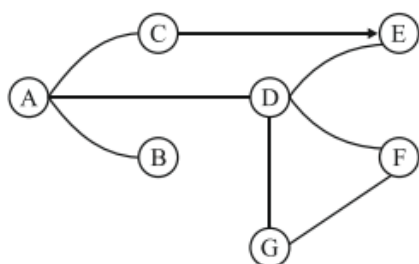# MBA PIONEER 2024

Data Interpretation & Logical Reasoning

DPP:5

Maps & Networks

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

Read the given information carefully and answer the questions given beside.

Seven cities A, B, C, D, E, F, G are connected by a two way roads as shown in the figure. Please assume that one can't travel the same place more than once (without backtracking).

Q1 In how many ways one can travel from A to F without backtracking the same path?
(A) 2 (B) 3
(C) 4 (D) 5

Q2 In how many ways one can travel from D to B without backtracking?
(A) 1 (B) 2
(C) 3 (D) 4

Q3 If we connect E to F then the number of possible ways by which one can travel from D to B.
(A) 2 (B) 3
(C) 4 (D) 5

Q4 If we connect D to B and G to B then the number of ways by which one can travel from A to F without backtracking.
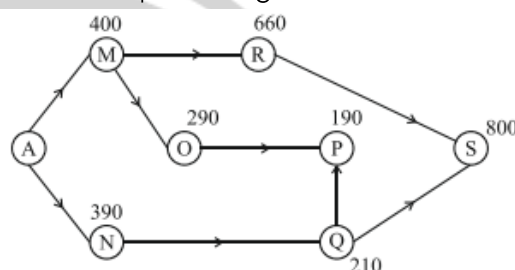(A) 4 (B) 6
(C) 8 (D) 10

Q5

If we connect E to F, D to C and B to C then the number of ways by which one can travel from B to E?
(A) 2 (B) 4
(C) 6 (D) 15

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

Read the given information carefully and answer the questions given beside.

The following figure shows the flow of water from Reservoir A to 7 water tanks. The capacity in litres is given. Please note that water can be transported only in the direction in which the arrow points. After filling the tank, the excess amount of water is then transferred to the next tank. The capacity of each pipeline is 1500 L.

Q6 If from A to M and A to N 1500 l is transferred and M to O only 400 l of water is transferred then how much quantity of water is required from Q to fill tank P?
(A) 60 (B) 80
(C) 70 (D) 90

Q7 1500 L of water is transferred from A to N. Then what is the slack in pipeline connecting N to Q, if slack is the amount of water required to bring the flow to full capacity.
(A) 390 (B) 210

(C) 600 (D) 800

Q8 What is the minimum flow of water in the pipeline connecting A and M?
(A) 1500 litres (B) 1460 litres
(C) 1440 litres (D) 1400 litres

Q9 What is the minimum flow of water in pipeline connecting Q and S?
(A) 650 (B) 700
(C) 750 (D) 800

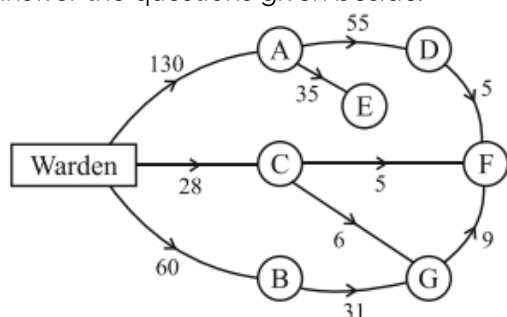**Q10** What is the minimum flow of water in the pipeline OP?
(A) 0 l (B) 190 l
(C) 480 l (D) 400 l

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

Read the given information carefully and answer the questions given beside.

Mr. X operates 7 colleges in a city. He sent 218 number of apple to distribute to 7 colleges and each student receive 1 apple. The warden of 7 colleges distribute the apples. The number mentioned in the flow chart represents the number of apples distributed. The consumption of number of apple in each college is not known. It is known that after fulfilling the requirement in a college, remaining number of apples are sent to another college as per the flow chat. It is also known that the number of demand of apple is equal to the supply of apples in the flow chart (although not on individual college).

