$\Rightarrow 100a = 37500 + 5a + 37500 + 30000 + 35a$

$\Rightarrow 60a = 105000$

$\Rightarrow a = 1750$

Total number of valid votes = 100a = 175000

% of valid votes polled in by the 2^{nd} runner- up = $\frac{30000}{175000}(100\%) = 17.14\%$

This case satisfies all given conditions.

We can create the following table using the above data.

	Constituency			
	A	B	C	D
No. of Candidates Contesting	10	12	5	8
Total No. of Valid Votes Polled	5,00,000	3,25,000	6,00,030	175000
No. of Votes polled by the winning Candidate	2,75,000	48,750	140006	46250
No. of votes polled by the first runner up	95,000		130006	37,500
No. of votes polled by the second runner up	85,000		120006	30,000
% of valid votes polled by the third runner up			100006	10%
Total number of votes polled by the candidates who lost their security deposit	45,000	276250		61250

Winning margin of Constituency A = 275000 – 950000 = 180000

Winning margin of Constituency C = 140006 – 130006 = 10000

Winning margin of Constituency D = 46250 – 37500 = 8750

Hence, option D is not possible as the winning margin of C is more than D.

10. For all the four constituencies taken together, what was the approximate number of votes polled by all the candidates who lost their security deposit expressed as a percentage of the total valid votes from these four constituencies?

A. 23.54%
B. 62.32%
C. 23.91%
D. 38.25%

Answer ||| C

Solution |||

For Constituency A, we can write the following:

Number of votes polled by the second runner-up = 95000 – 10000 = 85000

Total number of votes scored by the remaining 13 candidates = 500000 – 275000 – 95000 – 85000 = 45000 = 9% of valid votes

For Constituency B, we can write the following:

Total number of valid votes = 325,000

Number of votes polled by the winner = 48750

Maximum possible number of votes polled by first runner-up = 48749

So, the first-runner up lost his security deposit and all the remaining 10 contestants who polled less than the first runner-up also lost their security deposit.

For Constituency C, we can write the following:

Since none of the 5 candidates lost the security deposit in constituency C, we can say that every candidate scored more than $1/6^{th}$ of the valid votes.

Least possible number of votes polled by the 4^{th} runner-up in Constituency C = $\frac{600030}{6} + 1 = 100006$

Now, using statement 2, the least possible number of votes polled by 3^{rd} runner-up, 2^{nd} runner-up, 1^{st} runner-up, and winner are 110006, 120006, 130006, and 140006, respectively.

We can notice that the sum of the least possible number of votes polled is equal to the total number of valid votes; so, the only possibility is that all the candidates scored their least possible number of votes polled.

For Constituency D, we can write the following:

Let the total number of votes polled = 100a

Number of votes polled by the winning candidate = 37500 + 5a

Total number of votes polled in by the candidates who lost their security deposit = 35a

Now, let us consider two cases.

Case 1: The second runner-up lost the security deposit (polled in less than or equal to $1/6^{th}$ of the votes).

In this case, the total number of votes polled in by the winner, 1^{st} runner-up and the total votes polled by the candidates who lost their security deposit should be equal to the total number of valid votes.

⇒100a = 37500 + 5a + 37500 + 35a

⇒ 60a = 75000

⇒ a = 1250

Total number of valid votes = 100a = 125000

% of valid votes polled in by the 2nd runner up = $\frac{30000}{125000}(100\%) = 24\%$

It contradicts with the assumption that the 2nd runner-up lost the security deposit. So, we can eliminate this possibility.

Case 2: The second runner-up did not lose the security deposit (polled in more than 1/6th of the votes).

In this case, the total number of votes polled by the winner, 1st runner-up, 2nd runner-up and the total votes polled by the candidates who lost their security deposit should be equal to the total number of valid votes.

⇒100a = 37500 + 5a + 37500 + 30000 + 35a

⇒ 60a = 105000

⇒ a = 1750

Total number of valid votes = 100a = 175000

% of valid votes polled in by the 2nd runner- up = $\frac{30000}{175000}(100\%) = 17.14\%$

This case satisfies all given conditions.

