

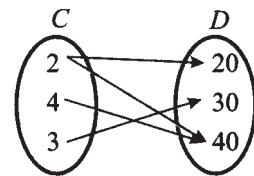
10. ΔABC is a right angled triangle where $\angle B = 90^\circ$ and $BD \perp AC$. If $BD = 8$ cm, $AD = 4$ cm, then CD is
- a) 24 cm b) 16 cm c) 32 cm d) 8 cm
11. $\frac{1 + \tan^2 \theta}{1 + \cot^2 \theta} =$
- a) $\cos^2 \theta$ b) $\tan^2 \theta$ c) $\sin^2 \theta$ d) $\cot^2 \theta$
12. $\cos^4 x - \sin^4 x =$
- a) $2\sin^2 x - 1$ b) $2\cos^2 x - 1$ c) $1 + 2\sin^2 x$ d) $1 - 2\cos^2 x$
13. The total surface area of a solid hemisphere is 12π cm² then its curved surface area is equal to
- a) 6π cm² b) 24π cm² c) 36π cm² d) 8π cm²
14. For any collection of n times, $\sum (x - \bar{x}) =$
- a) $\sum x$ b) \bar{x} c) $n\bar{x}$ d) 0
15. Probability of sure event is
- a) 1 b) 0 c) 100 d) 0.1

SECTION - B

- Note :** (i) Answer any **10** questions from questions numbered 16 to 30
(ii) Question No. **30** is compulsory
(iii) Each question carries two marks.

10 x 2 = 20

16. If $A \subset B$, then show that $A \cup B = B$ (use Venn Diagram)
17. Does each of the following arrow diagrams represent a function? Explain
18. Find the sum of the series : $1^3 + 2^3 + 3^3 + \dots + 20^3$
19. Multiply : $\frac{x^2 - 81}{x^2 - 4} \times \frac{x^2 + 6x + 8}{x^2 - 5x - 36}$
20. Form a quadratic equation whose roots are : $3 + \sqrt{7}$, $3 - \sqrt{7}$
21. If $A = \begin{pmatrix} 4 & -2 \\ 5 & -9 \end{pmatrix}$ and $B = \begin{pmatrix} 8 & 2 \\ -1 & -3 \end{pmatrix}$ find $6A - 3B$.
22. Construct a 2×3 matrix $A = [a_{ij}]$ whose elements are given by $a_{ij} = |2i - 3j|$
23. If the x - intercept and y - intercept of a straight line are $\frac{-2}{7}$ and $\frac{2}{3}$ respectively, then find the equation of the straight line.



24. Find the centroid of the triangle whose vertices are : (3, -5) , (-7 , 4) and (10 , -2)
25. In ΔABC , $DE \parallel BC$ and $\frac{AD}{DB} = \frac{2}{3}$. If $AE = 3.7$ cm, find EC .
26. The angle of elevation of the top of a tower as seen by an observer is 30° . The observer is at a distance of $30\sqrt{3}$ m from the tower. If the eye level of the observer is 1.5 m above the ground level, then find the height of the tower.
27. Find the curved surface area of a cone whose volume and height are $120\pi \text{ cm}^3$ and 10 cm respectively.
28. The outer and the inner radii of a hollow sphere are 12 cm and 10 cm. Find its volume.
29. Find the standard deviation of the first 10 natural numbers.
30. (a) A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is thrice that of drawing a red ball, then find the number of blue balls in the bag.

(OR)

(b) Prove the identities $\sqrt{\frac{1 - \sin \theta}{1 + \sin \theta}} = \sec \theta - \tan \theta$

SECTION - C

Note : (i) **9** questions to be answered from the questions numbered 31 to 45

9 x 5 = 45

(ii) Each question carries FIVE marks.

(iii) Answer any **8** questions from the first 14 questions

(iv) Question no **45** is compulsory.

31. Use Venn diagram to verify $A \setminus (B \cup C) = (A \setminus B) \cap (A \setminus C)$
32. A function $F : [1, 6) \rightarrow \mathbf{R}$ is defined as follows
- $$f(x) = \begin{cases} 1 + x, & 1 < x < 2 \\ 2x - 1, & 2 < x < 4 \\ 3x^2 - 10, & 4 < x < 6 \end{cases}$$
- Find the value of (i) $f(5)$ (ii) $f(3)$ (iii) $f(1)$ (iv) $f(2) - f(4)$
- (v) $2f(5) - 3f(1)$
33. Find the sum to n terms of the series $6 + 66 + 666 + \dots$
34. The sum of first three terms of a geometric sequence is $\frac{13}{12}$ and their product is -1. Find the common ratio and the terms
35. Factorize : $x^3 - 2x^2 - 5x + 6$

36. If $25x^4 - 30x^3 - 11x^2 + ax - b$ is a perfect square, then find a and b .

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37. If $A = \begin{pmatrix} 3 & 3 \\ 7 & 6 \end{pmatrix}$, $B = \begin{pmatrix} 8 & 7 \\ 0 & 9 \end{pmatrix}$ and $C = \begin{pmatrix} 2 & -3 \\ 4 & 6 \end{pmatrix}$, find $(A + B)C$ and $AC + BC$.

Is $(A + B)C = AC + BC$?

38. Find the area of the quadrilateral whose vertices are $(-4, 5)$, $(0, 7)$, $(5, -5)$ and $(-4, -2)$

39. If the vertices of a $\triangle ABC$ are $A(2, 1)$, $B(6, -1)$ and $C(4, 11)$. Find the equation of the straight line along the altitude from the vertex A .

40. State and prove Thales theorem.

41. From the top of a tower of height 60 m, the angles of depression of the top and the bottom of a building are observed to be 30° and 60° respectively. Find the height of the building.

42. A solid sphere of diameter 42 cm is melted and recast into a number of smaller identical cones, each of diameter 7 cm and height 3 cm. Find the number of cones so formed.

43. Find the standard deviation of the numbers 62, 58, 53, 50, 63, 52, 55.

44. The probability that a girl will be selected for admission in a medical college is 0.16. The probability that she will be selected for admission in an engineering college is 0.24 and the probability that she will be selected in both, is 0.11.

45. (a) If α and β are the roots of $5x^2 - px + 1 = 0$ and $\alpha - \beta = 1$, then find p .

(OR)

(b) A cylindrical shaped well of depth 20m and diameter 14m is dug. The dug out soil is evenly spread to form a cuboid-platform with base dimension 20 m x 14 m. Find the height of the platform.

SECTION - D

Note : (i) Each question carries TEN marks

(ii) Answer both the questions

2 x 10 = 20

46. (a) Draw a circle of diameter 10 cm. From a point P , 13 cm away from the centre, draw the two tangents PA and PB to the circle, and measure their lengths.

(OR)

(b) Construct a cyclic quadrilateral $ABCD$ where $AB = 6$ cm, $AD = 4.8$ cm, $BD = 8$ cm and $CD = 5.5$ cm.

47. (a) A cyclist travels from a place A to a place B along the same route at a uniform speed of different days. The following table gives the speed of his travel and the corresponding time he took to cover the distance

Speed in km/hr (x)	2	4	6	10	12
Time in hrs (y)	60	30	20	12	10

Draw the speed-time graph and use it to find.

(i) the number of hours he will take if he travels at a speed of 5 km/hr

(ii) the speed with which he should travel if he has to cover the distance in 40 hrs.

(OR)

(b) Draw the Graph of $y = 2x^2 + x - 6$ and hence solve $2x^2 + x - 10 = 0$