Q11 What is the consumption of apples at D?
(A) 5 (B) 50

(C) 55 (D) 60

Q12 What is the consumption of apples at G?
(A) 28 (B) 29
(C) 30 (D) 31

Q13 What is the difference of consumption of apples at F and E?
(A) 35 (B) 16
(C) 21 (D) 20

Q14 What is the sum of the consumption of apples at all colleges together?
(A) 200 (B) 218
(C) 201 (D) 209

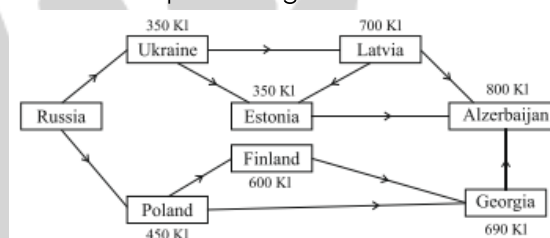**Q15** What is the average consumption of apple in all 7 colleges?
(A) 31.1 (B) 30
(C) 32 (D) 32.4

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

Read the given information carefully and answer the questions given beside.

The following flow chart show the distribution of natural gas from Russia to the nearby European countries. Natural gas flow only in the direction of the arrows and when the need of a country is fulfilled then the gas transferred to the next country as per the flow chart. The requirement of each country is given above the country.

Please note : Slack in a pipeline is the excess amount of gas required to bring the pipeline to full capacity.

Q16 What is the minimum capacity of each pipeline connecting Russia to Ukraine and Russia to Poland if the demand of all the countries are met?

(A) 3940   (B) 1970
(C) 2000   (D) 1980

Q17 What is the minimum flow in the pipeline connecting Estonia and Azerbaijan if the capacity of the pipeline connecting Russia directly is 2000 Kl and for others is 1700 Kl.
(A) 0 Kl   (B) 450 Kl
(C) 800 Kl   (D) 1150 Kl

Q18 What is the maximum number of gas pipeline can be shut down simultaneously without affecting the supply to any of the countries?
(A) 1   (B) 2
(C) 3   (D) 4

Q19 What is the maximum sum of the slacks in all the pipeline connecting Azerbaijan if the capacity of the pipeline connecting Russia directly with is 2000 Kl and for others is 1700 Kl.
(A) 4300 Kl   (B) 4400 Kl
(C) 5100 Kl   (D) 800 Kl

Q20 What is the minimum slack in the pipeline connecting Finland and Georgia if the capacity of the pipeline connecting Russia directly with is 2000 Kl and for others is 1700 Kl.
(A) 750 Kl   (B) 800 Kl
(C) 850 Kl   (D) 900 Kl

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

Read the given information carefully and answer the questions given beside.

Ankush, who is a newly graduated student decided to go for a visit to city X. Before reaching at city X he has created a rough network of places he wants to visit in city X. The following network diagram shows the way in which these six places are connected in city X. The arrow indicate the direction in which he can travel from one place to another place. He can move only in the direction of arrows. The values written in between the two places is nothing but the distance between them.
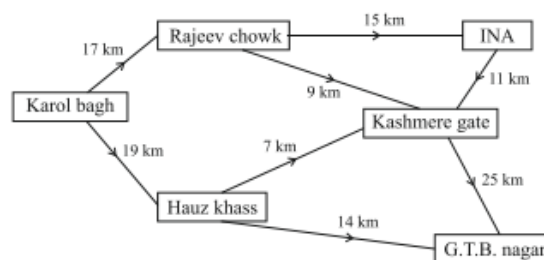
To travel from one place to another he booked an auto. The
charges of auto are as follows :
(a) Auto charge 100 Rs. as the fixed cost (Booking Charges)
(b) Further an auto charges Rs. 15 per km.
(c) If the total distance exceeds 23 km an additional charge of 8 Rs. is charged over and above Rs. 15 per km. For example, if one travels 25 km then he has to pay for the first 23 km at the rate of 15 Rs. per km and for the next 2 km he has to pay 23 Rs. per km

