

# Missing Data

# LRDI - 13

CEX-D-0285/18

Number of Questions : **20**

**Directions for questions 1 to 5:** Answer the questions on the basis of the information given below.

Six players A, B, C, D, E and F participated in a tournament which had 3 rounds. Points received by each player in a round have to be less than the maximum points for that round (see the table). A player with the least points in a round was eliminated in that round. After round 3, the sum of all the points received till then for each non-eliminated player was calculated and then the one with the maximum sum was declared as the "Champion".

Following table provides partial information about the performance of each player during the tournament.

Round	Maximum Points	A	B	C	D	E	F
1	30			13			23
2	20	11					
3	20				17		11

After the completion of the tournament following things were noticed:

- In each of the rounds 1, 2 and 3 one player got eliminated. Also, all the points obtained were prime numbers.
- No player got less than one-third of the maximum points in any of the rounds.
- Points in each column as well as each row (of the table) were distinct.

- The player who got the maximum points in round 1, got eliminated in round 3.
- In round 1, A got more points than E, who himself got more points than B.
- The player who got eliminated in round 2 had an aggregate of 24 points in rounds 1 and 2.

- Who got eliminated in Round 1?  
(1) A (2) B  
(3) D (4) E
- Who received the highest points in Round 1?  
(1) A (2) B  
(3) D (4) E
- Number of points received by C in Round 2 was  
(1) 7 (2) 13  
(3) 17 (4) 19
- Who received the third highest points in Round 3?  
(1) F (2) B  
(3) E (4) A
- Who was declared as the "Champion" at the end of the tournament?  
(1) A (2) C  
(3) D (4) None of these

**Directions for questions 6 to 8:** Answer the questions on the basis of the information given below.

For admission to various affiliated colleges, a university conducts a written test with four different sections, each with a maximum of 50 marks. The following table gives the aggregate as well as the sectional cut-off marks fixed by six different colleges affiliated to the university. A student will get admission only if he/she gets marks greater than or equal to the cut-off marks in each of the sections and his/her aggregate marks are at least equal to the aggregate cut-off marks as specified by the college.

	Sectional Cut – off Marks				Aggregate Cut-off Marks
	Section A	Section B	Section C	Section D	
College 1	42	42	42		176
College 2		45	45		175
College 3			46		171
College 4	43			45	178
College 5	45		43		180
College 6		41		44	176

6. Bhama got calls from all colleges. What could be the minimum aggregate marks obtained by her?

(1) 180 (2) 181  
(3) 196 (4) 176

7. Charlie got calls from two colleges. What could be the minimum marks obtained by him in a section?

(1) 0 (2) 21  
(3) 25 (4) 35

8. Aditya did not get a call from even a single college. What could be the maximum aggregate marks obtained by him?

(1) 181 (2) 176  
(3) 184 (4) 196

Pizzas could be of Thin Crust (T) or Deep Dish (D) variety and come in either Normal Cheese (NC) or Extra Cheese (EC) versions. Hence, There are four types of pizzas: T-NC, T-EC, D-NC and D-EC. Partial information about proportions of T and NC pizzas ordered by the three parties is given below:

	Thin Crust (T)	Normal Cheese (NC)
<b>Party 1</b>	0.6	
<b>Party 2</b>	0.55	0.3
<b>Party 3</b>		0.65
<b>Total</b>	0.375	0.52

9. How many Thin Crust pizzas were to be delivered to Party 3?

(1) 398 (2) 162  
(3) 196 (4) 364

10. How many Normal Cheese pizzas were required to be delivered to Party 1?

(1) 104 (2) 84  
(3) 16 (4) 196

**Directions for questions 9 to 12:** Answer the questions on the basis of the information given below.

Funky Pizzeria was required to supply pizzas to three different parties. The total number of pizzas it had to deliver was 800, 70% of which were to be delivered to Party 3 and the rest equally divided between Party 1 and Party 2.