We can create the following table using the above data.

	Constituency				Total
	A	B	C	D	
No. of Candidates Contesting	10	12	5	8	35
Total No. of Valid Votes Polled	5,00,000	3,25,000	6,00,030	175000	
No. of Votes polled by the winning Candidate	2,75,000	48,750	140006	46250	1600030
No. of votes polled by the first runner up	95,000		130006	37,500	
No. of votes polled by the second runner up	85,000		120006	30,000	
% of valid votes polled by the third runner up			100006	10%	
Total number of votes polled by the candidates who lost their security deposit	45,000	276250	0	61250	382500

Required % = $\frac{382500}{1600030}(100\%) = 23.91\%$

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

11.

|||Common|||

Direction: Read the information carefully and answer the following questions:

Twenty-five coloured beads are to be arranged in a grid comprising five rows and five columns. Each cell in the grid must contain exactly one bead. Each bead is coloured either red, blue, or green. While arranging the beads along any of the five rows or along any of the five columns, the rules given below are to be followed: 1) Two adjacent beads along the same row or column are always of different colours. 2) There is at least one green bead between any two blue beads along the same row or column. 3) There is at least one blue and at least one green bead between any two red beads along the same row or column. Every unique, complete arrangement of twenty-five beads is called a configuration.

|||End|||
The total number of possible configurations using beads of only two colours is ___.

Answer ||| 2

Solution |||

From statement 3, if we use red beads, then we have to use beads of other two colours as well. Hence, we have to use beads of green and blue colours if we have to use beads of only two colours.

Since adjacent beads cannot have the same colour, we can have only two possible configurations as shown below:

B	G	B	G	B
G	B	G	B	G
B	G	B	G	B
G	B	G	B	G
B	G	B	G	B

G	B	G	B	G
B	G	B	G	B
G	B	G	B	G
B	G	B	G	B
G	B	G	B	G

12. What is the maximum possible number of red beads that can appear in any configuration?

Answer ||| 9

Solution |||

To get the maximum number of red beads in any configuration, we need to use the minimum number of blue or green beads between them as shown in the following configuration:

R	B	G	R	B
G	R	B	G	R
B	G	R	B	G
R	B	G	R	B
G	R	B	G	R

Maximum possible number of red beads used = 9

13. What is the minimum number of blue beads in any configuration?

Answer ||| 6

Solution |||

To minimize the number of blue beads, we should maximize the number of green beads as shown in the following configuration.

R	G	B	G	R
G	B	G	R	G
B	G	R	G	B
G	R	G	B	R
R	G	B	R	G

Number of blue beads used = 6

14. Two red beads have been placed in 'second row, third column' and 'third row, second column'. How many more red beads can be placed so as to maximize the number of red beads used in the configuration?

Answer ||| 6

Solution |||

From statement 3, we can say that we need two cells between any two red beads. Considering this condition and the given information, the maximum number of red beads that can be filled is shown below:

R			R	
		R		
	R			R
R			R	
		R		

Now, considering the remaining statements, we can complete the configuration as shown below:

R	G	B	R	G
G	B	R	G	B
B	R	G	B	R
R	G	B	R	G
G	B	R	G	B

Number of extra red beads used = 8 – 2 = 6

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

15.

|||Common|||

Direction: Read the information carefully and answer the following questions:

A shopping mall has a large basement parking lot with parking slots painted in it along a single row. These slots are quite narrow; a compact car can fit in a single slot but an SUV requires two slots. When a car arrives, the parking attendant guides the car to the first available slot from the beginning of the row into which the car can fit. For our purpose, cars are numbered according to the order in which they arrive at the lot. For example, the first car to arrive is given a number 1, the second a number 2, and so on. This numbering does not indicate whether a car is a compact or an SUV. The configuration of a parking lot is a sequence of the car numbers in each slot. Each single vacant slot is represented by letter V. For instance, suppose cars numbered 1 through 5 arrive and park, where cars 1, 3, and 5 are compact cars and 2 and 4 are SUVs. At this point, the parking lot would be described by the sequence 1, 2, 3, 4, 5. If cars 2 and 5 now vacate their slots, the parking lot would now be described as 1, V, V, 3, 4 . If a compact car (numbered 6) arrives subsequently followed by an SUV (numbered 7), the parking lot would be described by the sequence 1, 6, V, 3, 4, 7. Answer the following questions INDEPENDENTLY of each other.