Q21 If Ankush wants to go from Karol bagh to Kashmere gate by paying the highest possible amount. Find the amount paid by him in such cases.
(A) 905   (B) 910
(C) 850   (D) 509

Q22 If Ankush wants to travel from Rajeev Chowk to G.T.B. Nagar then the difference between the highest amount paid to the lowest amount paid by him to reach.
(A) Rs. 1089
(B) Rs. 698
(C) Rs. 391
(D) Cannot be determined

Q23 If Ankush wants to travel from Karol bagh to G.T.B. Nagar by paying highest possible amount. What could be that amount?
(A) Rs. 1480   (B) Rs. 1400
(C) Rs. 1380   (D) Rs. 1020

Q24

What is the sum of distance of all the possible way by which one can travel from Karol bagh to Kashmere gate?

(A) 95 km   (B) 96 km

(C) 94 km   (D) 93 km

Q25 Is it possible for Ankush to reach each place in one go without back tracking the path if he has started from Karol bagh?

(A) Yes

(B) No

(C) Can't determine

(D) Data insufficient

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

Read the given information carefully and answer the questions given beside.

P, Q, R, S, T, U and V are seven African cities which are connected by one way and two way roads system. if one wants to travel from one city to another then the one can move only in the direction of arrow. The following diagram shows the flow chart of one way and two way road system.
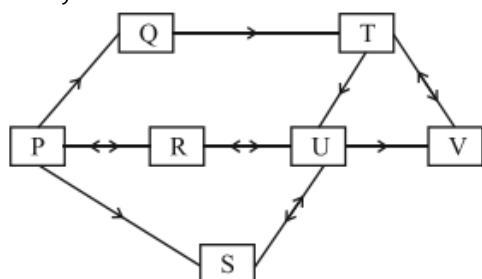
Q26

In how many ways one can travel from city P to U without backtracking the same path and without visiting the city more than once

(A) 1   (B) 2

(C) 3   (D) 4

Q27 In how many ways one can travel from city R to T without backtracking the same path and without visiting the city more than once.

(A) 2   (B) 3

(C) 4   (D) 5

Q28 Government plans to construct two way road connecting Q to U then find the possible ways by which one can travel from city R to V without backtracking and visiting the same city more than once.

(A) 5   (B) 6

(C) 7   (D) 8

Q29 If all the roads between these 7 cities becomes two way road then what could be the possible number of route by which one can travel all the cities in one go without backtracking and visiting the same city more than once.

(A) 7   (B) 8

(C) 9   (D) 10

Q30 In how many ways one can travel from V to S without backtracking and without visiting the city more than once.
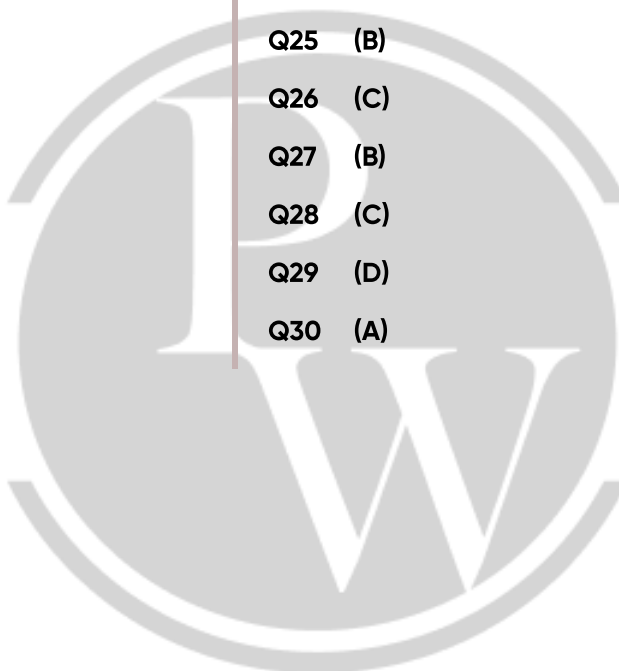
(A) 2   (B) 3

