

# Number Based

# LRDI - 07

CEX-D-0279/18

Number of Questions : **30**

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

Rinku goes to Delhi Food fair held at Pitampura last Sunday. He takes an entry ticket to the sweet and namkeen section of the fair. This section of the fair had four stalls namely Hi-Mirchi, Mircheez, Mirch Masala and Mirchi Rasoi. These four stalls had 16 sweet and namkeen items among them to sell, and these shops sell different number of sweet and namkeens. There were a total of 9 Sweets and 7 namkeens in the offering.

Namkeen items available in the fair were K, L, M, N, O, P and Q and the sweet items were R, S, T, U, V, W, X, Y and Z. The following information is also available:

- I. From each stall Rinku purchased different number of sweets and namkeens combined.
- II. P is the only Namkeen item available at a particular stall. The same is true for Q also.
- III. Mirchi Rasoi had more namkeens to offer than Hi-Mirchi, which did not have any sweet to offer.
- IV. Mirch Masala had only V, Y and Z to sell.
- V. The number of stalls selling sweets was less than the number of stalls selling namkeen.
- VI. P is not sold at the stall, which had maximum items to offer.
- VII. Rinku purchases all the 16 items by the end of the day and each item is available only at one stall in one single piece.

VIII. Further it is also known that the items K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y and Z had prices in rupees equal to 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 respectively.

1. At a certain instant, if Rinku had purchased four items at random, collectively from Mircheez and Mirchi Rasoi, then which of the following cannot be the amount he has to pay for those four items?  
 (1) Rs. 24                      (2) Rs. 33  
 (3) Rs. 38                      (4) None of these
2. The payment made at Mirchi Rasoi and Hi-Mirchi as a percentage of payment made at Mircheez is how much more than the payment made at Mirchi Rasoi as a percentage of payment made at Mircheez and Mirch Masala?  
 (1) 14.23%                      (2) 15.94%  
 (3) 16.12%                      (4) 16.96%
3. Rinku has already purchased all items of Mirchi Rasoi, Hi-Mirchi and Mirch Masala and the two cheapest items of Mircheez when he runs out of money. He rushes to his friend to get the balance amount required to purchase the remaining items. The amount that his friend lends him as a per-centage of the amount Rinku had already spent is  
 (1) 69.63%                      (2) 72.15%  
 (3) 77.33%                      (4) 80.1%

4. The fare organising committee decides to give offers wherein if someone purchases any two items from a particular stall, he gets one more item of his own choice from that stall as a free gift, irrespective of the price of that item. What should be the minimum amount Rinku should carry to the fare so that he can purchase all the 16 items?  
 (1) Rs. 84 (2) Rs. 92  
 (3) Rs. 88 (4) Rs. 81
5. If the absolute difference between the number of items sold at any two shops be D, then the absolute difference between the maximum and minimum distinct pair of stalls for which D has the same value is  
 (1) 1 (2) 2  
 (3) 3 (4) 4

**Directions for questions 6 to 10:** Answer the questions on the basis of the information given below.

Devendra has 15 different locks L1 through L15. The locks are classified into three categories based upon their number of levers. L1, L15, L13 and L4 are of 8 levers each. L6, L2, L7, L9 and L14 are of 6 levers each and the remaining locks are of 10 levers each. He selects five out of these fifteen locks on each of the eight consecutive days viz. Day 1, Day 2, Day 3, Day 4, Day 5, Day 6, Day 7 and Day 8. On each day he tries to unlock the selected locks but is successful in unlocking only one of the selected locks. If he unlocks a lock on a particular day, that lock is not selected by him on the subsequent days. It is also known that out of the locks unlocked by him, the number of locks of 6 levers is less than the number of locks of 8 levers.

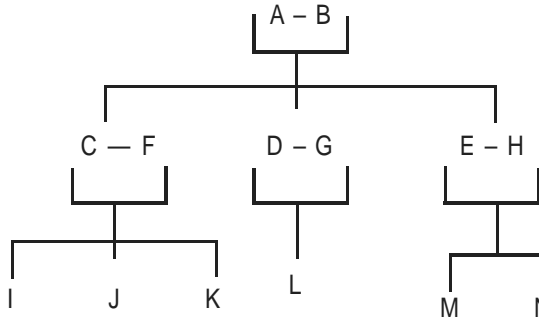
The following table gives details about the locks selected by him on each of the given eight days.