|||End|||
Initially, cars numbered 1, 2, 3, and 4 arrive, among which 1 and 4 are SUVs while 2 and 3 are compact cars. Car 1 then leaves, followed by the arrivals of car 5 (a compact car) and car 6 (an SUV). Car 4 then leaves. Then, car 7 (an SUV) and car 8 (a compact car) arrive. At this moment, which among the following numbered cars is parked next to car 3?
A. 8
B. 5
C. 6

D. 7

Answer ||| D

Solution |||

We can make the following table for the parking sequence after each event.

Event	Parking Sequence
Cars (1), 2, 3, (4) arrive	(1), 2, 3, (4)
Car (1) leaves	v, v, 2, 3, (4)
Car 5 arrives	5, v, 2, 3, (4)
car (6) arrives	5, v, 2, 3, (4), (6)
Car (4) leaves	5, v, 2, 3, v, v, (6)
Car (7) arrives	5, v, 2, 3, (7), (6)
car 8 arrives	5, 8, 2, 3, (7), (6)

( ) - SUV

The number without parenthesis means that the car is a compact car.

From the table, the cars 2 and (7) are parked along with car 3.

So, option D is the correct answer.

16. Suppose eight cars have arrived, of which two have left. Also suppose that car 4 is a compact and car 7 is an SUV. Which of the following is a POSSIBLE current configuration of the parking lot?

A. 8, 2, 3, V, 6, 5, 7
B. 8, 2, 3, V, 5, 7, 6
C. 8, 2, 3, V, 5, 6, 7
D. V, 2, 3, 7, 5, 6, 8

Answer ||| C

Solution |||

We can solve this question using the options.

For option A:

Since car 5 arrived before car 6, it should be parked before car 6 irrespective of the fact that it is a compact car or an SUV. Hence, option A cannot be a possible parking sequence.

For option B:

Car 6 should be parked before car 7 as it arrived before car 7. Hence, option B cannot be a possible parking sequence.

For option D:

In this case, car 7 is parked in place of car 4 before car 5 and car 6. It is only possible if car 4 left after car 6 arrived. But in that case, car 7 cannot be placed there as car 4 was a compact car and car 7 is an SUV. Hence, option D cannot be a possible parking sequence.

For option C:

This can be a possible parking sequence as shown in the following table:

( ) - SUV

The number without parenthesis means that the car is a compact car.

Event	Parking Sequence
Cars 1, 2, 3, 4, 5, 6, 7 arrived	1, 2, 3, 4, 5, 6, (7)
car 1 left	v, 2, 3, 4, 5, 6, (7)
car 8 arrived	8, 2, 3, 4, 5, 6, (7)
Car 4 left	8, 2, 3, v, 5, 6, (7)

17. Suppose the sequence at some point of time is 4, 5, 6, V, 3. Which of the following is NOT necessarily true?

A. Car 3 is an SUV.
B. Car 5 is a compact.
C. Car 1 is an SUV.
D. Car 4 is a compact car.

Answer ||| A

Solution |||

In the given parking sequence, car 3 comes after 4 spaces (as it cannot be placed after 4 spaces). So, we can conclude that 1 and 2 were SUVs. When car 1 and 2 left, there should have been 4 vacant spaces and each of the cars 4, 5, and 6 have occupied only 1 space, which means cars 4, 5, and 6 are compact cars. But we cannot conclude anything for car 3 which may be an SUV or a compact car.

Hence, option A is not necessarily true.

18. Suppose that car 4 is not the first car to leave and that the sequence at a time between the arrival of car 7 and car 8 is V, 7, 3, 6, 5. Which of the following statements MUST be false?

