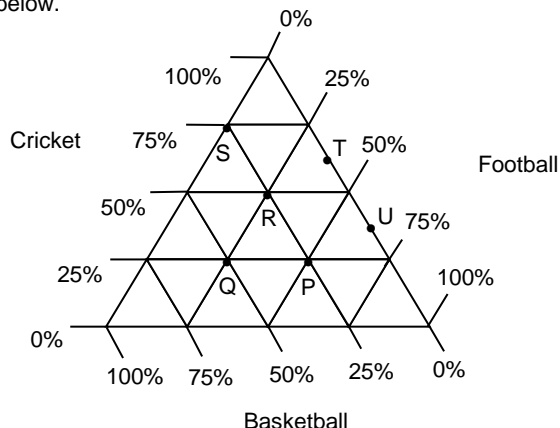


CHAPTER – 7

NETWORKS AND 3D DIAGRAMS

Worked out Examples:

These questions are based on the information given below.



The above diagram shows the percentage of students in six classes – P, Q, R, S, T and U and whose favourite game is cricket, football or basketball. The total number of students in these classes are P – 80, Q – 96, R – 120, S – 100, T – 80 and U – 120.

- 7.01:** Find the number of students in classes R and S together whose favourite game is cricket?
(A) 95 (B) 110 (C) 125 (D) 135

Sol: Number of students in class R whose favourite game is cricket = $\frac{50}{100}(120) = 60$
Number of students in class S whose favourite game is cricket = $\frac{75}{100}(100) = 75$
Required number = 135 Choice (D)

- 7.02:** How many more students in class Q had basketball as their favourite sport when compared to the number of students in class P whose favourite sport is football?
(A) 6 (B) 7
(C) 8 (D) 10

Sol: Number of students in class P whose favourite sport is football = $\frac{50}{100}(80) = 40$
Number of students in class Q whose favourite sport is basketball = $\frac{50}{100}(96) = 48$
 \therefore Required number = 8 Choice (C)

- 7.03:** The number of students in class Q whose favourite sport is cricket formed what percentage of the students in class R whose favourite sport is football?
(A) 60 (B) 75
(C) 84 (D) None of these

Sol: Number of students in Q whose favourite sport is cricket = $\frac{25}{100}(96)$

Number of students in R whose favourite sport is Football = $\frac{25}{100}(120)$

Required percentage = $\frac{\frac{25}{100}(96)}{\frac{25}{100}(120)}(100) = 80\%$
Choice (D)

- 7.04:** Find the total number of students in the given six classes whose favourite sport is football.
(A) 208 (B) 199
(C) 196 (D) 191

Sol: Number of students in P whose favourite sport is football = $\frac{50}{100}(80) = 40$
Number of students in Q whose favourite sport is football = $\frac{25}{100}(96) = 24$
Number of students in R whose favourite sport is football = $\frac{25}{100}(120) = 30$
Number of students in S whose favourite sport is football = $\frac{0}{100}(100) = 0$
Number of students in T whose favourite sport is football = $\frac{37.5}{100}(80) = 30$
Number of students in U whose favourite sport is football = $\frac{62.5}{100}(120) = 75$
Required number = 199 Choice (B)

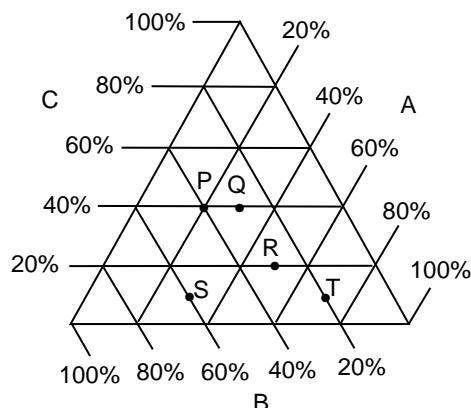
- 7.05:** In the class in which the percentage of students whose favourite sport is cricket was the highest, what is the number of students whose favourite sport was not cricket?
(A) 50 (B) 40
(C) 35 (D) 25

Sol: Class S had the maximum percentage of students whose favourite sport is cricket. In this class for 25% of the students, the favourite sport was not cricket.
 \therefore Required value = $\frac{25}{100}(100) = 25$
Choice (D)

Exercise – 7(a)

Directions for questions 1 to 5: These questions are based on the information given below.