<b>Day 1</b>	L1	L7	L8	L4	L11
<b>Day 2</b>	L3	L15	L14	L12	L8
<b>Day 3</b>	L2	L7	L15	L9	L10
<b>Day 4</b>	L15	L13	L10	L3	L6
<b>Day 5</b>	L2	L15	L9	L10	L5
<b>Day 6</b>	L13	L6	L1	L8	L10
<b>Day 7</b>	L14	L11	L8	L2	L13
<b>Day 8</b>	L5	L6	L10	L14	L11

6. For how many days is it possible to uniquely determine which lock is unlocked by Devendra?  
 (1) Three (2) Four  
 (3) Five (4) Six
7. If Devendra wants the aggregate number of levers of all the locks that he unlocks in these 8 days to be the minimum then the number of levers of the lock unlocked on day 7 is  
 (1) 6 (2) 8  
 (3) 10 (4) Either (1) or (2)
8. After Day 8 Devendra finds that the aggregate number of levers of all the locks that he has unlocked is more than 64 but not more than 68. Which of the following locks is definitely unlocked by Devendra?  
 (1) L15 (2) L13  
 (3) L10 (4) Cannot be determined
9. After Day 8 Devendra finds that the aggregate number of levers of all the locks that he has unlocked is more than 64 but not more than 68. If L9 is not unlocked and L8 is unlocked by Devendra, then which of the following can be a lock that is unlocked by him?  
 (1) L14 (2) L5  
 (3) L11 (4) L2
10. After Day 8 Devendra finds that the aggregate number of levers of all the locks that he has unlocked is more than 64 but not more than 68. If out of the locks unlocked by him, the number of locks of 10 levers is less than the number of locks of 8 levers, which is the lock unlocked on Day 7?  
 (1) L8  
 (2) L13  
 (3) L2  
 (4) Cannot be uniquely determined

**Directions for questions 11 to 14:** Answer the questions on the basis of the information given below.

The following figure shows a family tree in which A-B, C-F, D-G and E-H are couples. The couple A-B has three sons. A is a male. Vertical lines lead to the children of the couples.



The following information is available about how the family shared the candies among themselves:

- I. In the beginning none of the family members had any candy with him/her EXCEPT 'A'.
  - II. Each male gives half of the candies he received, to his wife and half of the remaining candies to his children. Then he eats the rest.
  - III. Each female eats  $\frac{1}{3}^{\text{rd}}$  of total candies received and gives the rest of the candies to her children.
  - IV. It is observed that candies got equally distributed among the children for each set of parents.
  - V. Each member gets integral number of candies and at least 1 candy each.
  - VI. A married female gets candies from her husband only.
11. If J receives 4 candies, then what is the ratio of candies received by K, L and N?  
 (1) 1 : 1 : 1                      (2) 4 : 8 : 4  
 (3) 2 : 6 : 3                      (4) 3 : 1 : 2
  12. C receives 108 candies and E is not the husband of H. Find the number of candies eaten by E.  
 (1) 18                                  (2) 36  
 (3) 9                                    (4) Either (1) or (2)

13. Number of candies received by L is not necessarily a multiple of which of the following?  
 (1) 2                                      (2) 3  
 (3) 4                                      (4) 6
14. If the number of candies received by D is greater than the number of candies received by G, then how is G related to A?  
 (1) Son                                      (2) Daughter-in-law  
 (3) Husband                              (4) Daughter

