MBA PIONEER 2024

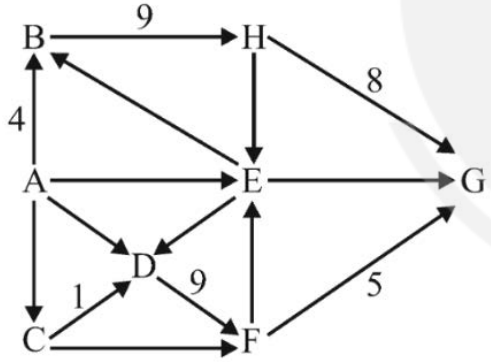
Data Interpretation & Logical Reasoning

DPP: 2

DILR Set Group - 2

Directions (1-5) Read the following passage and answer the given questions.

The provided network diagram depicts eight nodes, with node A representing a water reservoir and the remaining nodes representing different towns. The lines connecting these nodes symbolize pipelines through which water flows. The arrows on the lines indicate the direction of water flow. Some arrows have numbers associated with them, indicating the quantity of water in Million Gallons (MG) that flows through the respective pipelines in a day. It is important to note that towns B, C, D, E, F, and H are self–sufficient in terms of water, and the only water consumption occurs at town G from the reservoir.



Here are the additional details to consider :

i. No two pipelines connected to a town have the same quantity of water flowing through them in a day.

ii. The quantity of water flowing through each pipeline in a day is a positive integer less than 10 MG.

iii. The pipeline connecting towns C and F carries the minimum possible quantity of water under the given constraints.

Q1 What is the cumulative quantity (in MG) of water flowing out from reservoir A?

(A) 10 (B) 20

(C) 25 (D) 28

Q2 What is the volume (in MG) of water that flows from reservoir A to town E?

(A) 5 (B) 7

(C) 8 (D) 10

Q3 Which of the following statements is/are correct?

(i) The volume of water flowing between E and F is 8 MG.

(ii) The volume of water flowing between E and D is greater than 2 MG.

(A) Only i is true

(B) Only ii is true

(C) Both i and ii are true

(D) Neither i nor ii is true

Q4 Which of the following pairs of pipelines have an equal quantity of water flowing through them?

(A) Pipeline connecting A and D and pipeline connecting E and F.

(B) Pipeline connecting A and E and pipeline connecting E and G.

(C) Pipeline connecting H and E and pipeline connecting C and F.

(D) Pipeline connecting E and D and pipeline connecting A and C.

Q5 The volume of water flowing out from town E is?

(A) 7MG less than that flowing out of F

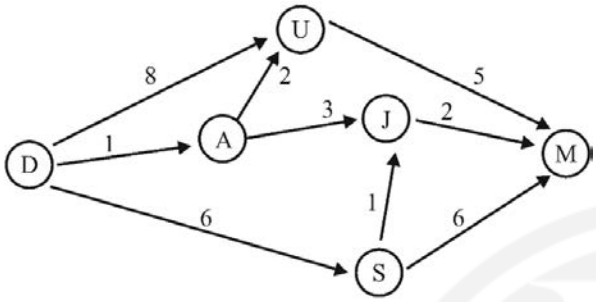
(B) 6MG less than that flowing into D

(C) 4MG more than that flowing out of H

(D) 5MG less than that flowing into G

Directions (6-10) Read the following passage and answer the given questions.

A significant amount of logistics flows from Delhi (D) to Mumbai (M) in one way as shown in the diagram below. Udaipur (U), Ahmedabad (A), Jaipur (J), and Surat (S) are the cities which come in between the direction of flow. The logistics cost in rs is mentioned adjacent to the arrows in the diagram.



The logistics transport will take the route which offers minimum cost. If the two or more routes offer same cost, then the transporter is indifferent about it.

The govt. can control the flow only by levying appropriate tax at each city. For ex the total cost of traveling from D–U–M will be 13 + taxes on city U

Q6 If Govt. want to ensure that all transporters traveling from D–M pays the same cost regardless of the route. Then what feasible toll should be charged to ensure uniformity? (Road from A–J is under repair hence unusable). (Cost in order –U, A, J, S)

(A) 2, 5, 3, 1 (B) 0, 5, 3, 2
(C) 1, 5, 3, 2 (D) 2, 3, 5, 1

Q7 If Govt. want to ensure no traffic flow on the street from S–M, then a feasible amount of toll would be? (Cost in order –U, A, J, S).

(A) 1, 5, 3, 3 (B) 1, 4, 4, 3
(C) 1, 5, 4, 1 (D) 0, 5, 2, 2

Q8 If Govt. want to ensure that all traffic traveling from D gets evenly distributed along D–U, D–A and D–S. Then what feasible toll should be charged to ensure uniformity? (Cost in order –U, A, J, S)

(A) 2, 5, 3, 1 (B) 0, 5, 4, 1
(C) 1, 5, 3, 2 (D) 2, 3, 5, 1

Q9 Govt. decide to make a policy in which the toll cost of traveling should be minimized. The policy should ensure all cities should be included. The cost incurred by travelers under this policy will be

(A) Rs. 6 (B) Rs. 8
(C) Rs. 9 (D) Rs. 12

Q10 If Govt. want to ensure that all transporters traveling from D to M pays the same cost regardless of the route. Then what feasible toll should be charged to ensure uniformity? (Cost in order –U, A, J, S)

(A) 2, 5, 3, 1 (B) 0, 5, 3, 2
(C) 1, 5, 3, 2 (D) 2, 3, 5, 1

Directions (11-15) Read the following passage and answer the given questions.

In a game of Chess(10 × 10)

A knight moves two squares in any direction vertically followed by one square horizontally, or two squares in any direction horizontally followed by one square vertically.

The rook moves horizontally or vertically, through any number of unoccupied squares.

The bishop moves in any direction diagonally.

The queen may move any number of unoccupied squares in any direction – horizontally, vertically, or diagonally.

The columns are labeled A to J (left to right) and the rows are numbered 1 to 10 (bottom to top). The position of a piece is given by the combination of column and row labels. For example, position B7 means that the piece is in Bth column and 7th row.

Q11 In a chessboard, a knight is placed at position E4. How many positions on the board can be attacked by the knight if there are no other pieces present?

(A) 10 (B) 8
(C) 7 (D) 5

Q12 If a bishop is placed at position G2. Given that the other pieces are located at positions B7, D5, F3, and H1, how many pieces can be attacked by the bishop?

