CAT 2019 Question Paper Slot 1

DILR

Instructions [35 - 38]

A supermarket has to place 12 items (coded A to L) in shelves numbered 1 to 16. Five of these items are types of biscuits, three are types of candies and the rest are types of savouries. Only one item can be kept in a shelf. Items are to be placed such that all items of same type are clustered together with no empty shelf between items of the same type and at least one empty shelf between two different types of items. At most two empty shelves can have consecutive numbers.
The following additional facts are known.
1. A and B are to be placed in consecutively numbered shelves in increasing order.
2. I and J are to be placed in consecutively numbered shelves both higher numbered than the shelves in which A and B are kept.
3. D, E and F are savouries and are to be placed in consecutively numbered shelves in increasing order after all the biscuits and candies.
4. K is to be placed in shelf number 16.
5. L and J are items of the same type, while H is an item of a different type.
6. C is a candy and is to be placed in a shelf preceded by two empty shelves.
7. L is to be placed in a shelf preceded by exactly one empty shelf.

35. In how many different ways can the items be arranged on the shelves?

A 8

B 4

C 2

D 1

36. Which of the following items is not a type of biscuit?

A L

B A

C B

D G

37. Which of the following can represent the numbers of the empty shelves in a possible arrangement?

A 1, 7, 11, 12

B 1, 5, 6, 12

C 1, 2, 6, 12

D 1, 2, 8, 12

38. Which of the following statements is necessarily true?

A All biscuits are kept before candies.

B There are two empty shelves between the biscuits and the candies.

C All candies are kept before biscuits.

D There are at least four shelves between items B and C.

Instructions [39 - 42]

Six players - Tanzi, Umeza, Wangdu, Xyla, Yonita and Zeneca competed in an archery tournament. The tournament had three compulsory rounds, Rounds 1 to 3. In each round every player shot an arrow at a target. Hitting the centre of the target (called bull's eye) fetched the highest score of 5. The only other possible scores that a player could achieve were 4, 3, 2 and 1. Every bull's eye score in the first three rounds gave a player one additional chance to shoot in the bonus rounds, Rounds 4 to 6. The possible scores in Rounds 4 to 6 were identical to the first three.

A player's total score in the tournament was the sum of his/her scores in all rounds played by him/her. The table below presents partial information on points scored by the players after completion of the tournament. In the table, NP means that the player did not participate in that round, while a hyphen means that the player participated in that round and the score information is missing.

	Round-1	Round-2	Round-3	Round-4	Round-5	Round-6
Tanzi	-	4	-	5	NP	NP
Umeza	-	-	-	1	2	NP
Wangdu	-	4	-	NP	NP	NP
Xyla	-	-	-	1	5	-
Yonita	-	-	3	5	NP	NP
Zeneca	-	-	-	5	5	NP

The following facts are also known.
1.Tanzi, Umeza and Yonita had the same total score.
2.Total scores for all players, except one, were in multiples of three.
3.The highest total score was one more than double of the lowest total score.
4.The number of players hitting bull's eye in Round 2 was double of that in Round 3.
5.Tanzi and Zeneca had the same score in Round 1 but different scores in Round 3.

39. What was the highest total score?

A 25

B 21

C 24

D 23

40. What was Zeneca's total score?

A 21

B 22

C 23

D 24

41. Which of the following statements is true?

A Xyla's score was 23.

B Zeneca's score was 23.

C Zeneca was the highest scorer.

D Xyla was the highest scorer.

42. What was Tanzi's score in Round 3?

A 4

B 5

C 3

D 1

Instructions [43 - 46]

The following table represents addition of two six-digit numbers given in the first and the second rows, while the sum is given in the third row. In the representation, each of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 has been coded with one letter among A, B, C, D, E, F, G, H, J, K, with distinct letters representing distinct digits.

		B	H	A	A	G	F
+		A	H	J	F	K	F
	A	A	F	G	C	A	F

43. Which digit does the letter A represent?

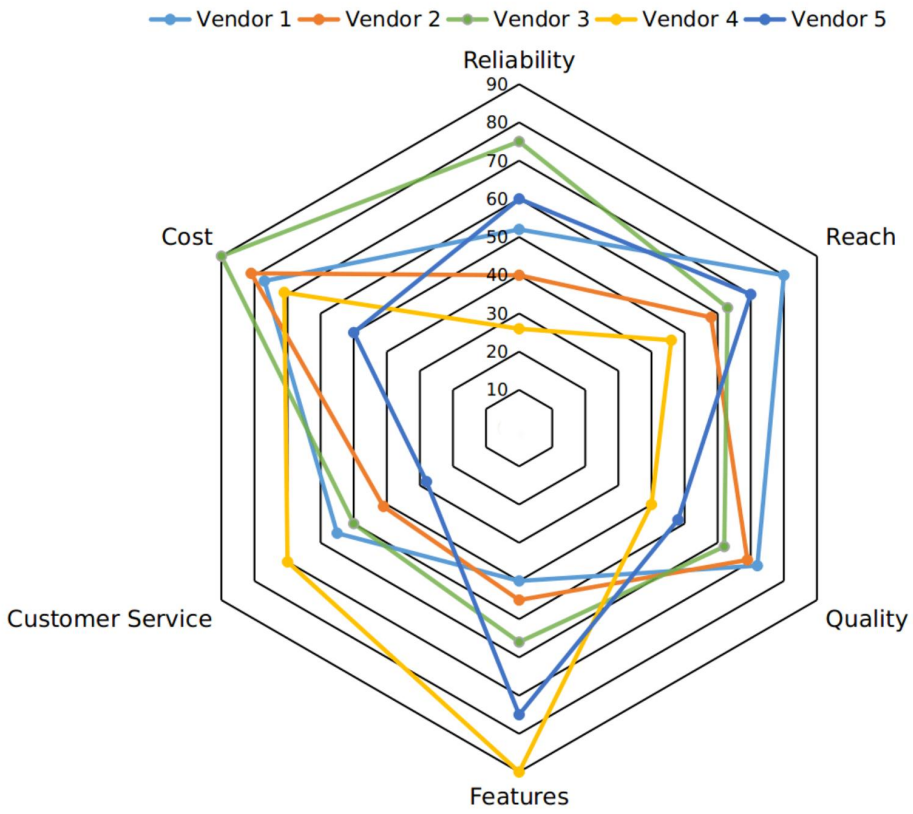
44. Which digit does the letter B represent?