**Directions for questions 15 to 19:** Answer the questions on the basis of the information given below.

Two brothers A and B are standing at a point P on a highway. They start playing a game with a die. The die is in form of a cube with integers 1 to 6 written on its six faces with one number on each face. Each one of them throws the die alternately. If the number appearing on the top face of the die is greater than the number appeared in the previous throw by the same brother then he moves forward (towards point Q situated on the same highway) by the number of steps equal to the number that appears on the top face of the die. If the number appearing on the top face of the die by a brother is less than the number appeared in the previous throw on the top face of the die, then that brother moves backwards (towards point P) by the number of steps equal to the number that appears on the top face of the die. If the number appearing on the top face of the die in a throw by a brother is same as that in the previous throw by him, then the throw is considered as cancelled and he throws the die again till a different number appears on the top face of the die. If after a throw, someone needs to take certain number of backward steps which prompts him to go even behind P, that throw is also considered as cancelled. In this case he has to throw the die again. In their first throw, these brothers move forward (towards Q) by the number of steps equal to the number that appears on the top face of the die (as they do not have any previous score to compare it with). Length of steps of these brothers is always same and constant. Round 'n' comprises nth throw of both the brothers.

15. What can be the maximum possible distance between the two brothers after the first 4 rounds?  
 (1) 24 steps (2) 18 steps  
 (3) 12 steps (4) 10 steps
16. If the number appearing on the top face of the die in 6 consecutive throws by A are distinct and 6 appears in the third throw, then what can be the maximum possible distance (towards Q) covered by A in these 6 throws?  
 (1) 12 steps (2) 14 steps  
 (3) 19 steps (4) 18 steps
17. In a particular throw by B, the number that appeared on the top face of the die was 1 and after that throw B was 14 steps ahead of A. Find the minimum possible number of throws required such that the distance between the two brothers becomes zero. A had got 1 on the top face of the die in his last throw.  
 (1) 3 (2) 2  
 (3) 5 (4) 4
18. If there was at least one throw in which A moves backwards (towards P) and A traveled 27 steps in the forward direction (towards Q), then the minimum possible number of times A threw the dice is  
 (1) 12 (2) 8  
 (3) 9 (4) 7
19. If A reaches Q without taking any backward step ever, what can be the maximum distance between P and Q?  
 (1) 27 steps (2) 21 steps  
 (3) 15 steps (4) 6 steps

**Directions for questions 20 to 23:** Answer the questions on the basis of the information given below.

Several lecturers from four disciplines, viz. Physics, Chemistry, Mathematics and Biology were short-listed. They were to attend a recently organized

faculty conclave. All applicants were classified into five age groups, namely:

**Young :** Age less than 50; **Middle aged :** 50 Age < 60 ; **Senior :** 60 Age < 70; **Stalwart :** 70 Age < 80; **Retired :** Age 80 and above

For the conclave, not more than two lecturers of a particular age group and particular discipline were selected for representing a discipline. Initially, the maximum possible lecturers were short-listed. However, only five more than half of them got selected and they finally sat for the conclave. The following observations about the selected lecturers were recorded.

- I. If two lecturers were excluded from the retired lecturers, then the number of seniors and stalwarts, each is one less than the number in each of the other three age groups.
- II. Total number of lecturers in Physics, Chemistry and Biology put together is the square of an integer.
- III. There is no Biology lecturer who is middle aged or stalwart and there is no Physics lecturer who is a senior. Every other discipline is represented by at least one lecturer from each age group.
- IV. Rocky and Platy are Young Physics lecturers.

Now the following questions pertain to those selected lecturers.

20. If the number of Physics lecturers is greater than the number of Chemistry lecturers, then which of the following is NOT possible to determine?  
 (1) Number of middle aged Physics lecturers.  
 (2) Number of retired Physics lecturers.  
 (3) Number of middle-aged Chemistry lecturers.  
 (4) All of these
21. What can be said about the total number of Physics and Chemistry lecturers put together?  
 I. It is less than or equal to 12.  
 II. It is more than or equal to 12.  
 (1) Only I (2) Only II  
 (3) Both I and II (4) Neither I nor II

22. If Kandy is the only retired Chemistry lecturer, then which of the following is certain?
- (1) There is one middle aged Physics lecturer.
  - (2) There are two middle-aged Physics lecturers.
  - (3) There is one retired Biology lecturer.
  - (4) There are two retired Biology lecturers.
23. Which of the combinations is NOT possible?
- (1) Two retired Physics lecturers and two retired Chemistry lecturers were selected for the conclave.
  - (2) One retired Physics lecturer and two retired Chemistry lecturers were selected for the conclave.
  - (3) One retired Physics lecturer and one retired Chemistry lecturer were selected for the conclave.
  - (4) Two retired Physics lecturers and one retired Chemistry lecturer were selected for the conclave.