A. Car 2 is a compact car.
B. Car 6 is a compact car.
C. Car 7 is a compact car.
D. Car 4 is an SUV.

Answer ||| B

Solution |||

From the given parking sequence, car 1, car 2, and car 4 have left. Since Car 6 is in place of car 4 and before car 5, car 4 has left after the arrival of car 5 and before the arrival of car 6. It is also given that car 4 is not the first car to leave. So, either car 1 or car 2 was the first car to leave. If car 1 was the first to leave, then the first space should not be vacant and car 7 should be parked at the first spot. So, we can say that car 2 was the first to leave. Using this information and the given parking sequence, we can make a possible parking sequence.

( ) - SUV

The number without parenthesis means that the car is a compact car.

Event	Parking Sequence
cars 1, 2,3, (4), 5 arrived	1, 2, 3, (4), 5
Car 2 left	1, v, 3, (4), 5
car 4 left	1, v, 3, v, v, 5
car (6) arrived	1, v, 3, (6), 5
car 7 arrived	1, 7, 3, (6), 5
car 1 left	v, 7, 3, (6), 5

Hence, the statements A, C, and D can be true but statement B must be false because if car 6 was a compact car, it would have occupied the single vacant space created by car 2.

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

19.

|||Common|||

Direction: Read the information carefully and answer the following questions:

The Humanities department of a college is planning to organize eight seminars, one for each of the eight doctoral students - A, B, C, D, E, F, G, and H. Four of them are from Economics, three from Sociology and one from Anthropology department. Each student is guided by one among P, Q, R, S, and T. Two students are guided by each of P, R, and T, while one student is guided by each of Q and S. Each student is guided by a guide belonging to their department. Each seminar is to be scheduled in one of four consecutive 30-minute slots starting at 9:00 a.m., 9:30 a.m., 10:00 a.m., and 10:30 a.m. on the same day. More than one seminar can be scheduled in a slot, provided the guide is free. Only three rooms are available and hence at the most three seminars can be scheduled in a slot. Students who are guided by the same guide must be scheduled in consecutive slots. The following additional facts are also known.

1) Seminars by students from Economics are scheduled in each of the four slots.

2) A's is the only seminar that is scheduled at 10:00 a.m.. A is guided by R.

3) F is an Anthropology student whose seminar is scheduled at 10:30 a.m.

4) The seminar of a Sociology student is scheduled at 9:00 a.m.

5) B and G are both Sociology students, whose seminars are scheduled in the same slot. The seminar of an Economics student, who is guided by T, is also scheduled in the same slot.

6) P, who is guiding both B and C, has students scheduled in the first two slots.

7) A and G are scheduled in two consecutive slots.

|||End|||
Which one of the following statements is true?
A. Two seminars are scheduled in the first slot.
B. Three seminars are scheduled in the first slot.
C. Only one seminar is scheduled in the second slot.
D. Three seminars are scheduled in the last slot.

Answer ||| A

Solution |||

From statements 1 and 2, in each of the four timings, exactly one seminar on Economics is scheduled and only A's seminar is scheduled at 10:00. We can conclude that A is an Economics student who is guided by R.

Using the above conclusion and statements 3 and 4, we can create the following table:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics			Sociology					
09:30	Economics								
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics			Anthropology	F				

'NA' in the above table means no seminar is scheduled in that slot.

From statement 5, both B and G are Sociology students, whose seminars are scheduled in the same slot. Hence, their time slot should either be 9 a.m. or 9:30 a.m.

From statement 7, A's and G's seminar should be consecutive; hence, G's seminar cannot be scheduled at 9:00 a.m. Therefore, seminars of both B and G should be scheduled at 9:30 a.m. From statement 5, the economics student scheduled in the 9:30 a.m. slot is guided by T.

Students who are guided by the same guide must be scheduled in consecutive slots and T is already guiding an Economics student whose seminar is scheduled at 9:30 a.m. Hence, T also guides the student whose seminar is scheduled at 9:00 a.m.

Similarly, R guides the Economics student whose seminar is scheduled at 10:30 a.m.

We have already concluded that B is a sociology student whose seminar is scheduled at 9:30. From statement 6, P is the guide of both B and C and has students scheduled in the first two slots. We can conclude that C is a sociology student whose seminar is scheduled at 9:00 a.m.