45. Which among the digits 3, 4, 6 and 7 cannot be represented by the letter D?

46. Which among the digits 4, 6, 7 and 8 cannot be represented by the letter G?

Instructions [47 - 50]

Five vendors are being considered for a service. The evaluation committee evaluated each vendor on six aspects - Cost, Customer Service,Features, Quality, Reach, and Reliability. Each of these evaluations are on a scale of 0 (worst) to 100 (perfect). The evaluation scores on these aspects are shown in the radar chart. For example, Vendor 1 obtains a score of 52 on Reliability, Vendor 2 obtains a score of 45 on Features and Vendor 3 obtains a score of 90 on Cost.



47. On which aspect is the median score of the five vendors the least?

A Customer Service

B Cost

C Reliability

D Quality

48. A vendor's final score is the average of their scores on all six aspects. Which vendor has the highest final score?

A Vendor 4

B Vendor 2

C Vendor 1

D Vendor 3

49. List of all the vendors who are among the top two scorers on the maximum number of aspects is:

A Vendor 2, Vendor 3 and Vendor 4

B Vendor 1 and Vendor 5

C Vendor 2 and Vendor 5

D Vendor 1 and Vendor 2

50. List of all the vendors who are among the top three vendors on all six aspects is:

A Vendor 1 and Vendor 3

B None of the Vendors

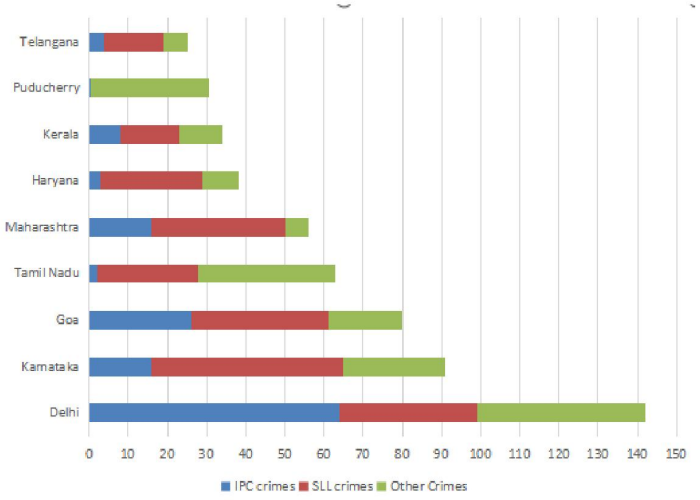
C Vendor 3

D Vendor 1

Instructions [51 - 54]

The Ministry of Home Affairs is analysing crimes committed by foreigners in different states and union territories (UT) of India. All cases refer to the ones registered against foreigners in 2016.

The number of cases - classfied into three categories: IPC crimes, SLL crimes and other crimes - for nine states/UTs are shown in thefigure below. These nine belong to the top ten states/UTs in terms of the total number of cases registered. The remaining state (among top ten) is West Bengal, where all the 520 cases registered were SLL crimes.



The table below shows the ranks of the ten states/UTs mentioned above among ALL states/UTs of India in terms of the number of cases registered in each of the three category of crimes. A state/UT is given rank r for a category of crimes if there are (r-1) states/UTs having a larger number of cases registered in that category of crimes. For example, if two states have the same number of cases in a category, and exactly three other states/UTs have larger numbers of cases registered in the same category, then both the states are given rank 4 in that category. Missing ranks in the table are denoted by *.

	IPC crimes	SLL crimes	OtherCrimes
Delhi	*	*	*
Goa	*	4	*
Haryana	8	6	*
Karnataka	3	2	*
Kerala	*	9	*
Maharashtra	3	4	8
Puducherry	13	29	*
Tamil Nadu	11	7	*
Telangana	6	9	8
WestBengal	17	*	16

51. What is the rank of Kerala in the 'IPC crimes' category?

52. In the two states where the highest total number of cases are registered, the ratio of the total number of cases in IPC crimes to the total number in SLL crimes is closest to

A 3 : 2

B 19 : 20

C 11 : 10

D 1 : 9

53. Which of the following is DEFINITELY true about the ranks of states/UT in the 'other crimes' category?
i) Tamil Nadu: 2
ii) Puducherry: 3

A both i) and ii)

B only ii)

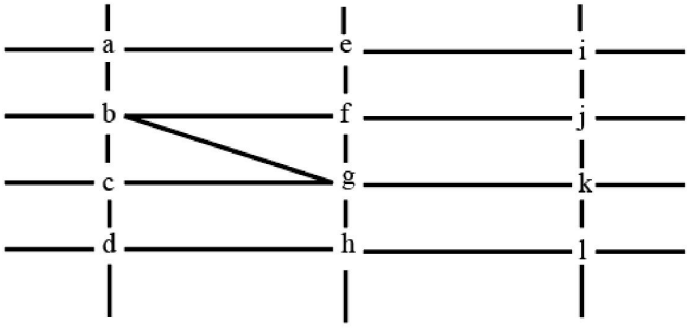
C neither i) , nor ii)

D only i)

54. What is the sum of the ranks of Delhi in the three categories of crimes?

Instructions [55 - 58]

The figure below shows the street map for a certain region with the street intersections marked from a through l. A person standing at an intersection can see along straight lines to other intersections that are in her line of sight and all other people standing at these intersections. For example, a person standing at intersection g can see all people standing at intersections b, c, e, f, h, and k. In particular, the person standing at intersection g can see the person standing at intersection e irrespective of whether there is a person standing at intersection f.