**Directions for questions 24 to 27:** Answer the questions on the basis of the information given below.

Sixteen consecutive natural numbers are to be filled into a  $4 \times 4$  square matrix (as shown below) such that there is one number in each box of the matrix, not necessarily in any order. A few of these 16 numbers are already shown in the boxes. Remaining 12 numbers are denoted by 12 alphabets namely A, B, C, D, E, F, G, H, I, J, K and L. The numbers are filled in the boxes in such a way that the sum of the numbers in the boxes of any row, any column and any diagonal of the square matrix is the same. It is also known that  $D + E + I = 60$ .

13	A	B	16
C	D	E	F
G	H	I	J
25	K	L	28

24. How many numbers in the given matrix are numerically greater than the number denoted by C?
- (1) 4
  - (2) 8
  - (3) 6
  - (4) 5

25. Find the numerical value of  $(A + I) - (B + H)$ .
- (1) 2
  - (2) 1
  - (3) 0
  - (4) 3
26. If we were to construct another 4 by 4 square matrix containing 16 consecutive natural numbers having the same properties as the matrix given above, then which of the following can be the sum of the numbers in the boxes of any one row?
- (1) 116
  - (2) 144
  - (3) 168
  - (4) 170
27. Find how many pairs of numbers are there in the given matrix such that both the numbers in the pair belong to either the same row or same column or same diagonal of the square matrix and the absolute difference between the numbers present in the pair is not less than 12.
- (1) 7
  - (2) 9
  - (3) 10
  - (4) 8

**Directions for questions 28 to 30:** Answer the questions on the basis of the information given below.

Seven friends, namely Piyashi, Qualin, Ravanya, Sanya, Tanya, Urvashi and Varsha passed their Xth board examination in 2007. The result was announced on a Sunday and from the next day, they started organising dinner parties on consecutive days. Each one of them organised exactly one party. On none of the days was more than one party organised. They decided that only four kinds of items viz. Dosa, Pizza, Burger and Idli would be ordered for the dinner parties. The costs per plate of Dosa, Pizza, Burger and Idli were Rs. 25, Rs.45, Rs. 20 and Rs.15 respectively. The following additional information was available:

- I. In each of the dinner parties, total number of plates ordered, taking all four items together was either 8 or 9.
- II. Each dinner party had different combination of number of plates of different items and each type of item was ordered for at least one plate but not more than three plates.

III.	Qualin hosted the party immediately after Urvashi.	29.	If Qualin ordered for equal number of plates of each item, then what can be the maximum possible difference between the amount paid by Qualin and the minimum possible amount paid by any other friend? (1) Rs.30 (2) Rs.20 (3) Rs.15 (4) Rs.10
IV.	Piyashi, Ravanya, Sanya and Varsha had ordered for more number of plates than the other three and hosted their parties immediately one after the other in that order only.		
V.	The total number of plates of Dosa, Pizza, Burger and Idli ordered were 14, 16, 18 and 12 respectively including all dinner parties.	30.	On which of the following days could maximum possible number of friends host the party? (1) Monday (2) Tuesday (3) Thursday (4) Friday
VI.	In each dinner party, at least three items were ordered for 2 or more plates		
28.	If the maximum possible amount for a dinner party was paid on Monday, then who hosted that party? (1) Urvashi (2) Piyashi (3) Ravanya (4) Tanya		

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# LRDI - 07

## Answers and Explanations

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1	4	2	3	3	2	4	3	5	1	6	3	7	2	8	4	9	1	10	2
11	3	12	4	13	3	14	2	15	2	16	3	17	3	18	4	19	2	20	4
21	2	22	4	23	3	24	1	25	1	26	4	27	2	28	2	29	1	30	4

### For questions 1 to 5:

Since, the number of stall selling sweets was less than the number of stalls selling Namkeen and it is also known that Mirch Masala had only sweets, so the number of stalls where Namkeen items are sold must be 3 and that of sweet items must be 2. Since, Mirchi Rasoi had more namkeen items to offer than Hi-Mirchi and since Hi-Mirchi did not have any sweet to offer and also P is not sold at the stall which had maximum items to offer therefore P and Q are sold at Hi-Mirchi and Mircheez respectively.