(A) 4 (B) 1
(C) 2 (D) 3

Q13 If a queen is placed at position H6, and the other pieces are positioned at A2, E6, H1, J3, and J8, how many pieces can be attacked by the queen?

(A) 3 (B) 4
(C) 5 (D) 2

Q14 Suppose the rook is the only piece on the board and it is at position C6. In how many positions can another piece be placed on the board such that it is safe from attack from the rook?

(A) 29 (B) 74
(C) 81 (D) 89

Q15 If the other pieces are only at positions A3, C4, D7, I7, G9 and J8, then which of the following positions of the queen results in the maximum number of pieces being under attack?

(A) G7 (B) B4
(C) A7 (D) E7

Directions (16-20) Read the following passage and answer the given questions.

In a game "MONEY AND TRADE", a ball can be moved in straight lines among the points A, B, C, D, E, F, G, and H as follows:

The ball can be moved between the points A and D; A and C; B and C, B and G; C and F; G and E; D and B; E and F in either way. The ball cannot be moved in any manner other than that mentioned above. Each time one player is allowed to move the ball among these points, with the condition that the ball does not touch any point more than once. A player wins ₹10, ₹20, ₹40, ₹50 and ₹70 when the ball touches points A, F, D, E, and G respectively. A player loses ₹30 and ₹60 at points C and B respectively. At the beginning of the game, a player is given a starting point from where the ball is to be moved and the end point where the ball has to be stopped. At the end of a game, the player wins/loses the money which is the net of the amounts that one wins/loses at those points which the ball touches. A player tries to win the maximum possible amount while moving the ball between these points.

Q16 What is the maximum possible amount in rupees that can be won by a player while moving the ball from point E to point C?

Q17 If the ball can be moved from point B to point G but not from point G to point B and from point C to point F but not from point F to point C, then what is the maximum possible amount in rupees that can be won by moving the ball starting from point A?

Q18 What is the maximum possible amount in rupees a player may lose by moving the ball touching exactly four points?

Q19 In how many distinct ways can a ball be moved from point A to point E?

Q20 If a ball moves from point A to point B through the maximum possible number of points, then how many minimum points would not be touched?

Directions (21-25) Read the following passage and answer the given questions.

These questions are based on a network connecting six different Offices, namely P, Q, R, S, T, and U in an administrative OFC program.

The Offices are connected by a single road that allows Car–Cab to travel in both directions for OFFICERs. Only one Car–Cab commutes between any two connected offices and each Car–Cab runs between two offices only. The following table gives the necessary information regarding connectivity among the different Offices and travel time which are as follows:

Connecting Offices	Travel Time in (Hours)
P to Q	5
U to P	1
Q to R	3
R to S	7
S to T	3
T to Q	2
Q to S	8
P to S	4
T to R	6
U to Q	12

Note:– First letter in each ***Connecting Offices*** is considered as the initial position of the Car–Cab.

On a particular day at 9:00 a.m., ten Car–Cab simultaneously started from ten different routes to reach their respective destinations. It is important to note that no Officer will wait anywhere for a longer time than necessary to catch the next available Car–Cab. This rule applies while traveling through different Offices until the Officer reaches their destination.

Q21 One day Mr. Ram wanted to travel from P to T. What will be the earliest time that he could reach the destination through any possible way if he started at 8:50 a.m. from P?

(A) 6:00 p.m. (B) 5:00 p.m

(C) 10:00 p.m. (D) 11:00 p.m.

Q22 If Mr. Shankar travelled from P to R, on the route P–S–T–R, starting by 9:00 a.m. with one of the assigned Car–Cab on that day, what is the minimum waiting time at Office–T?

(A) 5 hrs (B) 4 hrs

(C) 3 hrs (D) None of these

Q23 One day Mr. Ram wanted to travel from P to T by P– Q – T What will be the earliest time that he could reach the destination through the given route if he started at 8:50 a.m. from P?

(A) 6 : 00 pm (B) 7 : 00 pm

(C) 8 : 00 pm (D) 5 : 00 pm

Q24 If Mr. Vishnu reaches Office–T at 12:00 p.m. on that day, in which of the following routes will he take to reach R at the earliest?

Note:– Conditions for Car–Cab travel movement in different routes are same as per the question.

(A) T–S–R

(B) T–R

(C) T–Q–R

(D) Cannot be determined

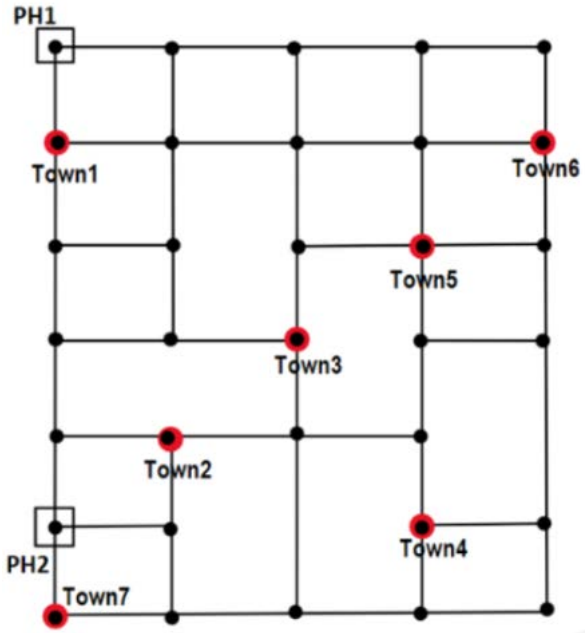
Q25 What is the earliest time that one OFFICER can reach Office–S from Office–Q, if he/she starts at Q at 9:00 a.m. and waiting time at any office will be minimum?

(A) 4:00 p.m. (B) 5:00 p.m.

(C) 3:00 p.m. (D) 8:00 p.m.

Directions (26-30) Read the following passage and answer the given questions.

The following diagram illustrates the road connections between seven cities: Mumbai, Bengaluru, Pune, Srinagar, Chennai, Delhi, and Hyderabad. Each city is Referred as Town1, Town2, Town3, Town4, Town5, Town 6, and Town7 although not necessarily in the same order. In addition, two powerhouses i.e., PH1, and PH2 are mentioned for necessary conditions.



When traveling from one town to another, there are no intermediate stops in other towns. Additionally, when starting from a town, the person will only take roads going East or West among the available options to any extent. The provided condition specifies the number and sequence of turns (left or right) taken by a person for traveling between certain pairs of towns. It is worth noting that the person always travels a certain distance before and after each turn.