Six people U, V, W, X, Y, and Z, are standing at different intersections. No two people are standing at the same intersection.
The following additional facts are known.
1. X, U, and Z are standing at the three corners of a triangle formed by three street segments.
2. X can see only U and Z.
3. Y can see only U and W.
4. U sees V standing in the next intersection behind Z.
5. W cannot see V or Z.
6. No one among the six is standing at intersection d.

55. Who is standing at intersection a?

A W

B Y

C No one

D V

56. Who can V see?

A Z only

B U, W and Z only

C U and Z only

D U only

57. What is the minimum number of street segments that X must cross to reach Y?

A 1

B 4

C 2

D 3

58. Should a new person stand at intersection d, who among the six would she see?

A W and X only

B U and W only

C U and Z only

D V and X only

Instructions [59 - 62]

Princess, Queen, Rani and Samragni were the four finalists in a dance competition. Ashman, Badal, Gagan and Dyu were the four music composers who individually assigned items to the dancers. Each dancer had to individually perform in two dance items assigned by the different composers. The first items performed by the four dancers were all assigned by different music composers. No dancer performed her second item before the performance of the first item by any other dancers. The dancers performed their second items in the same sequence of their performance of their first items.

The following additional facts are known.
i) No composer who assigned item to Princess, assigned any item to Queen.
ii) No composer who assigned item to Rani, assigned any item to Samragni.
iii) The first performance was by Princess; this item was assigned by Badal.
iv) The last performance was by Rani; this item was assigned by Gagan.
v) The items assigned by Ashman were performed consecutively. The number of performances between items assigned by each of the remaining composers was the same.

59. Which of the following is true?

A The second performance was composed by Dyu.

B The third performance was composed by Dyu.

C The third performance was composed by Ashman.

D The second performance was composed by Gagan.

60. Which of the following is FALSE?

A Samragni did not perform in any item composed by Ashman.

B Princess did not perform in any item composed by Dyu.

C Rani did not perform in any item composed by Badal.

D Queen did not perform in any item composed by Gagan.

61. The sixth performance was composed by:

A Badal

B Dyu

C Ashman

D Gagan

62. Which pair of performances were composed by the same composer?

A The first and the seventh

B The third and the seventh

C The second and the sixth

D The first and the sixth

Instructions [63 - 66]

A new game show on TV has 100 boxes numbered 1, 2, . . . , 100 in a row, each containing a mystery prize. The prizes are items of different types, a, b, c, . . . , in decreasing order of value. The most expensive item is of type a, a diamond ring, and there is exactly one of these. You are told that the number of items at least doubles as you move to the next type. For example, there would be at least twice as many items of type b as of type a, at least twice as many items of type c as of type b and so on. There is no particular order in which the prizes are placed in the boxes.

63. What is the minimum possible number of different types of prizes?

64. What is the maximum possible number of different types of prizes?

65. Which of the following is not possible?

A There are exactly 75 items of type e.

B There are exactly 30 items of type b.

C There are exactly 45 items of type c.

D There are exactly 60 items of type d.

66. You ask for the type of item in box 45. Instead of being given a direct answer, you are told that there are 31 items of the same type as box 45 in boxes 1 to 44 and 43 items of the same type as box 45 in boxes 46 to 100.
What is the maximum possible number of different types of items?

A 5

B 6

C 4

D 3

Answers

DILR

35.**A**	36.**D**	37.**C**	38.**D**	39.**A**	40.**D**	41.**D**	42.**D**
43.**1**	44.**9**	45.**7**	46.**6**	47.**A**	48.**D**	49.**B**	50.**C**
51.**5**	52.**D**	53.**A**	54.**5**	55.**C**	56.**C**	57.**C**	58.**A**
59.**A**	60.**D**	61.**A**	62.**D**	63.**2**	64.**6**	65.**C**	66.**A**

Explanations

Quantitative Aptitude

Explanation [35 - 38]:
The total number of biscuits = 5, the total number of candies =3 and the total number of savouries = 12-(3+5)=4

Representing the candies as C, biscuits as B and savories as S. K is to be placed in shelf number 16. D, E and F are savouries and are to be placed in consecutively numbered shelves in increasing order after all the biscuits and candies. Since there is no empty shelf between the items of same type, D,E,F and K are savouries and placed at 13,14,15 and 16 respectively. This can be tabulated as follows:

Shelf No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Item Code													D	E	F	K
Item Type													S	S	S	S

The shelf 12 will be empty.

It is given that items are to be placed such that all items of same type are clustered together.

From 1, A and B are to be placed in consecutively numbered shelves in increasing order.

From 6, C is a candy and is to be placed in a shelf preceded by two empty shelves and from 7, L is to be placed in a shelf preceded by exactly one empty shelf.

Hence C and L are items of different types. Since C is a candy, L will be a biscuit.

From 5, L and J are items of the same type, while H is an item of a different type.

Since I and J are clustered together, I, J and L are biscuits and H is a candy.

So C,H are candies and I,J,L are biscuits. It is given that A, B are place consecutively. Hence A and B are items of same types. So A, B should be biscuits because if they are candies, there will be 4 candies.

Hence, I,J,L,A,B are biscuits and C,H and G are candies.

Now there are two empty shelves before C and exactly one empty shelf before L, then the different cases can be tabulated as follows:

Case 1:

Shelf No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Item Code	__	L	A	B	I/J	J/I	___	___	C	H/G	G/H	___	D	E	F	K
Item Type	__	B	B	B	B	B	___	___	C	C	C	___	S	S	S	S

Case 2:

Shelf No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Item Code	__	__	C	H/G	G/H	__	L	A	B	I/J	J/I	___	D	E	F	K
Item Type	__	__	C	C	C	___	B	B	B	B	B	___	S	S	S	S

35. **A**

The number of arrangements for the first case = 2*2=4

The number of arrangements for the second case = 2*2=4

The total number of arrangements = 4+4=8

36. **D**

G is a candy. Hence D is the answer.