P, Q, R, S and T are five companies having branches in each of the cities A, B and C. The following figure gives the percentage contribution of the branches in different cities to the sales of each company.



Sales and other details of the five companies

	(in crores)				
	P	Q	R	S	T
Sales	250	300	150	350	240
Expenses	170	240	110	270	160
Taxes	24	32	16	38	23

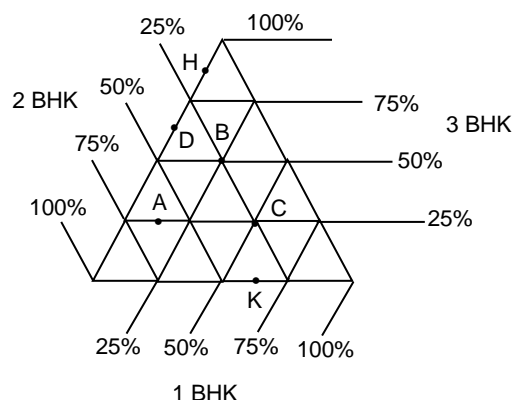
Gross profit = Sales – Expenses

Net profit = Gross profit – Taxes

- What is the difference between the total sales of the branches of the five companies in cities A and B (in crores)?
(A) 5 (B) 7 (C) 8 (D) 11
- For which of the following companies is the net profit, as a percentage of its sales, the highest?
(A) P (B) Q (C) S (D) T
- In city C, by what percentage is the sales of company P less than that of company Q?
(A) 0 (B) 10 (C) 16.66 (D) 20
- For how many of the given companies is the ratio of gross profit to expenses more than 0.4?
(A) 1 (B) 2 (C) 3 (D) 4
- Which of the following statements is/are true?
(I) In city A, the sales of company S is more than that of company R.
(II) For company R, the sales in city B was the least among the given cities.
(III) The sales of company R in city B is less than half of that of company P in city C.
(A) Only I (B) Only II and III
(C) Only I and III (D) Only II

Directions for questions 6 to 10: These questions are based on the information given below.

The triangular chart given below represents the percentage of flat owners who own either a 3 BHK, a 2 BHK or a 1 BHK flat in cities – Ahmedabad, Bangalore, Chennai, Delhi, Hyderabad and Kolkata. (Assume that no flat has more than one owner, no person owns more than one flat and that there are no other types of flats)



The total number of flats in the above mentioned cities are as follows (in thousands):

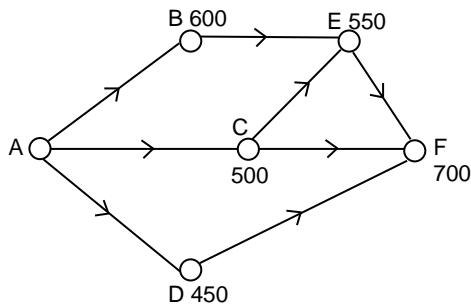
A (Ahmedabad) : 800	B (Bangalore) : 900
C (Chennai) : 700	D (Delhi) : 1000
H (Hyderabad) : 1100	K (Kolkata) : 600

- What is the total number of 2 BHK flats in the city which has the highest number of 2 BHK flats and the city which has the lowest number of 2 BHK flats?
(A) 6,37,500 (B) 3,62,500
(C) 6,75,000 (D) 8,75,000
- The number of 3 BHK flats in Hyderabad exceeds the number of 2 BHK flats in Ahmedabad by
(A) 7,37,500 (B) 4,62,500
(C) 7,37,500 (D) 5,87,500
- The number of 2 BHK flats in Ahmedabad form what percentage of the number of 3 BHK flats in Delhi?
(1) 75% (B) 62.5% (C) 80% (D) $83\frac{1}{3}\%$
- What is the total number of 1 BHK flats in all the six cities put together?
(A) 10,50,000 (B) 20,82,000
(C) 19,82,500 (D) 21,72,500
- For the six cities together, the total number of 1 BHK flats is what percent less than the total number of 2 BHK flats?
(A) 22.15% (B) $33\frac{1}{3}\%$ (C) 35.87% (D) 18.06%

Directions for questions 11 to 15: These questions are based on the information given below.

The following network gives the flow of water supplied from the storage tank A to the tanks B, C, D, E and F through pipelines. The supply of water is such that at each of the tanks B, C, D and E, only after the tank is full, water is passed on to the next tank connected to it. The capacity of each pipeline is 1000 kl. The values along side each tank gives the requirement (in kls) at each tank. The direction of flow of water is indicated by arrows. The

slack in a pipeline is the additional flow required to bring it to full capacity.