11. For Party 2, if 50% of the Normal Cheese pizzas were of Thin Crust variety, what was the difference between the numbers of T-EC and D-EC pizzas to be delivered to Party 2?  
 (1) 18 (2) 12  
 (3) 30 (4) 24
12. Suppose that a T-NC pizza cost as much as a D-NC pizza, but  $\frac{3}{5}$ th of the price of a D-EC pizza. A D-EC pizza costs Rs.50 more than a T-EC pizza, and the latter costs Rs.500. If 25% of the Normal Cheese pizzas delivered to Party 1 were of Deep Dish variety, what was the total bill for Party 1?  
 (1) Rs. 59480 (2) Rs. 59840  
 (3) RS. 42520 (4) Rs. 45240

**Directions for questions 13 to 16:** Answer the questions on the basis of the information given below.

There were seven elective courses - E1 to E7 - running in a specific term in a college. Each of the 300 students enrolled had chosen just one elective from among these seven. However, before the start of the term, E7 was withdrawn as the instructor concerned had left the college. The students who had opted for E7 were allowed to join any of the remaining electives, Also, the students who had chosen other electives were given one chance to change their choice. The table below captures the movement of the students from one elective to another during this process. Movement from one elective to the same elective simply means no movement. Some numbers in the table got accidentally erased; however, it is known that these were either 0 or 1.

		To Elective					
		E1	E2	E3	E4	E5	E6
From Elective	E1	9	5	10	1	4	2
	E2		34	8		2	2
	E3	2	6	25			2
	E4		3	2	14		4
	E5		5			30	
	E6		7	3		2	9
	E7	4	16	30	5	5	41

Further, the following are known:

- Before the change process there were 6 more students in E1 than in E4, but after the reshuffle, the number of students in E4 was 3 more than that in E1.
  - The number of students in E2 increased by 30 after the change process.
  - Before the change process, E4 had 2 more students than E6, while E2 had 10 more students than E3.
13. How many elective courses among E1 to E6 had a decrease in their enrollments after the change process?  
 (1) 4 (2) 1  
 (3) 2 (4) 3
14. After the change process, which of the following is the correct sequence of number of students in the six electives E1 to E6?  
 (1) 19, 76, 79, 21, 45, 60  
 (2) 19, 76, 78, 22, 45, 60  
 (3) 18, 76, 79, 23, 43, 61  
 (4) 18, 76, 79, 21, 45, 61
15. After the change process, which course among E1 to E6 had the largest change in its enrollment as a percentage of its original enrollment?  
 (1) E1 (2) E2  
 (3) E3 (4) E6
16. Later, the college imposed a condition that if after the change of electives, the enrollment in any elective (other than E7) dropped to less than 20 students, all the students who had left that course will be required to reenroll for that elective.  
 Which of the following is a correct sequence of electives in decreasing order of their final enrollments?  
 (1) E2, E3, E6, E5, E1, E4  
 (2) E3, E2, E6, E5, E4, E1  
 (3) E2, E5, E3, E1, E4, E6  
 (4) E2, E3, E5, E6, E1, E3

**Directions for questions 17 to 20:** Answer the questions on the basis of the information given below.

The year is 2089. Beijing, London, New York, and Paris are in contention to host the 2096 Olympics. The eventual winner is determined through several rounds of voting by members of the IOC with each member representing a different city. All the four cities in contention are also represented in IOC.

- (a) In any round of voting, the city receiving the lowest number of votes in that round gets eliminated. The survivor after the last round of voting gets to host the event.
- (b) A member is allowed to cast votes for at most two different cities in all rounds of voting combined. (Hence, a member becomes ineligible to cast a vote in a given round if both the cities (s)he voted for in earlier rounds are out of contention in that round of voting.)
- (c) A member is also ineligible to cast a vote in a round if the city (s)he represents is in contention in that round of voting.
- (d) As long as the member is eligible, (s)he must vote and vote for only one candidate city in any round of voting.

The following incomplete table shows the information on cities that received the maximum and minimum votes in different rounds, the number of votes cast in their favour, and the total votes that were cast in those rounds.