37. **C**

The total number of biscuits = 5, the total number of candies =3 and the total number of savouries = 12-(3+5)=4

Representing the candies as C, biscuits as B and savories as S. K is to be placed in shelf number 16. D, E and F are savouries and are to be placed in consecutively numbered shelves in increasing order after all the biscuits and candies. Since there is no empty shelf between the items of same type, D,E,F and K are savouries and placed at 13,14,15 and 16 respectively. This can be tabulated as follows:

Shelf No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Item Code													D	E	F	K
Item Type													S	S	S	S

The shelf 12 will be empty.

It is given that items are to be placed such that all items of same type are clustered together.

From 1, A and B are to be placed in consecutively numbered shelves in increasing order.

From 6, C is a candy and is to be placed in a shelf preceded by two empty shelves and from 7, L is to be placed in a shelf preceded by exactly one empty shelf.

Hence C and L are items of different types. Since C is a candy, L will be a biscuit.

From 5, L and J are items of the same type, while H is an item of a different type.

Since I and J are clustered together, I, J and L are biscuits and H is a candy.

So C,H are candies and I,J,L are biscuits. It is given that A, B are place consecutively. Hence A and B are items of same types. So A, B should be biscuits because if they are candies, there will be 4 candies.

Hence, I,J,L,A,B are biscuits and C,H and G are candies.

Now there are two empty shelves before C and exactly one empty shelf before L, then the different cases can be tabulated as follows:

Case 1:

Shelf No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Item Code	__	L	A	B	I/J	J/I	___	___	C	H/G	G/H	___	D	E	F	K
Item Type	__	B	B	B	B	B	___	___	C	C	C	___	S	S	S	S

Case 2:

Shelf No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Item Code	__	__	C	H/G	G/H	__	L	A	B	I/J	J/I	___	D	E	F	K
Item Type	__	__	C	C	C	___	B	B	B	B	B	___	S	S	S	S

From the table(case 2), only 1,2,6 and 12 are empty in the same arrangement. Hence, C is the answer.

38. **D**

The total number of biscuits = 5, the total number of candies =3 and the total number of savouries = 12-(3+5)=4

Representing the candies as C, biscuits as B and savories as S. K is to be placed in shelf number 16. D, E and F are savouries and are to be placed in consecutively numbered shelves in increasing order after all the biscuits and candies. Since there is no empty shelf between the items of same type, D,E,F and K are savouries and placed at 13,14,15 and 16 respectively. This can be tabulated as follows:

Shelf No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Item Code													D	E	F	K
Item Type													S	S	S	S

The shelf 12 will be empty.

It is given that items are to be placed such that all items of same type are clustered together.

From 1, A and B are to be placed in consecutively numbered shelves in increasing order.

From 6, C is a candy and is to be placed in a shelf preceded by two empty shelves and from 7, L is to be placed in a shelf preceded by exactly one empty shelf.

Hence C and L are items of different types. Since C is a candy, L will be a biscuit.

From 5, L and J are items of the same type, while H is an item of a different type.

Since I and J are clustered together, I, J and L are biscuits and H is a candy.

So C,H are candies and I,J,L are biscuits. It is given that A, B are place consecutively. Hence A and B are items of same types. So A, B should be biscuits because if they are candies, there will be 4 candies.

Hence, I,J,L,A,B are biscuits and C,H and G are candies.

Now there are two empty shelves before C and exactly one empty shelf before L, then the different cases can be tabulated as follows:

Case 1:

Shelf No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Item Code	__	L	A	B	I/J	J/I	___	___	C	H/G	G/H	___	D	E	F	K
Item Type	__	B	B	B	B	B	___	___	C	C	C	___	S	S	S	S

Case 2:

Shelf No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Item Code	__	__	C	H/G	G/H	__	L	A	B	I/J	J/I	___	D	E	F	K
Item Type	__	__	C	C	C	___	B	B	B	B	B	___	S	S	S	S

Option A and C are wrong as candies can come before biscuits and vice versa. B is not necessarily true as there can be one empty shelf too as shown in the table. Option D is true as there are at least 4 shelves between B and C. Hence D is the answer.

Explanation [39 - 42]:

	Round-1	Round-2	Round-3	Round-4	Round-5	Round-6
Tanzi	-	4	-	5	NP	NP
Umeza	-	-	-	1	2	NP
Wangdu	-	4	-	NP	NP	NP
Xyla	-	-	-	1	5	-
Yonita	-	-	3	5	NP	NP
Zeneca	-	-	-	5	5	NP

It is given that every bull's eye score in the first three rounds gave a player one additional chance to shoot in the bonus rounds, Rounds 4 to 6, which means Tanzi scored Bull's eye only once in the first 3 rounds because she participated only once in round 4 to 6. Similarly, Umeza scored Bull's eye exactly 2 times in the first 3 rounds. Wangdu did not score Bull's eye in the first three rounds and so on.

Now from 1, Tanzi, Umeza and Yonita had the same total score.

So, Total score of Tanzi will be 4+5+5+a=14+a, (She scored Bull's eye(a score of 5) in exactly one round and a is the unknown score)

Total score of Umeza = 1+2+5+5+b = 13+b (She scored Bull's eye(a score of 5) in exactly 2 rounds and b is the unknown score)

Total score of Yonita = 3+5+5+c=13+c (She scored Bull's eye(a score of 5) in exactly one round and c is the unknown score)

Now 14+a=13+b=13+c,

Also it is given that total scores for all players, except one, were in multiples of three, so these three will have to be a multiple of 3.

So, (a,b,c) can be either (1,2,2) or (4,5,5) in the same order. But the value (5,5) for b and c is not possible. (Umeza scored Bull's eye in exactly 2 rounds and Yonita in exactly 1 round)

Hence, a=1,b=2 and c=2. So each of Tanzi, Umeza and Yonita had total score of 15.