Directions for questions 11 to 15: Type in your answer in the input box provided below the question.

11. What is the minimum flow (in kls) in the pipeline connecting tanks A and C?

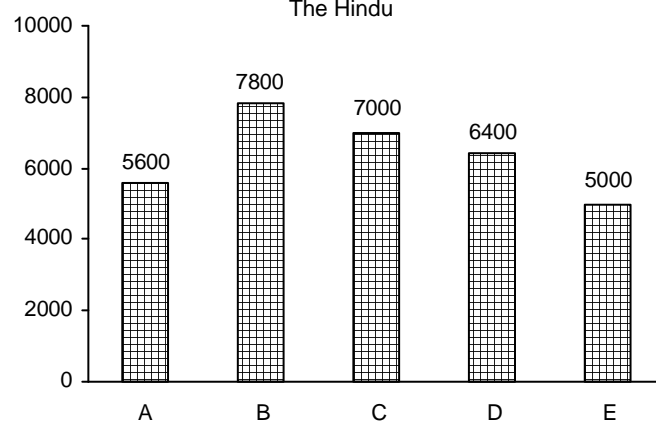
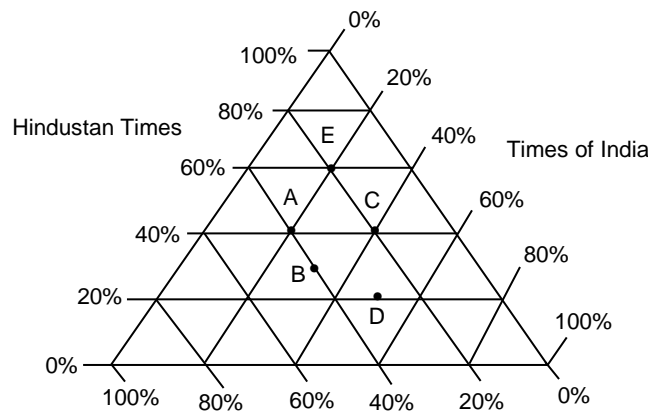
12. What is the maximum slack (in kls) in the pipeline connecting tanks B and E?

13. What is the minimum slack (in kls) in the pipeline connecting tanks C and E?

14. If the pipeline connecting C and F is under repair, what is the minimum quantity of water (in kls) that needs to be sent through it, so that the requirement at all the tanks is met?

15. What is the maximum slack (in kls) in all the pipelines combined?

Directions for questions 16 to 20: These questions are based on the information given below.



The graph gives the distribution of circulation of the three newspapers - The Times of India, The Hindu and The Hindustan Times in five localities - A, B, C, D and E of a city. The bar graph shows the total circulation of these three newspapers in these localities.

16. In how many localities does The Hindustan times have a circulation of more than 1500?
(A) 1 (B) 2
(C) 3 (D) 4

17. What is the ratio of the circulation of The Times of India in localities C and D together to that of The Hindu in localities C and E together?
(A) 2 : 5 (B) 5 : 2 (C) 3 : 5 (D) 5 : 3

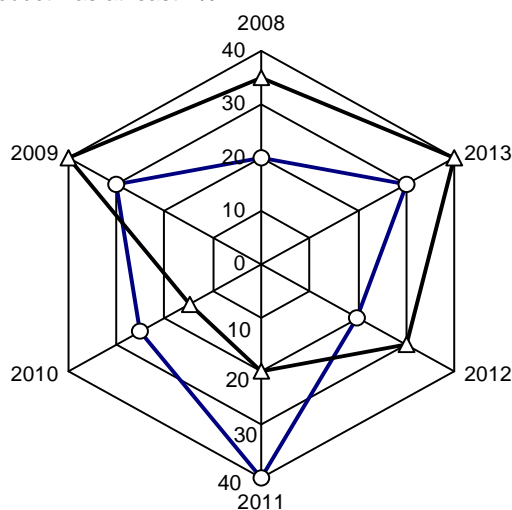
18. If in the next year the circulation of The Times of India in locality D increases by 20% and the circulation of The Hindu and The Hindustan times in the same locality increases by 30% and 40% respectively, then what will be the total circulation of these three papers in locality D?
 (A) 7214 (B) 8128
 (C) 9128 (D) 9620

19. What is the total circulation of The Hindu in the given five localities?
 (A) 9450 (B) 8762
 (C) 9220 (D) None of these
20. By approximately what percentage is the total circulation of The Times of India in the five localities, more/less than that of The Hindustan Times?
 (A) 21% (B) 20% (C) 24% (D) 10%

Exercise – 7(b)

Directions for questions 1 to 5: These questions are based on the information given below.