Conditions are: –

1. To travel from Bengaluru to Chennai, the person took two right turns followed by a left turn, in that order.
2. When going from Delhi to Hyderabad, the person made two right turns, followed by a left turn, and then another right turn.
3. To reach Srinagar from Chennai, the person took three left turns followed by two right turns, in that order.

Please Note : only in the starting of journey, movement of east and west are not considered as moves.

Q26 Which town is referred to as DELHI?
(A) Town 7
(B) Town 5
(C) Town 2
(D) Can't be determined

Q27 If a person starts from Hyderabad, takes one left turn, and reaches another city, which of the following cannot be the city that he reached?
(A) Delhi
(B) Srinagar
(C) Bengaluru
(D) More than one of the above

Q28 If a person wanted to go from Delhi to Hyderabad, what is the minimum number of turns that he must take?
(A) 5 (B) 3
(C) 2 (D) 4

Q29 If a person started from Srinagar and took exactly one turn, how many of the other six towns can he reach?
(A) more than 3 (B) 5
(C) 3 (D) 2

Q30 Which town is referred to as Hyderabad?
(A) TOWN 2 (B) TOWN 6
(C) TOWN 4 (D) TOWN 3

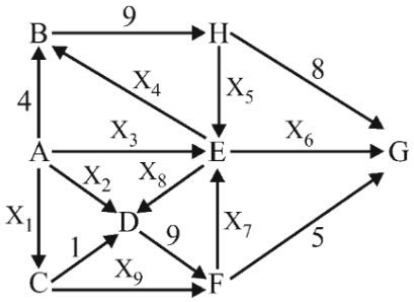
Answer Key

Q1	(B)
Q2	(C)
Q3	(B)
Q4	(D)
Q5	(D)
Q6	(C)
Q7	(D)
Q8	(C)
Q9	(C)
Q10	(C)
Q11	(B)
Q12	(C)
Q13	(A)
Q14	(C)
Q15	(D)
Q16	80
Q17	130
Q18	40
Q19	4
Q20	1
Q21	(B)
Q22	(C)
Q23	(D)
Q24	(C)
Q25	(C)
Q26	(C)
Q27	(A)
Q28	(B)
Q29	(D)
Q30	(B)

Hints & Solutions

Q1. Text Solution:

Since it is given that the only consumption of reservoir water happens at G, at every other town, the quantity of water entering the town equals that of leaving the town.



At H, $X_5 + 8 = 9$

$\Rightarrow X_5 = 1$

At B, $4 + X_4 = 9$

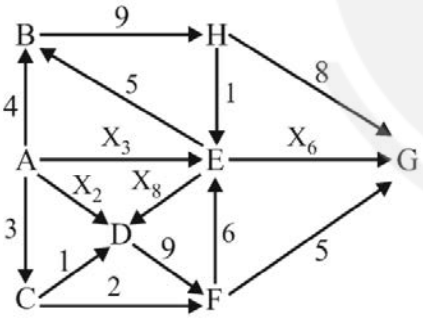
$\Rightarrow X_4 = 5$

It is given that the flow through CF is the minimum possible.

$X_9 = 2$ (it cannot be 1 from (i)) $\Rightarrow X_1 = 1 + X_9 = 3$

At F, $X_9 + 9 = X_7 + 5 \Rightarrow X_7 = 6$

The network now appears as below.



At D, $X_2 + X_8 + 1 = 9$

$\Rightarrow X_2 + X_8 = 8$

But X_2 cannot take values of 3, 4, 1, and 9 (otherwise, it violates the 1st condition given). Similarly, X8 cannot take 6, 5, 1, 8, or 9.

The possibilities for (X_2, X_8) are (5, 3) and (6, 2).

At E, $X_3 + 6 + 1 = X_6 + X_8 + 5$

$\Rightarrow X_3 + 2 = X_6 + X_8$

From the earlier result, X_8 can take the value of only 3 or 2.

If X_8 is 2, then $X_3 = X_6$ which violates the given condition.

So, $X_8 = 3$ and $X_2 = 6$

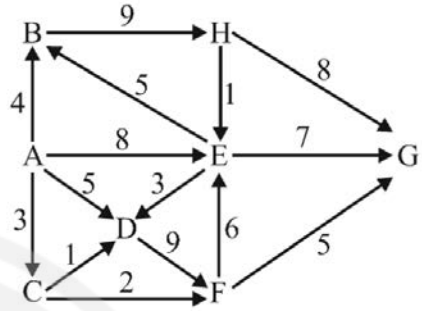
$\Rightarrow X_3 + 2 = X_6 + 3$

$\Rightarrow X_3 = X_6 + 1$

But X_3 and X_6 cannot be 1, 2, 3, 4, 5, 6 and X_6 also cannot be 8.

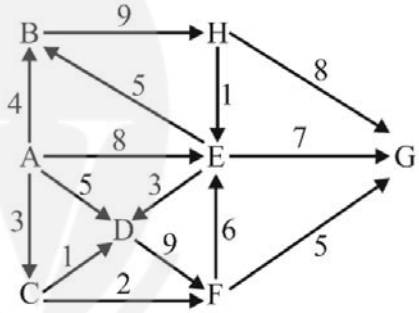
The only possibility is $X_6 = 7$ and $X_3 = 8$

The final network diagram is shown below.



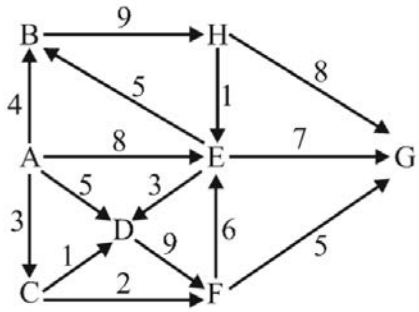
A total of 20MG of water flows from A.

Q2. Text Solution:



8MG of water flows from A to E.

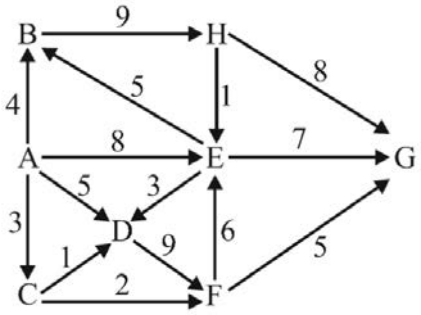
Q3. Text Solution:



Statement i– It is **false** as only 6MG of water flows through E to F.