By substituting the data in the above table, we get the following:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics	D/E/H	T	Sociology	C	P	NA	NA	NA
09:30	Economics	D/E/H	T	Sociology	B	P	Sociology	G	Q/S
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics	D/E/H	R	Anthropology	F	Q/S	NA	NA	NA

'NA' in the above table means no seminar is scheduled in that slot.

From the above table, we can say that only statement A is true.

20. Who all are NOT guiding any Economics students?

A. P, Q, and S
B. Q, R, and S
C. P, Q, and R
D. P, R, and S

Answer ||| A

Solution |||

In each of the four timings, exactly one seminar on Economics is scheduled (statement 1) and only A's seminar is scheduled at 10:00 (statement 2). We can conclude that A is an economics student guided by R.

Using the above conclusion and statements 3 and 4, we can create the following table:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics			Sociology					
09:30	Economics								
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics			Anthropology	F				

'NA' in the above table means no seminar is scheduled in that slot.

From statement 5, both B and G are Sociology students, whose seminars are scheduled in the same slot. Hence, their time slot should either be 9 a.m. or 9:30 a.m.

From statement 7, A's and G's seminar should be consecutive; hence, G's seminar cannot be scheduled at 9:00 a.m. Therefore, seminars of both B and G should be scheduled at 9:30 a.m. From statement 5, the economics student scheduled in the 9:30 a.m. slot is guided by T.

Students who are guided by the same guide must be scheduled in consecutive slots and T is already guiding an Economics student whose seminar is scheduled at 9:30 a.m. Hence, T also guides the student whose seminar is scheduled at 9:00 a.m.

Similarly, R guides the Economics student whose seminar is scheduled at 10:30 a.m.

We have already concluded that B is a sociology student whose seminar is scheduled at 9:30. From statement 6, P is the guide of both B and C and has students scheduled in the first two slots. We can conclude that C is a sociology student whose seminar is scheduled at 9:00 a.m.

By substituting the data in the above table, we get the following:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics	D/E/H	T	Sociology	C	P	NA	NA	NA
09:30	Economics	D/E/H	T	Sociology	B	P	Sociology	G	Q/S
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics	D/E/H	R	Anthropology	F	Q/S	NA	NA	NA

'NA' in the above table means no seminar is scheduled in that slot. Hence, P, Q, and S are not guiding Economics students.

21. Which of the following statements is necessarily true?

A. H is an Economics student.
B. B is scheduled in the first slot.
C. S is guiding F.
D. Q is guiding G.

Answer ||| A

Solution |||

In each of the four timings, exactly one seminar on Economics is scheduled (statement 1) and only A's seminar is scheduled at 10:00 (statement 2). We can conclude that A is an Economics student guided by R.

Using the above conclusion and statements 3 and 4, we can create the following table:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics			Sociology					
09:30	Economics								
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics			Anthropology	F				

'NA' in the above table means no seminar is scheduled in that slot.

From statement 5, both B and G are Sociology students, whose seminars are scheduled in the same slot. Hence, their time slot should either be 9 a.m. or 9:30 a.m.

From statement 7, A's and G's seminar should be consecutive; hence, G's seminar cannot be scheduled at 9:00 a.m. Therefore, seminars of both B and G should be scheduled at 9:30 a.m. From statement 5, the economics student scheduled in the 9:30 a.m. slot is guided by T.

Students who are guided by the same guide must be scheduled in consecutive slots and T is already guiding an Economics student whose seminar is scheduled at 9:30 a.m. Hence, T also guides the student whose seminar is scheduled at 9:00 a.m.

Similarly, R guides the Economics student whose seminar is scheduled at 10:30 a.m.

We have already concluded that B is a sociology student whose seminar is scheduled at 9:30. From statement 6, P is the guide of both B and C and has students scheduled in the first two slots. We can conclude that C is a sociology student whose seminar is scheduled at 9:00 a.m.