The following diagram gives the contribution towards the revenue, in percentage terms of two of the four products – A, B, C and D in a company. Within a year, the share of each product, as a percentage, is a distinct integer. In all the years from 2008 to 2013, contribution of each product was at least 1%.



Year	2008	2009	2010	2011	2012	2013
Revenue (in ₹)	20	25	30	22	34	40

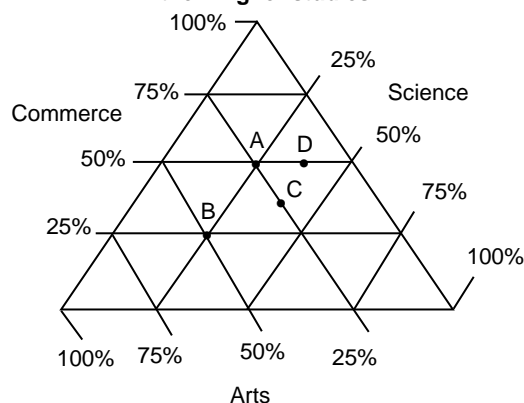
- The combined sales of C and D in 2013 is what percentage more than that in 2008?
 (A) 30% (B) $33\frac{1}{3}\%$ (C) $36\frac{2}{3}\%$ (D) 40%
- What is the maximum change in percentage points in the percentage share of C increase from 2009 to 2011?
 (A) 37 (B) 38 (C) 28 (D) 29
- If it is known that D's sales dipped in 2012, when compared to that in the previous year, then what could be the maximum drop in its sales in 2012?
 (A) ₹8.24 cr (B) ₹0.34 cr (C) ₹0.12 cr (D) ₹8.58 cr
- The highest change in the sales of any product over two consecutive years during 2008-2013 is _____.
 (A) ₹17.48 cr (B) ₹16.66 cr
 (C) ₹11.26 cr (D) None of these
- The manager of the firm estimates the sales targets for the year 2014 by taking the average of the firm's sales growth rates of the past 5 years. If the percentage share of A and B remains the same

as in 2013, then what could be the highest sales target that either C or D could have if the contribution of each product is at least 1%?

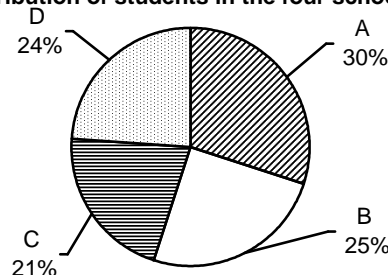
- (A) ₹13.7 cr (B) ₹14.17 cr
 (C) ₹12.2 cr (D) ₹11.19 cr

Directions for questions 6 to 10: These questions are based on the information given below.

Distribution of students in schools A, B, C, D and the different subjects they opted for their higher studies



Distribution of students in the four schools



Total = 12000

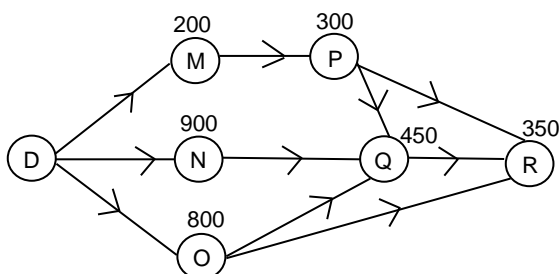
- What is the total number of students in the given schools who opted for Science for their higher studies?
 (A) 3270 (B) 3675 (C) 3440 (D) 3750
- What is the ratio of the number of students from schools D and C who opted for Arts for their higher studies?
 (A) 4 : 7 (B) 7 : 4 (C) 4 : 3 (D) 3 : 4
- By what percentage is the number of students who opted for Commerce in school B more/less than the number of students who opted for Science in school A?
 (A) 16.33% (B) 33.33% (C) 16.67% (D) 20%
- In how many schools is the number of students who opted for Science more than the average number of students who opted for Science in the four schools?
 (A) 1 (B) 2 (C) 3 (D) 4

10. Which of the following subjects did the maximum number of students in school A opt for their higher studies?

(A) Science (B) Arts
(C) Commerce (D) Both (A) and (B)

Directions for questions 11 to 15: These questions are based on the information given below.