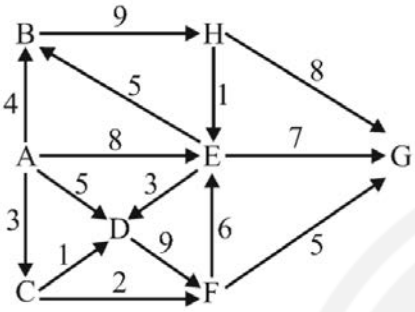
Statement ii– It is **true** since the amount of water flowing from E to D is 3MG.

Q4. Text Solution:



From the above chart one can say that option d will be the correct choice.

Q5. Text Solution:



The quantity of water flowing out from town E = 3 + 7 + 5 = 15 MG

The quantity of water flowing out of town F = 6 + 5 = 11 MG

The quantity of water flowing into town D = 9MG

The quantity of water flowing out of town H = 8 + 1 = 9 MG

The quantity of water flowing into town G = 20 MG

Q6. Text Solution:

The total route available for traveling D–M is

D–U–M

D–A–U–M

D–A–J–M

D–S–J–M

D–S–M

We cannot use D – A – J – M as A – J road is under repair

We will use hit and trial method to find cost from options

This table will give you the cost from all options (traveling cost + taxes)

Options/ Route	Option (a)	Option (b)	Option (c)	Option (d)
D–U–M	15	13	14	15
D–A–U–M	15	13	14	13
D–S–J–M	13	14	14	15
D–S–M	13	14	14	13

Hence the correct answer is Option C (1, 5, 3, 2).

Q7. Text Solution:

The total route available for traveling D–M is

D–U–M

D–A–U–M

D–A–J–M

D–S–J–M

D–S–M

We have to take 100% traffic among the remaining 4 routes (except D–S–M), for which the cost of all 4 routes should be equal and lower than the D–S–M route.

Again, using the hit and trial method in the below table.

This table will give you the cost from all options (traveling cost + taxes).

Options/ Route	Option (a)	Option (b)	Option (c)	Option (d)
D–U–M	14	14	14	13
D–A–U–M	14	13	14	13
D–A–J–M	14	14	15	13
D–S–J–M	15	16	14	13
D–S–M	15	15	13	14

Hence, Option (0,5,2,2) is correct.

Q8. Text Solution:

The total route available for traveling D–M is

D–U–M

D–A–U–M

D–A–J–M

D–S–J–M

D–S–M

The condition given here is equal traffic flow. This means 33.33% traffic flows from D–U, D–A and D–S.

This is possible when one route of A, U and S have equal and minimum cost and rest have higher cost

Again, using hit and trial method in the below table

This table will give you the cost from all options (traveling cost + taxes)

Options/ Route	Option (a)	Option (b)	Option (c)	Option (d)
D–U–M	15	13	14	14
D–A–U–M	15	13	14	13
D–A–J–M	14	15	14	14
D–S–J–M	13	14	14	15
D–S–M	13	13	14	13

Hence, Option (1, 5, 3, 2) is correct as it is dividing equal traffic into D–U, D–A and D–S.

Q9. Text Solution:

Cost minimization under given condition that all city should be included

Cost from all route is –

Route/Options	Cost (Taking taxes as 0)
D–U–M	13 (8+5)
D–A–U–M	8 (1+2+5)
D–A–J–M	6 (1+3+2)
D–S–J–M	9 (6+1+2)
D–S–M	12 (6+6)

So, if the Govt. set the Travelling cost as Rs. 6 then only city DAJM is included and other two cities U and S are excluded.

If the Travelling cost is Rs 8 then one can travel through D–A–J–M and D–A–U–M and city S is not included. So 8 cannot be the traveling cost.

Whereas if we take 3rd best cost Rs. 9 then 3 routes will be available (D–A–U–M, D–A–J–M, D–S–J–M) including the route which has city S.

Hence, the answer is option Rs. 9.

Q10. Text Solution:

The total route available for traveling D–M is

D–U–M

D–A–U–M

D–A–J–M

D–S–J–M

D–S–M

Again, using hit and trial method in the below table

This table will give you the cost from all options (traveling cost + taxes)

Options/ Route	Option (a)	Option (b)	Option (c)	Option (d)
D–U–M	15	13	14	15
D–A–U–M	15	13	14	13
D–A–J–M	14	14	14	14
D–S–J–M	13	14	14	15
D–S–M	13	14	14	13

Hence, Answer is option 1,5,3,2

Q11. Text Solution:

In this Solution we are required to make Chessboard of 10 × 10 to solve the question

A10	B10	C10	D10	E10	F10	G10	H10	I10	J10
A9	B9	C9	D9	E9	F9	G9	H9	I9	J9
A8	B8	C8	D8	E8	F8	G8	H8	I8	J8
A7	B7	C7	D7	E7	F7	G7	H7	I7	J7
A6	B6	C6	D6	E6	F6	G6	H6	I6	J6
A5	B5	C5	D5	E5	F5	G5	H5	I5	J5
A4	B4	C4	D4	E4	F4	G4	H4	I4	J4
A3	B3	C3	D3	E3	F3	G3	H3	I3	J3
A2	B2	C2	D2	E2	F2	G2	H2	I2	J2
A1	B1	C1	D1	E1	F1	G1	H1	I1	J1

As we know, A knight moves two squares in any direction vertically followed by one square horizontally, or two squares in any direction horizontally followed by one square vertically.
So, In this question knight sitting at E4 can attack D6, F6,G5,G3,F2,D2,C3,C5
Hence, the answer is 8 places.

Q12. Text Solution:

In this Solution we are required to make Chessboard of 10 × 10 to solve the question

A10	B10	C10	D10	E10	F10	G10	H10	I10	J10
A9	B9	C9	D9	E9	F9	G9	H9	I9	J9
A8	B8	C8	D8	E8	F8	G8	H8	I8	J8
A7	B7	C7	D7	E7	F7	G7	H7	I7	J7
A6	B6	C6	D6	E6	F6	G6	H6	I6	J6
A5	B5	C5	D5	E5	F5	G5	H5	I5	J5
A4	B4	C4	D4	E4	F4	G4	H4	I4	J4
A3	B3	C3	D3	E3	F3	G3	H3	I3	J3
A2	B2	C2	D2	E2	F2	G2	H2	I2	J2
A1	B1	C1	D1	E1	F1	G1	H1	I1	J1

As we know, the bishop moves in any direction diagonally.
As we can see H1, F3, D5 and B7 all are coming in diagonally to G2 but D5, F3 and B7 are in the same diagonal line and F3 is in between of these two so if bishop moves in this direction then it will kill F3 only and D5 and B7 remains untouched.
So one can say that only F3 and H1 can be attacked.