(C) 4   (D) 5

Answer Key

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

Hints & Solutions

Q1. Text Solution:

The possible ways are :

(1) A – D – F

(2) A – D – G – F

(3) A – C – E – D – F

(4) A – C – E – D – G – F

Q2. Text Solution:

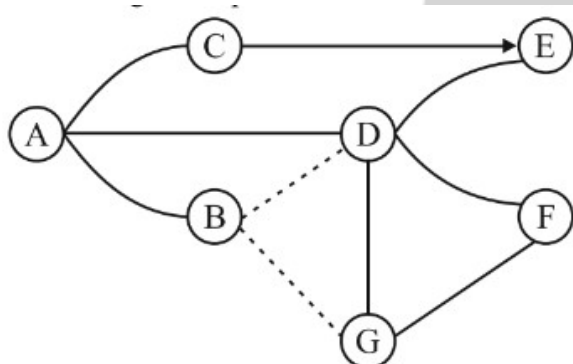The possible ways are :

(1) D – A – B

(2) D – E – C – A – B

Q3. Text Solution:

The possible ways are :

(1) D – A – B

(2) D – E – C – A – B

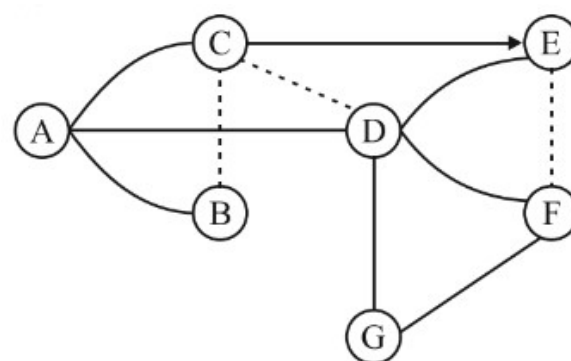(3) D – F – E – C – A – B

(4) D – G – F – E – C – A – B

Q4. Text Solution:

After doing so the possible route becomes

The possible ways are :

(1) A – B – G – F

(2) A – B – D – F

(3) A – B – G – D – F

(4) A – D – B – G – F

(5) A – D – G – F

(6) A – D – F

(7) A – C – E – D – F

(8) A – C – E – D – B – G – F

(9) A – C – E – D – G – F

(10) A – B – D – G – F

Q5. Text Solution:

The possible ways are :

(1) B – A – C – E

(2) B – A – C – D – E

(3) B – A – C – D – F – E

(4) B – A – C – D – G – F – E

(5) B – C – E

(6) B – C – D – E

(7) B – C – D – G – F – E

(8) B – C – D – F – E

(9) B – A – D – E

(10) B – A – D – C – E

(11) B – A – D – F – E

(12) B – A– D – G – F – E

(13) B – C – A – D – E

(14) B – C – A – D – F – E

(15) B – C – A – D – G – F – E

Q6. Text Solution:

1500 l is transferred from A to M and A to N. After filling tank M, 400 litres of water is transferred towards pipeline O and 700 litres of water is transferred to (R). 290 litres of water is used up at

O. Then remaining (400 – 290) = 110 litres.

110 litres of water from O transferred towards P. Amount of water required from tank Q = 190 – 110 = 80 litres

Q7. Text Solution:

1500 litre transferred from A to N. 390 litres of water used at N. Water flow N to Q = 1500 – 390 = 1110 litre

Slack = 1500 – 1110 = 390 litres

Q8. Text Solution:

To find the minimum flow in pipeline A and M we have to fulfilled the requirement through pipeline A to N.

1500 litre of water flows from pipeline A to N.

390 litre exhausted at N

210 litre exhausted at Q

100 litre exhausted at P

800 litre exhausted at S

minimum flow from pipeline A to M

⇒ 400 + 660 + 290 + 90

⇒ 1440 litre

Q9. Text Solution:

To find the minimum flow in pipeline QS we have to make sure that the maximum requirement at S fulfilled by pipeline RS.

1500 l water flows from A to M.

400 l exhausted at M, 290 l exhausted at O, 660 litres exhausted at R.