Tabulating the data, we have

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Total
Tanzi	1/5	4	1/5	5	NP	NP	15
Umeza	5/5/2	5/5/2	5/5/2	1	2	NP	15
Wangdu	1/2/3/4	4	1/2/3/4	NP	NP	NP	6-12
Xyla	5	5	5	1	5	1/2/3/4/5	22-26
Yonita	2/5	2/5	3	5	NP	NP	15
Zeneca	-	-	-	5	5	NP	-

From 5, Tanzi and Zeneca had the same score in Round 1 but different scores in Round 3.

Zeneca score Bull's eye 2 times in round 1 to 3. If Tanzi scored 1 in round 1, then Zeneca also has to score 1 in round 1, which means both Tanzi and Zeneca scores in round 3 will be 5, which violates 5. Hence Tanzi scored 5 in round 1 and Zeneca also scored the same in round 1.So the new table is:

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Total
Tanzi	5	4	1	5	NP	NP	15
Umeza	5/5/2	5/5/2	5/5/2	1	2	NP	15
Wangdu	1/2/3/4	4	1/2/3/4	NP	NP	NP	6-12
Xyla	5	5	5	1	5	1/2/3/4/5	22-26
Yonita	2/5	2/5	3	5	NP	NP	15
Zeneca	5	5/(2/3/4)	5/(2/3/4)	5	5	NP	-

From 4, the number of players hitting bull's eye in Round 2 was double of that in Round 3.

So, in round 3 either 1 or 2 Bull's eye can be scored and in round 2, 2 or 4 Bull's eye can be scored.

Case 1: If only 1 Bull's eye is scored in the round 3, then in round 3 Umeza will score 2 and Zeneca will score 2/3/4 in round 3, which means both will score 5 in round 2. So minimum Bull's eye in round 2 will be 3. (Umeza, Zeneca and Xyla)

Hence this case is rejected.

Case 2: 2 Bull's eye were scored in round 3 and 4 Bull's eye were scored in round 2. So in round 2 Umeza, Yonita and Zeneca scored 5. This can be tabulated as:

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Total
Tanzi	5	4	1	5	NP	NP	15
Umeza	5/2	5	5/2	1	2	NP	15
Wangdu	1/2/3/4	4	1/2/3/4	NP	NP	NP	6-12
Xyla	5	5	5	1	5	1/2/3/4/5	22-26
Yonita	2	5	3	5	NP	NP	15
Zeneca	5	5	(2/3/4)	5	5	NP	-

In round 3, 2 Bull's eye can only be scored by Xyla and Umeza.

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Total
Tanzi	5	4	1	5	NP	NP	15
Umeza	2	5	5	1	2	NP	15
Wangdu	1/2/3/4	4	1/2/3/4	NP	NP	NP	6-12
Xyla	5	5	5	1	5	1/2/3/4/5	22-26
Yonita	2	5	3	5	NP	NP	15
Zeneca	5	5	(2/3/4)	5	5	NP	22-24

The highest scorer can be either Xyla or Zeneca. The lowest scorer will be Wangdu.

1.Consider Zeneca is the highest scorer.

From 3, the highest total score was one more than double of the lowest total score. So the only possible score for Zeneca is 23 and that for Wangdu is 11. (11*2+1=23)

But this will violate condition 2, since both Zeneca and Wangdu do not have their scores as multiples of three in this case.

Hence, Xyla will be the highest scorer. The only possible total score for Xyla will be 25, and that for Wangdu is 12(4+4+4). (12*2+1=25)

Since Xyla already has non-multiple of 3 as total score. Zeneca will have 24 as the total score. The complete table is:

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Total
Tanzi	5	4	1	5	NP	NP	15
Umeza	2	5	5	1	2	NP	15
Wangdu	4	4	4	NP	NP	NP	12
Xyla	5	5	5	1	5	4	25
Yonita	2	5	3	5	NP	NP	15
Zeneca	5	5	4	5	5	NP	24

39. **A**
The highest score is 25.

40. **D**
Zeneca total score is 24.

41. **D**
Xyla was the highest scorer.

42. **D**
Tanzi scored 1 in round 3.

Explanation [43 - 46]:

		B	H	A	A	G	F
+		A	H	J	F	K	F
	A	A	F	G	C	A	F

The value of F can only be 0 as F+F=F can only hold if F=0.

Also, A can only be 1(in the second column) because to get a **carry** of more than 1, B has to be a double-digit number which is not possible. (**A carry is a digit that is transferred from one column of digits to another column of more significant digits**.)

So the data can be tabulated as follows:

		B	H	1	1	G	0
+		1	H	J	0	K	0
	1	1	0	G	C	1	0

Since the last row in the third column is 0, the carry to the second column must have been 1, Hence B+1+1=11 => B=9

In the 4th column, H+H = 10 since a carry 1 has gone to the 3rd column. Hence H=5.

G+K must be 11 and the carry 1 goes to the next column, so C=1+1=2.

Now, G,K can take values (3,8), (4,7) and (5,6) in any order.

From 5th column G=J+1 => J=G-1

Case: G=3 and K=8, here J =2 which is not possible as C =2

Case: G=8 and K=3, J=7, a possible case.

Case: G=4 and K=7, J=3 possible

Case: G=7 and K=4, J=6 possible

Case: G=5 and K=6, J=4 not possible as H =5.

Case: G=6 and K=5, J=5 both J and K are same, not possible.

Hence the cases can be tabulated as follows:

		9	5	1	1	8	0
+		1	5	7	0	3	0
	1	1	0	8	2	1	0

		9	5	1	1	7	0
+		1	5	6	0	4	0
	1	1	0	7	2	1	0

		9	5	1	1	4	0
+		1	5	3	0	7	0
	1	1	0	4	2	1	0

43. **1**
The letter A represents 1.

44.**9**

The letter B represents 9.

45.**7**

A carry is a digit that is transferred from one column of digits to another column of more significant digits.)

So the data can be tabulated as follows:

		B	H	1	1	G	0
+		1	H	J	0	K	0
	1	1	0	G	C	1	0

Since the last row in the third column is 0, the carry to the second column must have been 1, Hence B+1+1=11 => B=9

In the 4th column, H+H = 10 since a carry 1 has gone to the 3rd column. Hence H=5.