Round	Total votes cast	Maximum votes cast		Eliminated	
		City	No. of votes	City	No. of votes
1		London	30	New York	12
2	83	Paris	32	Beijing	21
3	75				

It is also known that:

- All those who voted for London and Paris in round, 1 continued to vote for the same cities in subsequent rounds as long as these cities were in contention. 75% of those who voted for Beijing in round 1, voted for Beijing in round 2 as well.
  - Those who voted for New York in round 1, voted either for Beijing or Paris in round 2.
  - The difference in votes cast for the two contending cities in the last round was 1.
  - 50% of those who voted for Beijing in round 1, voted for Paris in round 3.
17. What percentage of members from among those who voted for New York in round 1, voted for Beijing in round 2?  
(1) 33.33 (2) 50 (3) 66.67 (4) 75
18. What is the number of votes cast for Paris in round 1?  
(1) 16 (2) 18 (3) 22 (4) 24
19. What percentage of members from among those who voted for Beijing in round 2 and were eligible to vote in round 3, voted for London?  
(1) 33.33 (2) 38.10 (3) 50 (4) 66.67
20. Which of the following statements must be true?  
I. IOC member from New York must have voted for Paris in round 2.  
II. IOC member from Beijing voted for London in round 3.  
(1) Only I (2) Only II (3) Both I and II (4) Neither I nor II

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# LRDI - 13

## Answers and Explanations

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

### For questions 1 to 5:

⇒ D received 13 points and C received 17 points in round 2.

The final table looks like:

Maximum Points	Round	A	B	C	D	E	F
30	1	29	11	13	19	17	23
20	2	11	X	17	13	7	19
20	3	7	X	19	17	X	11
Total	-	-	-	49	49	-	53

1. 2 From the table, it's clear that B got the least points i.e. 11 in round 1 and hence, got eliminated.
2. 1 From the table, it's clear that A received the highest points i.e. 29 in round 1.
3. 3 From the table, it's clear that C received 17 points in round 2.
4. 1 From the table, it's clear that F received the third highest points i.e. 11 in Round 3. C got the highest while D got the second highest.
5. 4 F's aggregate points of 53 were the highest and hence, he was declared the "Champion".
6. 2 Since Bhama got calls from all colleges, she has to score marks in each section equal to at least the maximum of the cut-offs across colleges which means 45, 45, 46 & 45 in section A, B, C & D respectively. This makes her total to be 181 with which she will clear the overall cut-offs of all institutes also.
7. 3 Since we have to minimise the marks in a particular section, we will have to maximise the marks in other 3 sections. Let us assume that marks obtained in each of the three sections in which we are going to maximize the score, is equal to 50. Now, the lowest overall cut-off is 171 & second lowest is 175. Hence, Charlie must have scored at least  $175 - (50 + 50 + 50) = 25$  marks in the remaining section.

Let us confirm whether he can clear sectional cut-offs also with such a distribution. On seeing the sectional cut-offs, we conclude that they can be cleared with 50 marks each in section A, B & C and 25 marks in section D, which may enable Charlie to clear the sectional cut-off of section D for college 1, 2, 3 or 5. Hence, 25 is the correct answer.

8. 3 Since we have to maximize Aditya's marks, let us take the base values of 50 marks in each section and try to reduce that by minimum values to ensure he doesn't get any call. We notice that by reducing the marks obtained in section C to 41, we ensure colleges 1, 2, 3 & 5 are ruled out. Now for colleges 4 & 6, reducing the marks obtained in section D to 43, ensures these colleges are also ruled out. Please note that we are reducing the score to 1 less than the minimum cut-off across all colleges for that particular section. In the other two sections A and B, Aditya may score 50 each. So the maximum possible aggregate marks =  $50 + 50 + 41 + 43 = 184$ .