So, K, L, M, N and O must be sold at Mirchi Rasoi. Mircheez must therefore have the rest of the sweet items.

The following table represents the items purchased from different stalls along with their prices given in the bracket.

Mircheez	Q (7)	R (8)	S (9)	T (10)	U (11)	W (13)	X (14)
Mirch Masala	V (12)	Y (15)	Z (16)				
Mirch Rasoi	K (1)	L (2)	M (3)	N (4)	O (5)		

1. 4 Choice of Q, T, L, O requires a payment of Rs. 24.  
Choice of Q, R, W, O requires a payment of Rs. 33.  
Choice of S, U, W, O requires a payment of Rs. 38.  
Hence, none of these are correct.

2. 3 Clearly from the table the payment made to Hi-Mirchi, Mircheez, Mirch Masala, Mirchi Rasoi are 6, 72, 43 and 15 respectively. So, the required percentage

$$\text{difference} = \left( \frac{21}{72} - \frac{15}{115} \right) \times 100 = 16.12\%$$

3. 2 Obviously, from Mircheez Rinku has purchased Q and R and he need  $(72 - 7 - 8) = 57$  more from his friend. The amount already spent by Rinku on the rest of items that he has already purchased =  $(15 + 6 + 43 + 15) = 79$

$$\text{Hence, the required percentage} = \frac{57}{79} \times 100 = 72.15\%$$

4. 3 Clearly, the amount required at Hi-Mirchi = Rs. 6  
At Mircheez in order to minimise the payment, Rinku should purchase Q and R and then choose X as the free item.

Then, he should purchase S and T and then choose W as the free item.

And lastly he should purchase U.

So, the minimum amount required at Mircheez =  $7 + 8 + 9 + 10 + 11 = 45$

Clearly, the minimum amount required at Mirch Masala =  $12 + 15 = 27$

At Mirchi Rasoi the minimum amount required =  $1 + 2 + 3 + 4 = 10$

Hence, total minimum amount required =  $6 + 45 + 27 + 10 = 88$

5. 1 The pair-wise differences between the number of items of any two stalls are 6, 2, 4, 4, 2 and 2.

Clearly, the maximum distinct pair of stalls having same value for D occurs for  $D = 2$  and the maximum value is 3.

Clearly, the minimum distinct pair of stalls having same value for D occurs for  $D = 4$  and the minimum value is 2. Hence, the absolute difference is  $|3 - 2| = 1$

### For questions 6 to 10:

As per the information given, the following can be concluded, where the possible list of locks unlocked by Devendra on each of the eight days is given in "grey".

Day 1	L1	L7	L9	L4	L11			L4
Day 2	L3	L15	L14	L12	L8			L12
Day 3	L2	L7	L15	L9	L10			L7
Day 4	L15	L13	L10	L3	L6			L3
Day 5	L2	L15	L9	L10	L5		L15	L9
Day 6	L13	L6	L1	L8	L10			L1
Day 7	L14	L11	L8	L2	L13	L8	L2	L13
Day 8	L5	L6	L10	L14	L11			

Out of the locks unlocked by him, the number of locks of 6 levers is less than the number of locks of 8 levers.

L1	8 levers	L7	6 levers	L13	8 levers
L2	6 levers	L8	10 levers	L14	6 levers
L3	10 levers	L9	6 levers	L15	8 levers
L4	8 levers	L10	10 levers		
L5	10 levers	L11	10 levers		
L6	6 levers	L12	10 levers		

Also, out of L15 and L9, one lock has definitely been unlocked by Devendra.

Out of L8, L2 and L13, one lock has definitely been unlocked by Devendra.

Out of L5, L6, L10, L14 and L11, one lock has definitely been opened by Devendra.