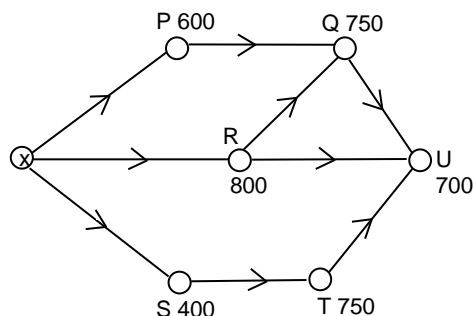
The figure below depicts the distribution network of KAMUL Dairy. Milk is transported from the Dairy D, to the company-owned outlets M, N, O, P, Q and R through a series of pipelines. The arrows show the direction of flow in the pipeline and the number above each outlet denotes the requirement (in litres) of milk at that outlet. Milk is pumped to an outlet only when the requirement is met at the preceding outlet. The maximum capacity (in litres) of the pipeline connecting the Dairy and the outlets is 1,200 l and that of the pipelines connecting any two outlets is 600 l. The slack in a pipeline is defined as the extra flow required to bring the pipeline to full capacity. The Dairy pumps sufficient milk to fulfill the requirement at all the outlets.



11. What is the maximum possible slack that can exist in the pipeline connecting O and R?
(A) 600 l (B) 400 l (C) 250 l (D) 350 l
12. Due to a technical problem, if the pipeline connecting N and Q cannot be used, then what will be the deficit at Q and R put together?
(A) 300 l (B) 250 l (C) 100 l (D) zero
13. If the requirement at R increases by three-fifths because of a surge in demand, the deficit at P, Q, O and R put together is _____.
(A) 100 l (B) 120 l (C) 10 l (D) zero
14. If the pipeline connecting N and Q is carrying only half its capacity, the pipeline connecting which other two points can also have a 50% slack?
(A) D and O (B) M and P (C) D and M (D) D and N
15. If it is known that outlet P pumps exactly 100 litres of milk to an outlet connected to it, what is the range of the quantity of milk, that O pumps to R?
(A) 0 - 100 l (B) 0 - 180 l (C) 0 - 250 l (D) 0 - 350 l

Directions for questions 16 to 20: These questions are based on the information given below.

The following pipeline diagram gives the oil flow from a refinery X to various depots – P, Q, R, S, T and U located in six cities. At each depot oil is stocked and when the capacity is met oil is passed on to the next depot connected to it. The figure also gives the capacity of each depot. The flow in the network is such that the requirement at all the depots is exactly met. The arrows give the direction of flow of oil. The capacity of each pipeline connected to the refinery is 1500 kls and that of pipelines connecting the depots is 1000 kls. The slack in a pipeline is defined as the excess flow required to bring the pipeline to full capacity.



Directions for questions 16 to 20: Type in your answer in the input box provided below the question.

16. What is the maximum slack (in kls) in the pipeline connecting the refinery with depot R?
17. What is the minimum flow (in kls) in the pipeline connecting P and Q?
18. What is the maximum slack (in kls) in all the pipelines connected to depot S?
19. If the depot P is under repair and no oil flows into or out of it, then what is the maximum quantity of oil (in kls) that can reach depot U?
20. What is the maximum slack (in kls) in all the pipelines together?

Key

Exercise – 7(a)

- | | | | | |
|------|------|---------|----------|-------|
| 1. A | 5. C | 9. A | 13. 500 | 17. B |
| 2. D | 6. A | 10. C | 14. 0 | 18. B |
| 3. C | 7. B | 11. 800 | 15. 3950 | 19. D |
| 4. B | 8. C | 12. 800 | 16. D | 20. D |

Exercise – 7(b)

- | | | | | |
|------|------|-------|---------|----------|
| 1. B | 5. A | 9. B | 13. C | 17. 500 |
| 2. B | 6. B | 10. C | 14. C | 18. 600 |
| 3. A | 7. A | 11. A | 15. D | 19. 700 |
| 4. A | 8. C | 12. C | 16. 400 | 20. 4300 |