### For questions 9 to 12:

Total number of pizza = 800

$$70\% \text{ were delivered to party 3} = \frac{70 \times 800}{100} = 560 \text{ pizza}$$

$$800 - 560 = 240$$

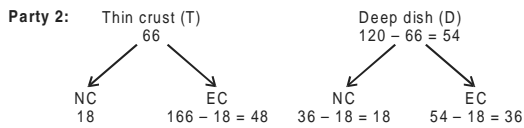
∴ 120 pizza each were delivered to party 1 and party

	(T) THIN CRUST	Normal Cheese (NC)
Party 1	$0.6 \times 120 = 72$	$416 - 364 - 36 = 16$
Party 2	$0.55 \times 120 = 66$	$0.3 \times 120 = 36$
Party 3	$300 - 72 - 66 = 162$	$0.66 \times 560 = 364$
Total	$0.375 \times 800 = 300$	$0.52 \times 800 = 416$

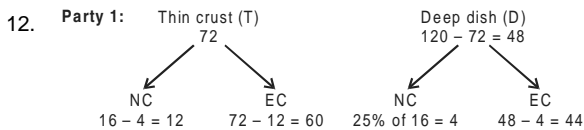
9. From table, 162 thin crust pizzas were to be delivered to party 3.
10. From table, 16 normal cheese pizzas were required to be delivered to party.

11. 50% of normal cheese of party 2 =  $\frac{50 \times 36}{100} = 18$  pizza

were thin crust.



Difference between number of T - EC and D - EC  
=  $48 - 36 = 12$



Given: T-EC (Thin crust with extra cheese)  
= Rs.500

D-EC =  $500 + 50 = \text{Rs.}550$

T-NC costs =  $\frac{3}{5}$  of D-EC =  $\frac{3}{5} \times 550 = 330$  Rs.

D-NC costs = Rs.330

Total biu for party 1

=  $(12 \times 330) + (500 \times 60) + 4 \times (330) + (550 \times 44)$   
=  $3960 + 30,000 + 1320 + 24200 = 59480$

#### For questions 13 to 16:

Total students = 300

After change process = 292

Missing information = 8 students

	E1	E2	E3	E4	E5	E6
E1	9	5	10	1	4	2
E2	D	34	8	0	2	2
E3	2	6	25	0	1	2
E4	1	3	2	14	1	4
E5	1	5	1	0	30	1
E6	1	7	3	1	2	9
E7	4	16	30	5	5	41

Before the change process

$E1 = E4 + 6$

$E1 = 31$  (With missing information)

$E4 = 23$  (With missing information)

After the change process  $E4 = E1 + 3$

$E1 = 16$

$E4 = 20$

Number of E2 increased by 30

After reshuffling  $E2 = 76$

Before =  $76 - 36 = 46$

With missing information  $E2 = 46$ , number change

Before reshuffling  $E4 = E6 + 2$

Since with missing information  $E4 = 25$ ,  $E6 = 21$ .

Before, reshuffling  $E2 = e3 + 10$

$E2 = 46$ ,  $E3 = 35$

Since after change,  $E4 = E1 + 3$

$E4 = 21$ ,  $E1 = 17$

Now, since total students are 300, fill out missing information

	Before	After
E1	31	18
E2	46	76
E3	36	79
E4	25	21
E5	38	45
E6	23	61

14. 18, 76, 79, 21, 45, 61

15.  $\frac{E3_{\text{After}} - E3_{\text{Before}}}{E3_{\text{Before}}} \times 100 = \frac{61 - 23}{61} \times 100 = 165.217$ .

Which is largest.

16. After reshuffling E1 has 18 students which is less than 20.  $E1 + (5 + 10 + 1 + 4 + 2) = 18 + 22 = 40$   
From E1 to E2 = 5 students  
 $E2 - 5 = (76 - 5)$  students = 71  
From E1 to E3 = 10 students  
 $E3 - 10 = (79 - 10)$  students = 69  
From E1 to E4 = 1 students  
 $E4 - 1 = 21 - 1 = 20$  students  
From E1 to E5 = 4 students  
 $E5 - 4 = 45 - 4 = 41$  students  
From E1 to E6 = 2 students  
 $E6 - 2 = (61 - 2) = 59$  students  
Decreasing order  
 $E2 > E3 > E6 > E5 > E1 > E4$ .