L15	L9		L8	L2	L13
8 levers	6 levers		10 levers	6 levers	8 levers
	L5	L6	L10	L14	L11
	10 levers	6 levers	10 levers	6 levers	10 levers

The levers of the locks definitely unlocked by Devendra are as follows.

L1	L3	L4	L7	L12
8 levers	10 levers	8 levers	6 levers	10 levers

6. 3 On five days, i.e. Day 1, Day 2, Day 3, Day 4 and Day 6 it can be uniquely determined which lock has been unlocked by Devendra.

7. 2 For the aggregate number of levers to be minimum out of the locks unlocked by him, the number of locks having six levers has to be less than the number of locks having eight levers.  
Hence, the only possible case is

Day 5	Day 7	Day 8
8 levers	8 levers	6 levers

8. 4 Given that after Day 8 Devendra finds that the aggregate number of levers of all the locks that he has unlocked is more than 64 but not more than 68.

Therefore, the aggregate number of levers of the locks unlocked on Day 5, Day 7 and Day 8 has to be greater than 22 but not more than 26.

The following cases are possible.

		Day 5	Day 7	Day 8	
	Case 1	8	6	10	24
	Case 2	8	8	10	26
	Case 3	6	8	10	24
Not Possible	Case 4	6	10	10	26
	Case 5	8	10	6	24

Case 4 is not possible because out of the locks unlocked by him, the number of locks of 6 levers is less than the number of locks of 8 levers.

Out of the given locks, it cannot be confirmed which one was unlocked by Devendra.

9. 1 He unlocks L15 on day 5 and L8 on day 7.  
Aggregate number of levers of all the locks that he has unlocked till day 7 = 60.

Given that, after Day 8 Devendra finds that the aggregate number of levers of all the locks that he has unlocked is more than 64 but not more than 68, he can open either L6 or L14 (having 6 levers each) on day 8.

10. 2 Given that after Day 8 Devendra finds that the aggregate number of levers of all the locks that he has unlocked is more than 64 but not more than 68.

Therefore, the aggregate number of levers of the locks unlocked on Day 5, Day 7 and Day 8 has to be greater than 22 but not more than 26.

The following cases are possible.

		Day 5	Day 7	Day 8	
	Case 1	8	6	10	24
	Case 2	8	8	10	26
	Case 3	6	8	10	24
Not Possible	Case 4	6	10	10	26
	Case 5	8	10	6	24

Case 4 is not possible because out of the locks unlocked by him, the number of locks of 6 levers is less than the number of locks of 8 levers.

If out of the locks unlocked by him, the number of locks of 10 levers is less than the number of locks of 8 levers, then the only feasible case is case 2. So, the lock unlocked on Day 7 is L13.

11. 3 Number of candies received by couples C-F, D-G and E-H is equal and so is number of candies given to children by these couples.

Let number of candies given by each of these couples to their children be x.

$$\Rightarrow \text{Candies received by K} = \frac{x}{3}$$

$$\text{Candies received by L} = x$$

$$\text{Candies received by N} = \frac{x}{2}$$

Hence the ratio of candies received by K, L and

$$N = \frac{x}{3} : x : \frac{x}{2} = 2 : 6 : 3$$

12. 4 **Case I:** C is a male.

C receives 108 candies.

E is not the husband of H  $\Rightarrow$  E is wife of H

$\Rightarrow$  H also receives 108 candies

$$\text{E receives} = \frac{108}{2} = 54 \text{ candies}$$

$$\text{E eats } \frac{1}{3} \times 54 = 18 \text{ candies.}$$

**Case II:** C is a female.

C receives 108 candies.

So F, who is the husband of C, receives 216 candies.