G+K must be 11 and the carry 1 goes to the next column, so C=1+1=2.

Now, G,K can take values (3,8), (4,7) and (5,6) in any order.

From 5th column G=J+1 => J=G-1

Case: G=3 and K=8, here J =2 which is not possible as C =2

Case: G=8 and K=3, J=7, a possible case.

Case: G=4 and K=7, J=3 possible

Case: G=7 and K=4, J=6 possible

Case: G=5 and K=6, J=4 not possible as H =5.

Case: G=6 and K=5, J=5 both J and K are same, not possible.

Hence the cases can be tabulated as follows:

		9	5	1	1	8	0
+		1	5	7	0	3	0
	1	1	0	8	2	1	0

		9	5	1	1	7	0
+		1	5	6	0	4	0
	1	1	0	7	2	1	0

		9	5	1	1	4	0
+		1	5	3	0	7	0
	1	1	0	4	2	1	0

In all possible cases 7 is already represented by a letter other than D. Hence 7 is the answer.

46.**6**

A carry is a digit that is transferred from one column of digits to another column of more significant digits.)

So the data can be tabulated as follows:

		B	H	1	1	G	0
+		1	H	J	0	K	0
	1	1	0	G	C	1	0

Since the last row in the third column is 0, the carry to the second column must have been 1, Hence B+1+1=11 => B=9

In the 4th column, H+H = 10 since a carry 1 has gone to the 3rd column. Hence H=5.

G+K must be 11 and the carry 1 goes to the next column, so C=1+1=2.

Now, G,K can take values (3,8), (4,7) and (5,6) in any order.

From 5th column G=J+1 => J=G-1

Case: G=3 and K=8, here J =2 which is not possible as C =2

Case: G=8 and K=3, J=7, a possible case.

Case: G=4 and K=7, J=3 possible

Case: G=7 and K=4, J=6 possible

Case: G=5 and K=6, J=4 not possible as H =5.

Case: G=6 and K=5, J=5 both J and K are same, not possible.

Hence the cases can be tabulated as follows:

		9	5	1	1	8	0
+		1	5	7	0	3	0
	1	1	0	8	2	1	0

		9	5	1	1	7	0
+		1	5	6	0	4	0
	1	1	0	7	2	1	0

		9	5	1	1	4	0
+		1	5	3	0	7	0
	1	1	0	4	2	1	0

From the table it is clear that 6 cannot be represented by G.

47. **A**

The data can be tabulated as follows(approximately):

Parameters	Vendor 1	Vendor 2	Vendor 3	Vendor 4	Vendor 5
Reliability	52	40	75	26	60
Reach	80	58	63	46	70
Quality	72	69	62	40	48
Features	40	45	56	90	75
Customer Serivces	55	41	50	70	28
Cost	77	81	90	71	50

Customer Services: 28,41,50,55,70 (The median is 50)

Cost: 50,71,77,81,90 (The median is 77)

Reliability: 26, 40, 52, 60, 75 (The median is 52)

Quality: 40, 48, 62, 69, 72 (The median is 62)

Features: 40, 45, 56, 75, 90 (The median is 56)

Reach: 46, 58, 63, 70, 80 (The median is 63)

Hence the customer services has the lowest median.

48. **D**

The data can be tabulated as follows(approximately):

Parameters	Vendor 1	Vendor 2	Vendor 3	Vendor 4	Vendor 5
Reliability	52	40	75	26	60
Reach	80	58	63	46	70
Quality	72	69	62	40	48
Features	40	45	56	90	75
Customer Serivces	55	41	50	70	28
Cost	77	81	90	71	50
Total	376	334	396	343	321

The average of the vendor will be highest which has highest total score. Hence vendor 3 has the highest average.

49. **B**

The data can be tabulated as follows(approximately):

Parameters	Vendor 1	Vendor 2	Vendor 3	Vendor 4	Vendor 5
Reliability	52	40	75	26	60
Reach	80	58	63	46	70
Quality	72	69	62	40	48
Features	40	45	56	90	75
Customer Serivces	55	41	50	70	28
Cost	77	81	90	71	50

Top 3 on Reliability: Vendor 3, Vendor 5

Top 3 on Reach: Vendor 1, Vendor 5

Top 3 on Quality: Vendor 1, Vendor 2

Top 3 on Features: Vendor 4, Vendor 5

Top 3 on Customer Services: Vendor 4, Vendor 1

Top 3 on Cost: Vendor 3, Vendor 2

Vendor 1: 3 times Vendor 2: Only once Vendor 3: 2 times Vendor 4: 2 times Vendor 5: 3 times

Here 1 and 5 comes 3 times. Hence B is the answer.

50. **C**

The data can be tabulated as follows(approximately):

Parameters	Vendor 1	Vendor 2	Vendor 3	Vendor 4	Vendor 5
Reliability	52	40	75	26	60
Reach	80	58	63	46	70
Quality	72	69	62	40	48
Features	40	45	56	90	75
Customer Serivces	55	41	50	70	28
Cost	77	81	90	71	50

Top 3 on Reliability: Vendor 3, Vendor 5, Vendor 1

Top 3 on Reach: Vendor 1, Vendor 5, Vendor 3

Top 3 on Quality: Vendor 1, Vendor 2, Vendor 3

Top 3 on Features: Vendor 4, Vendor 5, Vendor 3

Top 3 on Customer Services: Vendor 4, Vendor 1, Vendor 3

Top 3 on Cost: Vendor 3, Vendor 2, Vendor 1

Only Vendor 3 ranks among top 3 in all the six parameters.