Q13. Text Solution:

In this Solution we are required to make Chessboard of 10 × 10 to solve the question

A10	B10	C10	D10	E10	F10	G10	H10	I10	J10
A9	B9	C9	D9	E9	F9	G9	H9	I9	J9
A8	B8	C8	D8	E8	F8	G8	H8	I8	J8
A7	B7	C7	D7	E7	F7	G7	H7	I7	J7
A6	B6	C6	D6	E6	F6	G6	H6	I6	J6
A5	B5	C5	D5	E5	F5	G5	H5	I5	J5
A4	B4	C4	D4	E4	F4	G4	H4	I4	J4
A3	B3	C3	D3	E3	F3	G3	H3	I3	J3
A2	B2	C2	D2	E2	F2	G2	H2	I2	J2
A1	B1	C1	D1	E1	F1	G1	H1	I1	J1

As we know, the queen may move any number of unoccupied squares in any direction – horizontally, vertically, or diagonally.
We can see E6 is horizontal, H1 is vertical and J8 is Diagonal to H6 (Queen)
Rest(A2 and J3) have no connection to Queen
Hence the answer is 3 pieces can be attacked by a queen.

Q14. Text Solution:

In this Solution we are required to make Chessboard of 10 × 10 to solve the question

A10	B10	C10	D10	E10	F10	G10	H10	I10	J10
A9	B9	C9	D9	E9	F9	G9	H9	I9	J9
A8	B8	C8	D8	E8	F8	G8	H8	I8	J8
A7	B7	C7	D7	E7	F7	G7	H7	I7	J7
A6	B6	C6	D6	E6	F6	G6	H6	I6	J6
A5	B5	C5	D5	E5	F5	G5	H5	I5	J5
A4	B4	C4	D4	E4	F4	G4	H4	I4	J4
A3	B3	C3	D3	E3	F3	G3	H3	I3	J3
A2	B2	C2	D2	E2	F2	G2	H2	I2	J2
A1	B1	C1	D1	E1	F1	G1	H1	I1	J1

As we know, the rook moves horizontally or vertically, through any number of unoccupied squares.

Rook at C6 can attack Vertically to C1–C5 and C7–C10 (9 blocks)

It can also attack horizontally to A6–B6 and D6–J6 (9 block)

there are total 10 × 10 = 100 blocks

So safe block = total block – block under attack – player block (Rook's block)

= 100 – 18 (9 + 9) – 1

= 81

There are 81 positions safe from the rook

Q15. Text Solution:

In this Solution we are required to make Chessboard of 10 × 10 to solve the question

A10	B10	C10	D10	E10	F10	G10	H10	I10	J10
A9	B9	C9	D9	E9	F9	G9	H9	I9	J9
A8	B8	C8	D8	E8	F8	G8	H8	I8	J8
A7	B7	C7	D7	E7	F7	G7	H7	I7	J7
A6	B6	C6	D6	E6	F6	G6	H6	I6	J6
A5	B5	C5	D5	E5	F5	G5	H5	I5	J5
A4	B4	C4	D4	E4	F4	G4	H4	I4	J4
A3	B3	C3	D3	E3	F3	G3	H3	I3	J3
A2	B2	C2	D2	E2	F2	G2	H2	I2	J2
A1	B1	C1	D1	E1	F1	G1	H1	I1	J1

As we know, the queen may move any number of unoccupied squares in any direction – horizontally, vertically, or diagonally.

The easy way to solve this question to go by options and use hit and trial method

Option 1) – From G7 queen can attack D7, I7, G9 (3 players)

Option 2) – From B4 queen can attack A3, C4, G9 (3 players)

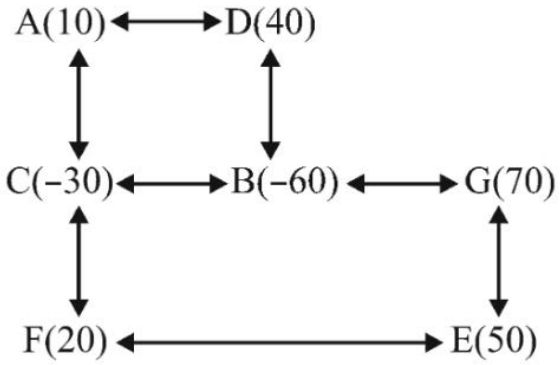
Option 3) – From A7 queen can attack A3, D7, (2 players)

Option 4) – From E7 queen can A3, D7, G9, I7 (4 players)

Hence, at E7 queen can attack maximum.

Q16. Text Solution:

The network through which a ball can be moved is shown below. The values in the brackets indicate the amount, in rupees, won/lost at that point.



The possible routes between E and C and the amounts won are as follows:

(A) E – F – C = 50 + 20 – 30 = 40.

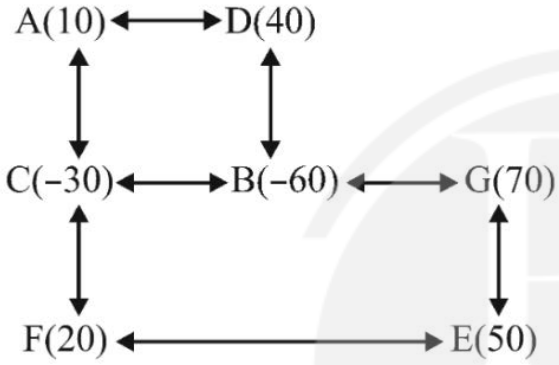
(B) E – G – B – C = 50 + 70 – 60 – 30 = 30

(C) E – G – B – D – A – C = 50 + 70 – 60 + 40 + 10 – 30 = 80

The maximum possible amount that can be won is ₹80.

Q17. Text Solution:

The network through which a ball can be moved is shown below. The values in the brackets indicate the amount, in (₹) rupees, won/lost at that point.



The possible ways in which the ball can be moved are as follows.

(i) A – C – F – E – G = 10 – 30 + 20 + 50 + 70 = ₹120.