#### Questions 17 to 20:

**L = London, Paris = P, New York= NY, Beijing = B**

In round III, one of the two cities, either London or Paris will get 38 votes and the other 37. Further:

- (1) The persons representing London, Paris, Beijing and New York can not vote as long as their own cities are in contention. In round I, New York gets eliminated and hence the representative from NY becomes eligible for voting in the II round hence increasing the total votes by 1. This means the total votes in the first round must be  $83 - 1 = 82$ .
- (2) After round II, the representative from Beijing votes in the III round. This should have increased the number of total votes by 1 and the total votes must have become  $83 + 1 = 84$ .  
We are given that the total votes in round III are 75 only. We conclude that  $84 - 75 = 9$  people who voted in round I and II have become ineligible for voting in round III.

- (3) 9 people who have voted in round I and II become ineligible for voting in round III. The reason of their ineligibility is that till round I and II, they have already voted for two different cities which are not available for contention in round III. All of these 9 voters are those who voted for NY in round I and then voted for Beijing in round II.
- (4) Beijing's vote in round II is 21. This includes 9 votes from people who voted for NY in the first round. So  $21 - 9 = 12$  people voted for Beijing in both round I and II.
- (5) We are given that 75% of the people who voted for Beijing in round I, voted again for Beijing in round II as well. So, 16 people must have voted for Beijing in round I.
- (6) In round I we have:  
 $82 = L + P + B + NY$   
 Or  
 $82 = 30 + P + 16 + 12$   
 Giving  $P = 24$
- (7) In round II, we have:  
 $83 = L + 32 + 21$ , giving  $L = 30$
- (8) NY had 12 votes in round I. 9 of these votes went to B (see point 2, again). The rest 3 went to P.
- (9) 16 votes for B in round I. 12 of them still vote for B. The rest 4 voted for either L or P. L has the same number of votes in both the rounds I and II. This means in round II, these 4 votes must have gone to Paris only.
- (10) The representative from NY did not vote in round I but has voted in round II. As L has the same people voting for it (30 votes in both the rounds I and II) and we know the exact break up of B in II. This NY-representative vote must go to Paris only. Further, in order to avoid ineligibility, this NY rep must vote for Paris only in round III also.
- (11) Paris (in round II) break up is:  
 $32 = 24$  ( from round I, who voted for Paris )  
 $+ 4$  ( out of the 16, who voted for Beijing in round I )  
 $+ 3$  ( out of 12, who voted for NY in round I )  
 $+ 1$  (NY -Rep)
- (12) Beijing gets eliminated in round II. So the rep of Beijing can vote in round III.
- (13) 12 People (out of 21) who voted for Beijing in round II are still eligible for vote in round III.
- (14) 50% of people who voted for Beijing in I ( i.e. 8 People) voted for Paris in round III. These 8 People include 4 of those who voted for Paris in round II also. Therefore 4 (out of 12 who voted for Beijing in round II and are still eligible for vote in round III ) people have voted for Paris in round III.
- (15) This implies that the rest 8 (out of 12 who voted for Beijing in round II and are still eligible for vote in round III ) can vote for London only. This makes London's vote =  $30 + 8$  or 38 in round III. Which implies that Paris got 37 votes.
- (16) The Beijing Rep who is eligible to vote in round III must have voted for Paris only.  
 The following table sums up the Vote Pattern:

Round	Total Votes	London (L)	Paris(P)	Beijing (B)	New York (NY)
I	82	30	24	16	12
II	83	30	<b>32</b> = ( 24 + 4 + 3 + 1 of NY-rep)	<b>21</b> (12 + 9)	X
III	75	38 = (30 + 8)	37 = (32 + 4 + 1 of B-rep )	X	X

(The data shown in **Bold** was already provided in the problem. The other data is deduced from the solution.)

17. 4 Required percentage =  $\frac{9}{12} \times 100 = 75\%$
18. 4 As seen from the table, Paris got 24 votes.
19. 4 Required percentage =  $\frac{8}{12} \times 100 = 66.67\%$
20. 1 Based on the table, IOC members from New York must have voted for Paris in Round II.