By substituting the data in the above table, we get the following:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics	D/E/H	T	Sociology	C	P	NA	NA	NA
09:30	Economics	D/E/H	T	Sociology	B	P	Sociology	G	Q/S
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics	D/E/H	R	Anthropology	F	Q/S	NA	NA	NA

'NA' in the above table means no seminar is scheduled in that slot.

From the above table, we can say that H is definitely an Economics student. Hence, statement A must be true.

22. If D is scheduled in a slot later than Q's, then which of the following two statement(s) is/are true?

(i) E and H are guided by T.

(ii) G is guided by Q.

A. Only (i)
B. Both (i) and (ii)
C. Neither (i) nor (ii)
D. Only (ii)

Answer ||| B

Solution |||

In each of the four timings, exactly one seminar on Economics is scheduled (statement 1) and only A's seminar is scheduled at 10:00 (statement 2). We can conclude that A is an economics student guided by R.

Using the above conclusion and statements 3 and 4, we can create the following table:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics			Sociology					
09:30	Economics								
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics			Anthropology	F				

'NA' in the above table means no seminar is scheduled in that slot.

From statement 5, both B and G are Sociology students, whose seminars are scheduled in the same slot. Hence, their time slot should either be 9 a.m. or 9:30 a.m.

From statement 7, A's and G's seminar should be consecutive; hence, G's seminar cannot be scheduled at 9:00 a.m. Therefore, seminars of both B and G should be scheduled at 9:30 a.m. From statement 5, the economics student scheduled in the 9:30 a.m. slot is guided by T.

Students who are guided by the same guide must be scheduled in consecutive slots and T is already guiding an Economics student whose seminar is scheduled at 9:30 a.m. Hence, T also guides the student whose seminar is scheduled at 9:00 a.m.

Similarly, R guides the Economics student whose seminar is scheduled at 10:30 a.m.

We have already concluded that B is a sociology student whose seminar is scheduled at 9:30. From statement 6, P is the guide of both B and C and has students scheduled in the first two slots. We can conclude that C is a sociology student whose seminar is scheduled at 9:00 a.m.

By substituting the data in the above table, we get the following:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics	D/E/H	T	Sociology	C	P	NA	NA	NA
09:30	Economics	D/E/H	T	Sociology	B	P	Sociology	G	Q/S
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics	D/E/H	R	Anthropology	F	Q/S	NA	NA	NA

'NA' in the above table means no seminar is scheduled in that slot.

Now, it is given that D's slot is scheduled later than Q's. So, Q's seminar must be scheduled in the 9:30 a.m. slot and D's seminar must be scheduled at 10:30 a.m. Substituting this information, we get the new table as the following:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics	E/H	T	Sociology	C	P	-	-	-
09:30	Economics	E/H	T	Sociology	B	P	Sociology	G	Q
10:00	Economics	A	R	-	-	-	-	-	-
10:30	Economics	D	R	Anthropology	F	S			

From the above table, we can see that both the given statements (i) and (ii) are true.

23. If E and Q are both scheduled in the same slot, then which of the following statements BEST describes the relationship between D, H, and T?

A. Exactly one of D and H is guided by T.
B. Both D and H are guided by T.
C. At least one of D and H is guided by T.
D. Neither D nor H is guided by T.

Answer ||| C

Solution |||

In each of the four timings, exactly one seminar on Economics is scheduled (statement 1) and only A's seminar is scheduled at 10:00 (statement 2). We can conclude that A is an Economics student guided by R.

Using the above conclusion and statements 3 and 4, we can create the following table:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics			Sociology					
09:30	Economics								
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics			Anthropology	F				

'NA' in the above table means no seminar is scheduled in that slot.

From statement 5, both B and G are Sociology students, whose seminars are scheduled in the same slot. Hence, their time slot should either be 9 a.m. or 9:30 a.m.

From statement 7, A's and G's seminar should be consecutive; hence, G's seminar cannot be scheduled at 9:00 a.m. Therefore, seminars of both B and G should be scheduled at 9:30 a.m. From statement 5, the economics student scheduled in the 9:30 a.m. slot is guided by T.