(ii) A – D – B – G – E – F = 10 + 40 – 60 + 70 + 50 + 20 = ₹130.

(iii) A – D – B – C – F – E – G = 10 + 40 – 60 – 30 + 20 + 50 + 70 = ₹100.

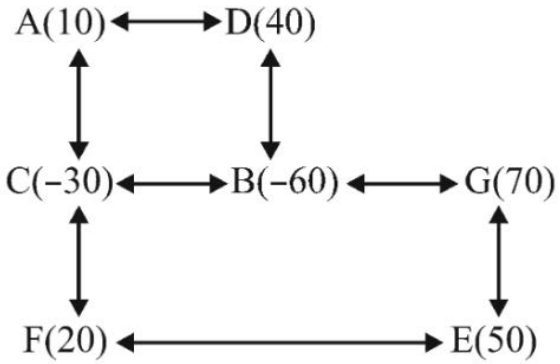
(iv) A – C – B – G – E – F = 10 – 30 – 60 + 70 + 50 + 20 = ₹60.

The maximum possible amount that can be won is

₹130.

Q18. Text Solution:

The network through which a ball can be moved is shown below. The values in the brackets indicate the amount, in rupees, won/lost at that point.



Here we have written only those cases in which we get negative numbers or zero because positive numbers ultimately get rejected.

The possible ways in which a player can lose is as follows.

(i) G – B – C – A = 70 – 60 – 30 + 10 = –10

(ii) E – F – C – B = 50 + 20 – 30 – 60 = –20

(iii) F – C – B – D = 20 – 30 – 60 + 40 = –30

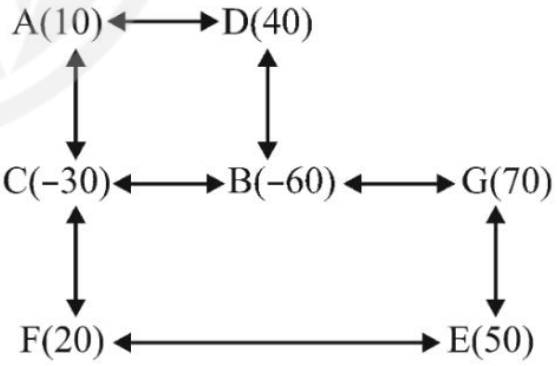
(iv) B – D – A – C = –60 + 40 + 10 – 30 = –40

(v) G – B – C – F = 70 – 60 – 30 + 20 = 0

The maximum possible amount a person can lose is ₹40.

Q19. Text Solution:

The network through which a ball can be moved is shown below. The values in the brackets indicate the amount, in rupees, won/lost at that point.



The distinct paths from A to E are.

1 –> A–D–B–G–E

2 –> A–C–F–E

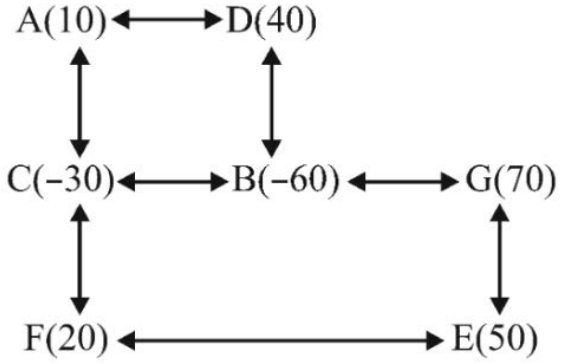
3 –> A–C–B–G–E

4 –> A–D–B–C–F–E

Q20. Text Solution:

The network through which a ball can be moved is shown below. The values in the

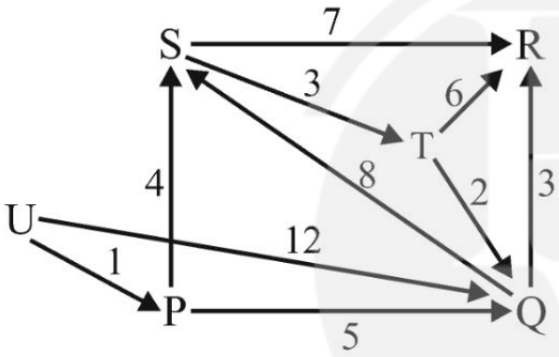
brackets indicate the amount, in rupees, won/lost at that point.



The path from A to B with the maximum number of intermediate points is A – C – F – E – G – B, So only D is not touched.

Hence 1 will be the correct choice.

Q21. Text Solution:

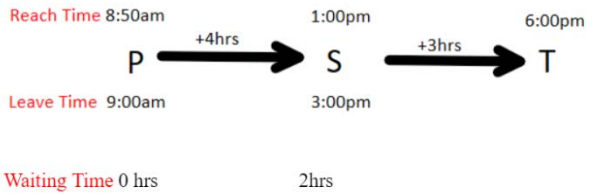


As noted :–> Car–Cab starts from any offices along each route at 9:00am as per given direction, e.g. for P–Q, P is the starting position not Q. So, the same Car–Cab will reach Q at 9:00am + 5 hrs = **2:00pm** and getting back will reach P at 2:00 pm+ 5hrs = **7:00pm.** Same process is applicable for each of the given routes with allotted travel time.

Considering Mr. Ram will reach Office P by 8:50 a.m., he will start from office P at 9:00 am targeting to reach T at earliest time.

As you know any Car–Cab is running between only two offices, you are necessarily opting for the destination with least time with different routes. i.e., Possible least arrival time P–S–T, P–Q–T mentioned as follows.

For: P–S–T



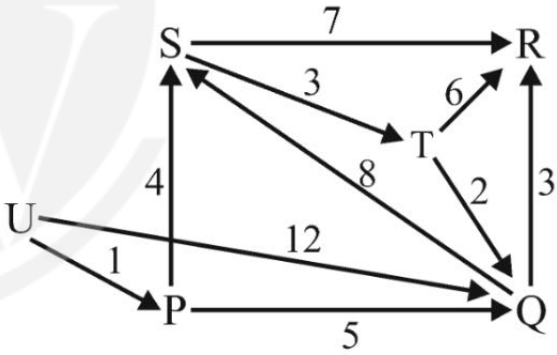
For: P – Q – T

Here we have to minimize the time so Suppose cab starts at 9am from P and reaches Q at 9 + 5 = 2 pm. Now he has to change to another cab from Q to T. To minimize the time, suppose at 9 am the cab starts from T and reaches Q at 11 then Again reaches T at 1pm and again reaches Q at 3pm. In this case waiting time is 1 hour and at 3 pm the cab starts and Mr Ram reaches T at 5 pm.