Explanation [51 - 54]:

The data can be tabulated as follows(approximately):

States	IPC Crimes	SLL Crimes	Other Crimes	Total Crimes
Telangana	3-4	14-15	6-7	24-25
Puducherry	1	0	30	31
Kerala	7-8	15-16	10-11	33-34
Haryana	3-4	25-26	9-10	37-38
Maharashtra	15-16	35-36	5-6	55-56
Tamilnadu	2-3	25-26	35-36	62-64
Goa	25-26	35-36	18-19	80
Karnataka	15-16	48-49	25-26	91
Delhi	63-64	35-36	42-43	142-143
West Bengal	0	520	0	520

	IPC crimes	SLL crimes	OtherCrimes
Delhi	*	*	*
Goa	*	4	*
Haryana	8	6	*
Karnataka	3	2	*
Kerala	*	9	*
Maharashtra	3	4	8
Puducherry	13	29	*
Tamil Nadu	11	7	*
Telangana	6	9	8
WestBengal	17	*	16

51. **5**

Rank of Delhi in IPC crimes category = 1, The rank of Karnataka and Maharashtra is 3(from table), then the rank of Goa can only be 2.

The rank of Telangana is 6 which has less |IPC crimes than Kerala, which means the rank of Kerala can be less than or equal to 5.

Now, there are two states with 3 ranks, so there will be no rank 4, there can only be rank 5 which is Kerala.

52. **D**

The highest cases are registered in West Bengal and Delhi.

The total number of IPC crimes = 63-64

The total number of SLL crimes = 520+35-36 = 555-556

Hence the ratio = (63-64)/(555-556) = 0.11 (Approximately) = 1:9

53. **A**

From the table, the rank of Tamilnadu in other crimes is 2. The states which are not in the table will have crimes less than Telangana(i.e 24-25)

From the table the rank of Pudducherry in other crimes is 3.

54. **5**

The data can be tabulated as follows(approximately):

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States	IPC Crimes	SLL Crimes	Other Crimes	Total Crimes
Telangana	3-4	14-15	6-7	24-25
Puducherry	1	0	30	31
Kerala	7-8	15-16	10-11	33-34
Haryana	3-4	25-26	9-10	37-38
Maharashtra	15-16	35-36	5-6	55-56
Tamilnadu	2-3	25-26	35-36	62-64
Goa	25-26	35-36	18-19	80
Karnataka	15-16	48-49	25-26	91
Delhi	63-64	35-36	42-43	142-143
West Bengal	0	520	0	520

	IPC crimes	SLL crimes	OtherCrimes
Delhi	*	*	*
Goa	*	4	*
Haryana	8	6	*
Karnataka	3	2	*
Kerala	*	9	*
Maharashtra	3	4	8
Puducherry	13	29	*
Tamil Nadu	11	7	*
Telangana	6	9	8
WestBengal	17	*	16

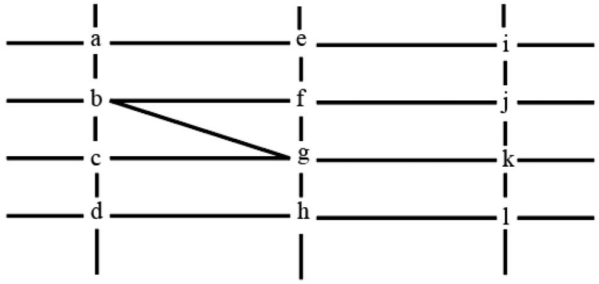
The rank of Delhi in IPC crimes should be 1 because the states which are not in table cannot crime more than that of Telangana which is 24-25.

Similarly Delhi Rank in Other crimes will be 1.

Now in SLL crimes clearly West Bengal has rank 1. It is given that Karnataka has rank 2. The rank 3 can go to either Goa, Delhi and Maharashtra but Goa and Maharashtra already have rank 4. So Delhi will have rank 3. Also no state outside of the table can be ranked 3 in SLL crimes as maximum number of crime should be less than that of Telangana(24-25). Here the number of SLL crimes is 35-36.

Hence the sum of the ranks = 1+3+1=5

Explanation [55 - 58]:



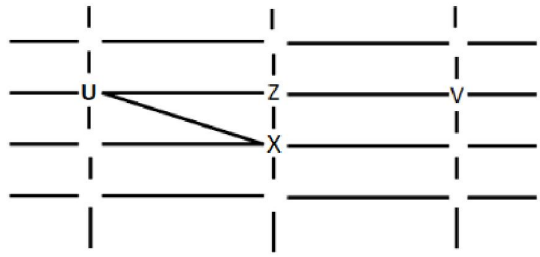
From 1, X, U, and Z are standing at the three corners of a triangle formed by three street segments.

From 2, X can see only U and Z.

From 4, U sees V standing in the next intersection behind Z. Also, no one among the six is standing at intersection d.

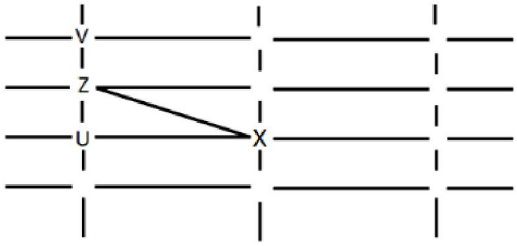
Only cases possible are:

1.



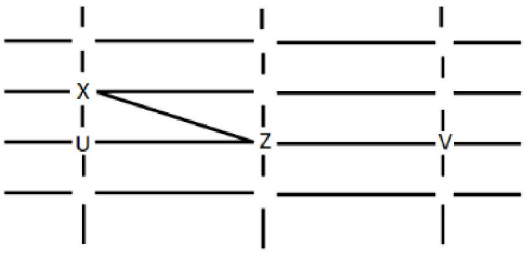
W cannot see V or Z. So W can only be at the intersection a. Since Y can see only U and W, Y can only be at c where X can see him. Hence this case is rejected.

2.



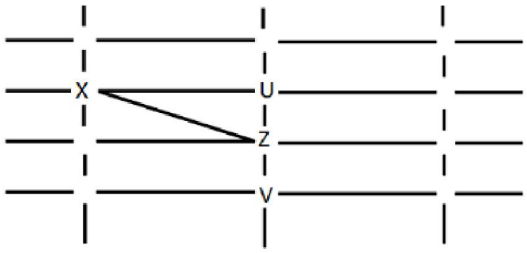
Y can only see U and W. Y cannot be placed anywhere. Hence this case is also rejected.