Students who are guided by the same guide must be scheduled in consecutive slots and T is already guiding an Economics student whose seminar is scheduled at 9:30 a.m. Hence, T also guides the student whose seminar is scheduled at 9:00 a.m.

Similarly, R guides the Economics student whose seminar is scheduled at 10:30 a.m.

We have already concluded that B is a sociology student whose seminar is scheduled at 9:30. From statement 6, P is the guide of both B and C and has students scheduled in the first two slots. We can conclude that C is a sociology student whose seminar is scheduled at 9:00 a.m.

By substituting the data in the above table, we get the following:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics	D/E/H	T	Sociology	C	P	NA	NA	NA
09:30	Economics	D/E/H	T	Sociology	B	P	Sociology	G	Q/S
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics	D/E/H	R	Anthropology	F	Q/S	NA	NA	NA

'NA' in the above table means no seminar is scheduled in that slot.

Now, it is given that the seminars of both E and Q are scheduled in the same time slot; their seminars must be scheduled at 9:30 a.m. or 10:30 a.m.

Now, if E's seminar is scheduled at 9:30 a.m., then exactly one of D and H is guided by T, and if E's seminar is scheduled at 10:30 a.m., then both D and H are guided by T.

Considering both the cases, we can say that at least one of D and H is guided by T. So, option C is correct.

24. If D is scheduled in the slot immediately before Q's, then which of the following is NOT necessarily true?

A. D is guided by T.
B. E is guided by R.
C. G is guided by Q.
D. F is guided by S.

Answer ||| B

Solution |||

In each of the four timings, exactly one seminar on Economics is scheduled (statement 1) and only A's seminar is scheduled at 10:00 (statement 2). We can conclude that A is an economics student guided by R.

Using the above conclusion and statements 3 and 4, we can create the following table:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics			Sociology					
09:30	Economics								
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics			Anthropology	F				

'NA' in the above table means no seminar is scheduled in that slot.

From statement 5, both B and G are Sociology students, whose seminars are scheduled in the same slot. Hence, their time slot should either be 9 a.m. or 9:30 a.m.

From statement 7, A's and G's seminar should be consecutive; hence, G's seminar cannot be scheduled at 9:00 a.m. Therefore, seminars of both B and G should be scheduled at 9:30 a.m. From statement 5, the economics student scheduled in the 9:30 a.m. slot is guided by T.

Students who are guided by the same guide must be scheduled in consecutive slots and T is already guiding an Economics student whose seminar is scheduled at 9:30 a.m. Hence, T also guides the student whose seminar is scheduled at 9:00 a.m.

Similarly, R guides the Economics student whose seminar is scheduled at 10:30 a.m.

We have already concluded that B is a sociology student whose seminar is scheduled at 9:30. From statement 6, P is the guide of both B and C and has

students scheduled in the first two slots. We can conclude that C is a sociology student whose seminar is scheduled at 9:00 a.m.

By substituting the data in the above table, we get the following table:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics	D/E/H	T	Sociology	C	P	NA	NA	NA
09:30	Economics	D/E/H	T	Sociology	B	P	Sociology	G	Q/S
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics	D/E/H	R	Anthropology	F	Q/S	NA	NA	NA

'NA' in the above table means no seminar is scheduled in that slot.

Now, it is given that D's seminar is scheduled in the slot immediately before Q's. Then, D's seminar must be scheduled at 9:00 a.m. and Q's seminar must be scheduled at 9:30 a.m. Substituting these values, we get the following table:

Time (a.m.)	Slot 1			Slot 2			Slot 3		
	Subject	Student	Guide	Subject	Student	Guide	Subject	Student	Guide
09:00	Economics	D	T	Sociology	C	P	NA	NA	NA
09:30	Economics	E/H	T	Sociology	B	P	Sociology	G	Q
10:00	Economics	A	R	NA	NA	NA	NA	NA	NA
10:30	Economics	E/H	R	Anthropology	F	S	NA	NA	NA

From the table, we can see that options A, C, and D are definitely true and B may or may not be true.

Hence, statement B is not necessarily true.

###TOPIC###Logical Reasoning||Logical Sequence||Logical Sequence###