NB: When you consider other (Intermediate) routes to reach T from P, will take more waiting time so as result more time to reach at destination. Hence other routes are neglected.

So, 5:00 pm is the earliest time.

Q22. Text Solution:

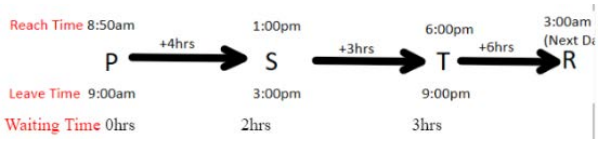


As noted :–> Car–Cab starts from any offices along each route at 9:00am as per given direction, e.g. for P–Q, P is the starting position not Q. So, the same Car–Cab will reach Q at 9:00am + 5hrs=**2:00pm** and getting back will reach P at 2:00 pm+ 5 hrs=**7:00pm.** Same process is applicable for each of the given routes with allotted travel time.

Here we have to find the minimum waiting time at T so one has to start the cab at 9am from that source so waiting time will ultimately be reduced. In our case if we have to reduce the

waiting time at T we have to start the cab at 9am from T.

So, for the route P–S–T–R

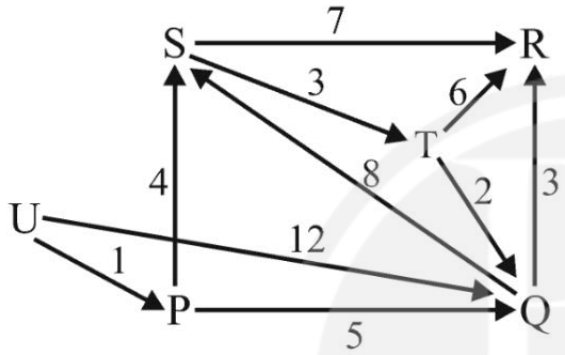


Mr. Shankar has to wait 0–hours at Office–P.

Mr. Shankar has to wait for 2 hours (1:00pm–3:00pm) at Office–S.

Mr. Shankar has to wait for 3 hours (6:00pm–9:00pm) at Office–T.

Q23. Text Solution:



As noted :–> Car–Cab starts from any offices along each route at 9:00am as per given direction, e.g. for P–Q, P is the starting position not Q. So, the same Car–Cab will reach Q at 9:00am + 5hrs = **2:00pm** and getting back will reach P at 2:00pm + 5hrs = **7:00pm.** Same process is applicable for each of the given routes with allotted travel time.

To find the minimum possible time one has to start the cab from the offices in such a way that the waiting will become as minimum as possible.

The cab starts from P at 9am, then it takes 5 hours to reach Q.

Now Mr Ram reached Q at 2pm.

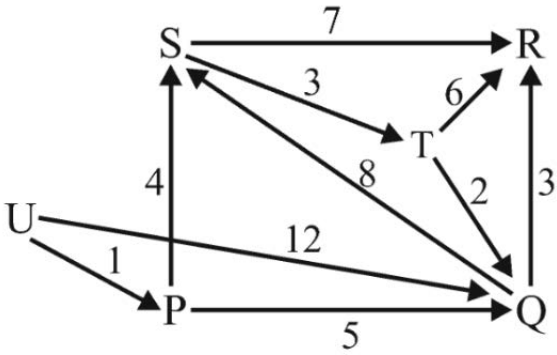
Suppose if Cab starts at 9am from Q then it reaches T and 11am and reaches Q at 1pm and again reaches T at 3pm and reaches Q at 5pm. So here waiting time will become 3 hours.

If Cab starts from T at 9am then it reaches Q at 11am then reaches T at 1 pm and Reaches Q at 3pm. Now here waiting time is 1 hour.

So this is the way our waiting time becomes as minimum as possible.

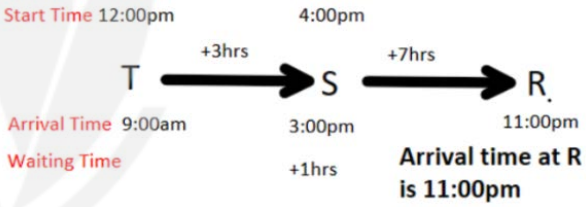
Now Mr Ram takes a cab from Q at 3pm and reaches T at 5pm.

Q24. Text Solution:



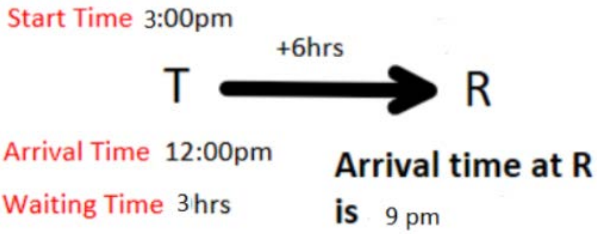
As noted :–> Car–Cab starts from any offices along each route at 9:00am as per given direction, e.g. for P–Q, P is the starting position not Q. So, the same Car–Cab will reach Q at 9:00am + 5hrs = **2:00pm** and getting back will reach P at 2:00pm + 5hrs = **7:00pm.** Same process is applicable for each of the given routes with allotted travel time.

For T–S–R



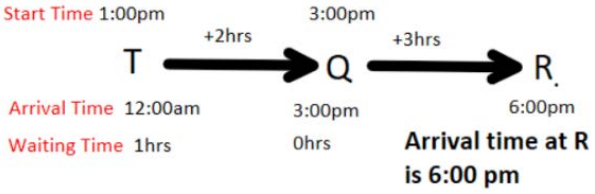
Similarly, in the routes (T–R)

Suppose the cab starts from R at 9 am.



The arrival time at R is 9pm

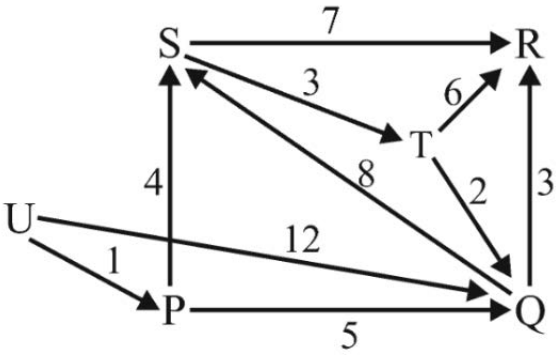
and in the routes (T–Q–R) we are getting



The arrival time at R is 6:00pm on the same day.