Remaining amount of water flow from

R to S = 1500 − 400 − 290 − 660

R to S = 1500 − 1350

= 150 litres

X litres required from A to N.

390 l exhausted at N, 210 l exhausted at Q, 190 l exhausted at P, 650 exhausted at S.

Total amount of water flow from A to N

= 390 + 210 + 190 + 650

= 1440

Minimum flow in pipeline Q to S = 650 litres

Q10. Text Solution:

1500 l flowed from A to M.

400 l exhausted at M

290 l exhausted at O

660 l exhausted at R

and remaining 150 l transferred to S.

The minimum flow in pipeline OP is 0.

Q11. Text Solution:

As one can see from the chart, 55 apples are transferred from A to D and 5 apples are transferred

from D to F.

Consumption = 55 − 5 = 50 apples

Q12. Text Solution:

G receive 6 apples from college C and 31 apples

from B and transferred 9 apples to F.

Total consumption at G = 31 + 6 − 9 = 28 apples

Q13. Text Solution:

F receives 5 apples from D, 9 from G and 5 from C.

Consumption of F = 5 + 5 + 9 = 19 apples

E receives 35 apples from A and 0 apples are transferred to any other colleges.

Consumption at E = 35 apples

Required difference = 35 − 19 = 16 apples

Q14. Text Solution:

Consumption of apples at A = 130 − 55 − 35 = 40 apples

Consumption of apples at B = 60 − 31 = 29 apples

Consumption of apples at C = 28 − 5 − 6 = 17 apples

Consumption of apples at D = 55 − 5 = 50 apples

Consumption of apples at E = 35

Consumption of apples at F = 5 + 5 + 9 = 19

Consumption of apples at G = 31 + 6 − 9 = 28

Total consumption ⇒ 40 + 29 + 50 + 35 + 19 + 28 + 17 = 218 apples

One can solve this by using a constraint that Total Demand = Total Supply

Total supply = 130 + 60 + 28 = 218

Q15. Text Solution:

Total consumption of apples ⇒ 130 + 60 + 28 = 218

Required average = $\frac{218}{7}$ = 31.1

Q16. Text Solution:

Total demand = 350 + 700 + 350 + 800 + 450 + 600 + 690 = 3940 Kl

The capacity of each pipeline should be at least = $\frac{3940}{2}$ = 1970Kl

Q17. **Text Solution:**

2000 Kl is transferred from Russia to Ukraine and Poland each.

350 exhausted at Ukraine, then only 350 Kl is transferred to Estonia, 700 Kl transferred to Latvia and 600 Kl remaining is transferred to Azerbaijan and all the requirement will be met by the gas which is transferred from Russia to Poland.

Hence the minimum flow will be zero.

Q18. **Text Solution:**

One can shut 3 gas pipeline connecting "Estonia to Latvia", "Estonia to Azerbaijan" and "Finland to Georgia".

Q19. **Text Solution:**

To find the maximum slack, the flow from Russia is as minimum as possible.

Maximum capacity of all pipelines connecting Azerbaijan is 1700 × 3 = 5100 Kl

Demand at Azerbaijan = 800 Kl

Maximum slack = 5100 − 800 = 4300 Kl

Q20. **Text Solution:**

To find the minimum slack, one has to maximize the flow in pipeline connecting Finland and Georgia.

Suppose maximum amount of gas is transferred from Russia to Poland.

2000 Kl is transferred from Russia to Poland.

450Kl exhausted at Poland.

Remaining 1550 Kl is transferred to Finland.

600 Kl exhausted at Finland.

Remaining Flow = 1550 − 600 = 950 Kl

Minimum Slack = 1700 − 950 = 750 Kl

Q21. **Text Solution:**

Highest possible amount = Highest distance Possible ways to travel from Karol bagh to Kashmere gate.

Karol bagh − Rajeev Chowk − INA − Kashmere gate

⇒ 17 + 15 + 11

⇒ 43 km

Amount paid = 100 + 15 × 43 + 20 × 8

= Rs. 905

Q22. **Text Solution:**

Ankush wants to travel from Rajeev Chowk to G.T.B. Nagar.