E is not the husband of H  $\Rightarrow$  E is wife of H

$\Rightarrow$  H also receives 216 candies

$$\text{E receives} = \frac{216}{2} = 108 \text{ candies}$$

$$\text{E eats } \frac{1}{3} \times 108 = 36 \text{ candies.}$$



13. 3 Number of candies received by L is equal to the total number of candies received by the children of C-F or E-H. As C-F has 3 children and E-H has 2 children hence number of candies received by L should be a multiple of 2 and 3 as well as (LCM of 2 and 3) i.e. 6. It is not necessarily a multiple of 4.
14. 2 Among couples C-F, D-G and E-H, males will receive more number of candies than females. As D received more number of candies than G  $\Rightarrow$  G is a female  
Hence G is daughter-in-law of A.
15. 2 Maximum possible distance between the two brothers is when one brother moves maximum possible distance in 4 rounds and the other brother moves minimum possible distance in those 4 rounds. Maximum possible distance that a brother can move in 4 rounds is equal to 18 steps. This is possible when the numbers appearing on the top face of the die are 3, 4, 5 and 6 in the four rounds in that particular order.  
Therefore the distance moved by the brother in first, second, third and a fourth round is 3, 4, 5 and 6 steps respectively.  
Minimum possible distance that a brother can move in 4 rounds from start is equal to 0 steps. This is possible when the numbers appearing on the top face of the die are 4, 2, 4 and 2 respectively or 5, 1, 5 and 1 respectively in those four rounds in that particular order.  
Therefore maximum possible difference between the brothers after 4 rounds = 18 steps.
16. 3 Maximum possible distance covered by A after 6 consecutive throws in which the number appearing on the top face of the die are distinct and 6 appears in the third throw then the maximum distance can be achieved if the 4th throw which is 'stepping backward' (the one that follows 6) must be 1.  
The required distance =  $2 + 3 + 6 - 1 + 4 + 5 = 19$ .
17. 3 At least 5 throws are required in order to make the distance between the two brothers zero. The sequence of the throws will be: A - 4, B - 2, A - 5, B - 1 and A - 6.
18. 4 In the following throw A can travel 27 steps if forward direction 3, 4, 5, 6, 1, 4, 6.
19. 2 The sequence will be 1, 2, 3, 4, 5, 6. So the answer is 21 steps.

### For questions 20 to 23:

The maximum possible lecturers were short-listed. Since there are 5 age groups and 4 different disciplines; and there can be at most two lecturers of a particular age group representing a particular discipline, the number of lecturers short-listed =  $5 \times 4 \times 2 = 40$

Number of them selected =  $5 + 20 = 25$

From statement (I), if two lecturers are excluded from retired lecturers' group then number of lecturers in seniors' and stalwarts' group become 1 less than the others. So,

Young	Middle-aged	Senior	Stalwart	Retired
$x$	$x$	$x - 1$	$x - 1$	$x + 2$

$$\Rightarrow x + x + x - 1 + x - 1 + x + 2 = 25 \Rightarrow x = 5$$

Hence,

Young	:	5
Middle-aged	:	5
Senior	:	4
Stalwarts	:	4
Retired	:	7

From statements (II) and (III), the number of lecturers in Physics, Chemistry and Biology put together must be 16, and 9 lecturers are in Maths team. Since none of the cells contains more than two persons, so from statements (III) and (IV) (also there are only 5 young lecturers) we get the following table

	Physics	Chemistry	Mathematics	Biology
Young	2	1	1	1
Middle-aged	1	1	2	0
Senior	0	1	2	1
Stalwart	1	1	2	0
Retired	1	1	2	1

We are still left with 1 middle aged, 2 retired lecturers, and these 3 lecturers are to be distributed to Physics, Chemistry or Biology (as total in these groups is 16).

20. 4 Since, we have to still distribute 3 lecturers to Physics, Chemistry and Biology. So, it is impossible to determine the number of lecturers in any age group given in the options.

21. 2 Maximum only one more lecturer can be in Biology team. So, total number of Physics and Chemistry lecturers put together must be more than or equals to 12.

22. 4 If Kandy is the only retired Chemistry lecturer, then Physics, Maths and Biology team will contain 2 retired lecturers each.

23. 3

**For questions 24 to 27:**

Since 13 and 28 are the two numbers that are already filled in the boxes of the matrix, therefore the 16 consecutive natural numbers are from 13 to 28.

$$\text{Sum of these 16 numbers} = \frac{16(13+28)}{2} = 8 \times 41$$

Sum of the numbers in the boxes of any row of any column or

$$\text{any diagonal of the square matrix is } \frac{8 \times 41}{4} = 82$$

Hence,  $A + B = 53$ ;  $C + G = 44$ ;  $F + J = 38$ ;  $E + H = 41$ ;  $D + I = 41$  and  $K + L = 29$ .