3.



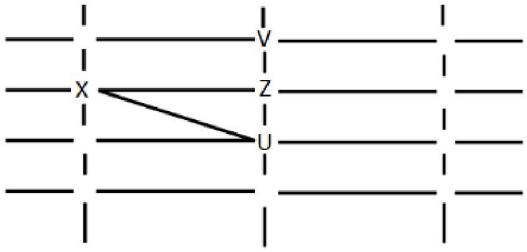
Y can only see U and W. Y cannot be placed anywhere. Hence this case is also rejected.

4.

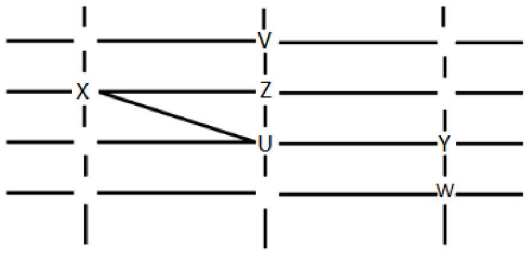


W cannot see V or Z. W can only be placed at i. Y can see only U and W. Y can only be placed at j or e, where he can see more people than U and W. Hence this case is also rejected.

5.



W cannot see V or Z. Y can only see U and W. Hence W and Y can only be placed as shown:



55. **C**
No one is standing at the intersection A. Hence C is the answer.

56. **C**
V can see U and Z only. Hence C is the answer.

57. **C**
To reach Y, X has to go from b to g and g to k, i.e. 2 streets.

58. **A**
If a new person stands at d(left down corner), they can see W and X only. Hence A is the answer.

Explanation [59 - 62]:

	1st Performance				2nd Performance			
Finalists	Princess							Rani
Composers	Badal							Gagan

Since the dancers performed their second items in the same sequence of their performance of the first items. The table will be as follows:

	1st Performance				2nd Performance			
Finalists	Princess			Rani	Princess			Rani
Composers	Badal							Gagan

The items assigned by Ashman were performed consecutively. The number of performances between items assigned by each of the remaining composers was the same.

Also, the first items performed by the four dancers were all assigned by different music composers. Badal can come only at the place as shown in the table.

	1st Performance				2nd Performance			
Finalists	Princess			Rani	Princess			Rani
Composers	Badal		Gagan			Badal		Gagan

Then Ashman can only compose for the following performances.

	1st Performance				2nd Performance			
Finalists	Princess			Rani	Princess			Rani
Composers	Badal		Gagan	Ashman	Ashman	Badal		Gagan

Hence Dyu will compose for the following performances:

	1st Performance				2nd Performance			
Finalists	Princess			Rani	Princess			Rani
Composers	Badal	Dyu	Gagan	Ashman	Ashman	Badal	Dyu	Gagan

From (i) No composer who assigned item to Princess, assigned any item to Queen.
From (ii) No composer who assigned item to Rani, assigned any item to Samragni.

Hence Dyu will compose for Samragni 1st Performance and Gagan will compose for Queen 1st Performance.
Also, Badal will compose for Samragni 2nd Performance and Dyu will compose for Queens 2nd Performance.

Hence, the complete table is as follows:

	1st Performance				2nd Performance			
Finalists	Princess	Samragni	Queen	Rani	Princess	Samragni	Queen	Rani
Composers	Badal	Dyu	Gagan	Ashman	Ashman	Badal	Dyu	Gagan

59. **A**
The second performance was composed by Dyu. Hence A is the answer.

60. **D**

Option A: Samragni did not perform in any item composed by Ashman. This statement is true.

Option B: Princess did not perform in any item composed by Dyu. This is also true.

Option C: Rani did not perform in any item composed by Badal. This statement is true.

Option D: Queen did not perform in any item composed by Gagan. This statement is false.

Hence D is the answer.

61. **A**

The sixth performance was composed by Badal. Hence C is the answer.

62. **D**

The first and the sixth items were composed by Badal. Hence D is the answer.

63. **2**

It is given that the most expensive item is a diamond ring of type a and there is exactly one of these. Since the item b should be at least twice. The minimum number of items will be obtained when a=1 and b=99, which means there are only two different types of items.

64. **6**

It is given that the most expensive item is a diamond ring of type a and there is exactly one of these. Since the number of items of type b should be at least twice of that of a and the number of items of type c should be at least twice of that of b and so on. So the maximum number of different types of items of a, b and c will be obtained when a=1, b=2, c=4, d=8, e=16, f=69. Hence the maximum number of different types of items will be 6.

If the number of items is 7, then the minimum number of prizes should be 1+2+4+8+16+32+64=127 which is more than 100.

Hence 6 is the answer.

65. **C**

Option A: There are exactly 75 items of type e.

a=1,b=2,c=4,d=8, e=85. Here the maximum value of e= 85. Hence it can take the value 75.

An example of such case is a=1,b=2,c=4,d=18, e=75

Option B: There are exactly 30 items of type b.

a=1 b=30 and c=69. Hence this case is also possible.

Option C: There are exactly 45 items of type c.

Since the value of d should be at least 90, it means that d is not present because 45+90 will be more than 100(maximum number of items). Only a,b and c are present.

The maximum value of b = 22 and a =1, but 45+22+1=68, which is less than 100. So this case is not possible.

Option D: There are exactly 60 items of type d.

d=60, c=30, b=9 and a=1. a+b+c+d=100. Hence this case is possible.

C is the answer.

66. **A**

The total number of items from 1 to 100, which are of same type as in box 45 = 31+1+43=75

Now to maximize the number of items, a=1, b=2, c=4, d=18 and e=75(given)

There can be maximum 5 types of items.

If we consider number of items to be 6, then minimum number of items of 5th type will be 16, 1+2+4+8+16+75=106 which is more than 100.