Highest distance travelled to reach G.T.B. Nagar from Rajeev Chowk = 51 km

Amount paid = 100 + 15 × 51 + 28 × 8

= 100 + 765 + 224

= Rs. 1089

Shortest distance travelled to reach G.T.B. from Rajeev Chowk = 34 km

Amount paid = 100 + 15 × 34 + 11 × 8

= 100 + 510 + 88

= Rs. 698

Required difference = Rs. 1089 − Rs. 698

= Rs. 391

Q23. **Text Solution:**

Highest amount = Highest distance

Highest distance = 17 + 15 + 11 + 25 = 68 km

Required amount = 100 + 15 × 68 + 45 × 8

= 100 + 1020 + 360

= Rs. 1480

Q24. **Text Solution:**

Possible ways are :

1. Karol bagh − Rajeev chowk − Kashmere gate

2. Karol bagh −Rajeev chowk − INA − Kashmere gate

3. Karol bagh − Hauz Khass − Kashmere gate

Required sum = (17 + 9) + (17 + 15 + 11) + (19 + 7)

⇒ 26 + 43 + 26 = 95 km

Q25. **Text Solution:**

If he starts from Karol bagh, then possible way could be

(1) Karol bagh − Rajeev chowk − INA − Kashmere gate − GTB nagar, in this case he missed Hauz Khass

This is the only case in which he covers the maximum places (not all)

So one can say that it is not possible for Ankush to travel all places in one go and without back tracking.

Q26. **Text Solution:**

Possible ways are

1 → P – R – U

2 → P – S – U

3 → P – Q – T – U

Q27. **Text Solution:**

The possible ways are :

1 → R – P – Q – T

2 → R – U – V – T

3 → R – P – S – U – V – T

Q28. **Text Solution:**
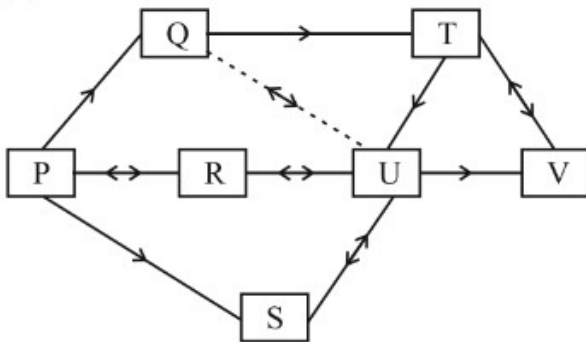
The possible ways are :

1 → R – U – V

2 → R – U – Q – T – V

3 → R – P – S – U – V

4 → R – P – S – U – Q – T – V

5 → R – P – Q – T – V

6 → R – P – Q – T – U – V

7 → R – P – Q – U – V

Q29. **Text Solution:**
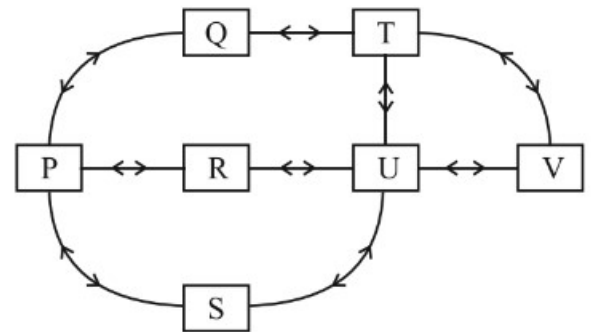
Possible ways are :

1 → Q – T – V – U – R – P – S

2 → Q – T – V – U – S – P – R

3 → V – T – Q – P – R – U – S

4 → R – P – Q – T – V – U – S

5 → R – P – S – U – V – T – Q

6 → R – U – V – T – Q – P – S

7 → S – U – V – T – Q – P – R

8 → S – P – R – U – V – T – Q

9 → S – P – Q – T – V – U – R

10 → S – U – R – P – Q – T – V

Q30. **Text Solution:**

The possible ways are ;

(a) V – T – U – S

(b) V – T – U – R – P – S