Therefore,  $(K, L) \rightarrow (15, 14)$  or  $(14, 15)$ .

Similarly,  $(A, B) \rightarrow (26, 27)$  or  $(27, 26)$ .

Also,  $E = 60 - 41 = 19$  (given:  $D + E + I = 60$ )

$\Rightarrow H = 22$

$(C, G) \rightarrow (20, 24), (24, 20), (21, 23), (23, 21)$

$(F, J) \rightarrow (17, 21), (21, 17), (18, 20), (20, 18)$

$(D, I) \rightarrow (17, 24), (24, 17), (18, 23), (23, 18), (20, 21), (21, 20)$

In the third column,  $E = 19$ . So,  $B + I + L = 63$

The only combination of  $(B, L)$  that satisfied without violating any condition is  $(26, 14)$ .

Hence,  $I = 23$ ,  $D = 18$ ,  $K = 15$ ,  $A = 27$ ,  $B = 26$ ,  $L = 14$ ,  $H = 22$  and  $E = 19$

Now,  $(C, G) \rightarrow (20, 24), (24, 20)$  and  $(C, F) \rightarrow (21, 24), (24, 21)$

Hence,  $C = 24$ ,  $G = 20$ ,  $F = 21$  and  $J = 17$ .

Finally the given matrix will look like as follows:

13	27	26	16
24	18	19	21
20	22	23	17
25	15	14	28

24. 1 Since  $C = 24$ , therefore 4 numbers are numerically greater than  $C$ .

25. 1  $(A + I) - (B + H) = 50 - 48 = 2$ .

26. 4 The 16 consecutive natural numbers could be from ' $n$ ' to ' $n + 15$ ', where ' $n$ ' is a natural number.

$$\text{Sum of these numbers} = \frac{16(n+n+15)}{2} = 16n + 120.$$

Sum of the numbers in the boxes of any

$$\text{row} = \frac{16n+120}{4} = 4n + 30.$$

Only option (4), i.e. 170 gives an integer value of  $n$ .

27. 2 Such pairs are  $(13, 25), (27, 15), (26, 14), (28, 16), (28, 13), (27, 13), (26, 13), (28, 14), (28, 15)$   
Therefore in total there are 9 such pairs.

28. 2 The maximum amount will be reached when 3 plates of Dosa, 3 plates of Pizza, 2 plates of Burger and 1 plate of Idli will be ordered. It could have been from Piyashi, Ravanya, Sanya and Varsha because only they have ordered for 9 items. But on Monday only Piyashi can host the dinner party among them, which is obvious from the following table collating all possible sequences of hosting the parties.

	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	Sun
Case 1	P	R	S	V	U	Q	T
Case 2	P	R	S	V	T	U	Q
Case 3	T	P	R	S	V	U	Q
Case 4	U	Q	P	R	S	V	T
Case 5	T	U	Q	P	R	S	V
Case 6	U	Q	T	P	R	S	B

**Note:** In the above table  $P = \text{Piyashi}$ ,  $Q = \text{Qualin}$ ,  $R = \text{Ravanya}$ ,  $S = \text{Sanya}$ ,  $T = \text{Tanya}$ ,  $U = \text{Urvashi}$  and  $V = \text{Varsha}$

29. 1 In the dinner party hosted by Qualin, she ordered for 2 plates of Dosa, 2 plates of Pizza, 2 plates of Burger and 2 plates of Idli. She paid Rs. 210. Some other friend paid minimum amount when 2 plates of Dosa, 1 plate of Pizza, 2 plates of Burger and 3 plates of Idli was ordered by her. Total amount in this case was Rs. 180. So difference  $= (210 - 180) = \text{Rs. } 30$ .

30. 4 Referring to the table given in the explanation of question 138 there are six possible sequences. We can see that on each of Wednesday and Friday, 5 friends could possibly host the party. Among the given options, (4) Friday is the right answer.