So, the earliest arrival time at R is from T–Q–R.

Q25. Text Solution:



As noted :–> Car–Cab starts from any offices among each route at 9:00am as per given direction, e.g. for P–Q, P is the starting position not Q. So, the same Car–Cab will reach Q at 9:00am + 5hrs = **2:00pm** and getting back will reach P at 2:00pm + 5hrs = **7:00pm.** Same process is applicable for each of the given routes with allotted travel time.

One quick way to interpret is to choose the direct route rather than taking the in–direct route for the earliest arrival time. Here we have consider that cab start from Q at 9am. As there is possible waiting time for the Car–Cab traveling through intervening routes. Hence, traveling from Q–S has no waiting time(0hrs), only traveling time will be considered.

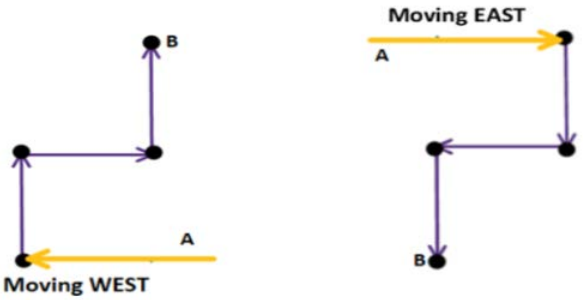
Possible arrival time = 9:00 a.m. + 8 hrs = 17:00 hrs i.e., 5:00 p.m.

But that is not the only possible shortest route. If we consider Route Q – T – S then, suppose one cab starts at 9am from Q and another cab starts from S at the same time. Officer reach T at 11 am and has to wait for 1 hour. Then officer reach S in 3 more hours i.e., 12pm + 3hr = 3pm.

Then in this case the the possible earliest time is 3pm.

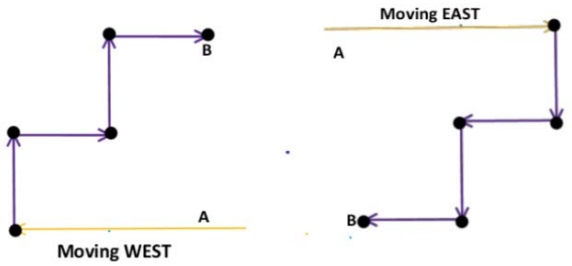
Q26. Text Solution:

From (i), for a person traveling EAST/West, the following route must be followed:



Let TOWN 1 be Bengaluru. No other city can be reached using the route by traveling EAST. Hence, this is not possible. Let TOWN 2 be Bengaluru. By traveling EAST, a person will not be able to take the last left. By traveling WEST, a person cannot reach any other city . Let TOWN 3 be Bengaluru. Even in this case, no other city can be reached by traveling along this route. Similarly, TOWN 4 also cannot be Bengaluru. Let TOWN 5 be Bengaluru. In this case, a person can reach TOWN 4 by traveling EAST. Hence, this is one possibility. Town 6 cannot be Bengaluru because by taking this route one cannot reach to any other city. TOWN 7 cannot be Bengaluru because there are no roads to travel along the given route. Hence, the only possibility is that TOWN 5 is Bengaluru and TOWN 4 is Chennai.

From (ii), a person took two right turns, a left turn, and another right turn to reach Hyderabad from Delhi in the same order. For the given turns, a person going EAST/ WEST from A to B will have to follow a path as shown in the figure below but the distance between turns can vary:



We can use this pattern to see whether this will connect any pair of towns. Let Delhi be TOWN 1. From TOWN 1, a person can only go EAST. If he takes the first right, he will not be able to take

the last right, as there will be no roads to take the last right.

If he takes the second right, he will have to pass through TOWN 3, which is not possible. If he takes the third right, he will have to pass through TOWN5, which is again not allowed (it is cleared as BENGALURU). He cannot take the fourth right because he will reach TOWN 6 before he can take the fourth right. Hence, TOWN 1 is not Delhi.

Let TOWN 2 be Delhi. If he is going EAST, he cannot take the path given above, since he cannot take the last right. Hence, he must be going WEST. From TOWN 2, he can reach TOWN 6 by moving west first, and then the first 2 right after that, the first left, and then the right. Hence, Delhi and Hyderabad can be TOWN 2 and TOWN 6 respectively.

From TOWN 2, no other city is accessible for the given route.

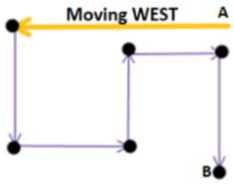
Let TOWN 3 be Delhi. From TOWN 3, a person can reach TOWN6 by travelling WEST. Hence, this is another possibility.

TOWN 4 is Chennai and TOWN 5 is Bengaluru so it is not considered as Delhi.

TOWN 6 cannot be Delhi because there will be no roads to take a left after he takes two rights.

TOWN cannot be Delhi as one can not take any right. Hence, TOWN2/TOWN3 can be Delhi. In either case, TOWN 6 is Hyderabad.

Since Chennai is TOWN 4, a person can reach Srinagar by taking three left turns and two right turns following condition(iii) as follows. Srinagar can only be one among TOWN 1 or TOWN 2 or TOWN 3. By taking three left turns and two right turns, a person can only reach TOWN 3 from TOWN 4. Hence, TOWN 3 is Srinagar. From the possibilities arrived at from (ii), only one remains, i.e., TOWN 2 is Delhi.



After this discussion, one can find this table as –

TOWN 1	Mumbai / Pune
TOWN 2	Delhi
TOWN 3	Srinagar
TOWN 4	Chennai
TOWN 5	Bengaluru
TOWN 6	Hyderabad
TOWN 7	Pune / Mumbai

Town 2 referred to Delhi.

Q27. Text Solution:

A person cannot reach Delhi.

Option A is correct.

Q28. Text Solution:

To get the minimum number of turns, he first moves to the east then takes 1 left then 1 right then 1 left. A person must take at least three turns to go from Delhi to Hyderabad.

Option B is correct.

Q29. Text Solution:

Starting from Srinagar one has to travel to the west first and by taking only one turn a person could reach TOWN 1 and TOWN 7, i.e., Mumbai and Pune.

Option D is correct.

Q30. Text Solution:

From the table, Hyderabad is considered as TOWN 6.

Option B is correct