

bracket:

$$\left(\frac{2}{5}, x < 3, 6, 7.5, 4\right)$$

7. The value of x , if $(2x, x + y) = (8, 4)$.
8. The geometric mean of 3 and 12 is _____.
9. The value of x for the inequality $7x + 3 < 5x + 9 (x \in R)$ is _____.
10. Conversion of 40% to fractions is _____.
11. The angle $\frac{\pi}{24}$ radians in degree is _____.

IV. Answer the following questions:

12. Find the equation of the locus of the point which moves such that the sum of the square of its distances from the co-ordinate axes is 2.
13. Find the sum to infinity of the GP $1, \frac{1}{2}, \frac{1}{4}, \dots$
14. Solve: $3(x - 2) - (x - 1) = 7(x - 1) - 6(x - 2)$.
15. The average score of 20 boys is 60% and average score of 30 girls is 70%. Find the combined average score.
16. Find the value of $\tan A \cdot \operatorname{cosec} A \cdot \cos A$.

PART-B**V. Answer any SIX of the following questions:****6 × 2 = 12**

17. Find the sum of all positive divisors of the number 960.
18. If $f(x) = 2x + 1$, $g(x) = x^2 + 2x + 1$. Find $\operatorname{gof}(3)$ and $\operatorname{fog}(-1)$.
19. Find the domain and range of the relation $R = \{(x, y): y = x^3, x \text{ is a positive prime number less than } 10\}$.
20. Insert 3 H.M.'s between $\frac{1}{4}$ and $\frac{1}{12}$.
21. Two numbers are in the ratio 7: 5 and their difference is 12. Find the numbers.
22. Solve $7x + 3 < 5x + 9, x \in R$. Also represent the solution on the number line.
23. Prerana bought a Car for ₹4,00,000. If it depreciates at the rate of 12% per year how much will it worth after 10 years?
24. The difference between the acute angles of a right-angled triangle is $\frac{2\pi}{5}$. Express the angles in degrees.
25. Prove that $(1 + \cot A)^2 + (1 - \cot A)^2 = 2 \operatorname{cosec}^2 A$.
26. Find the equation of the locus of the point which moves such that its distance from (1, 2) is 3.
27. Find the length of the perpendicular drawn from the point (-2, -1) to the line $4x + 3y - 5 = 0$.

PART-C**VI. Answer any FIVE of the following questions:****5 × 3 = 15**

28. If $p^x = q^y = r^z = s^w$ and $pq = rs$. Prove that $\frac{1}{x} + \frac{1}{y} = \frac{1}{z} + \frac{1}{w}$.
29. The sum of n elements of an AP 21, 23, 25, is 384. Find the number of terms and the last term.

30. If α and β are the roots of the equation $2x^2 - 5x + 7 = 0$. Find the values of:
 (i) $\alpha^2 + \beta^2$ (ii) $\alpha + \beta + \alpha\beta$ (iii) $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$
31. Find all pair of consecutive odd positive integer which are smaller than 10 such that their sum is greater than 11.
32. The average age of Ashok and Abdul is 45 years, the average age of Abdul and Anthony is 50 years and the average age of Anthony and Ashok is 35 years. Find the age of Abdul, Ashok and Anthony.
33. M/s. Chandana and Co., Bombay finds that the production cost directly attributed to each book is ₹25 and the fixed cost are ₹10,000. If each book can be sold for ₹35 find (i) Revenue Function (ii) Profit function (iii) Break Even Point.
34. For what values of k are the three lines $x - 2y + 1 = 0$, $2x - 5y + 3 = 0$ and $5x - 9y + k = 0$ concurrent?

PART-D

IV. Answer any FIVE of the following questions:

5 × 5 = 25

35. a) Define complex number
 b) Prove that $\sqrt{2}$ is an irrational number.
36. In a survey of 100 persons, it was found that 28 read magazine A, 30 read magazine B, 42 read magazine C, 8 read magazine A and B, 10 read magazine A and C, 5 read magazines B and C while 3 read all the three magazines. Find: i) How many read none of the three magazines? ii) How many read only magazine C? Also show the result through Venn diagram.
37. Evaluate using logarithmic table $\frac{\sqrt{6.43} \times 0.5789}{(13.46)^{3/2}}$.
38. Find an integral root between -3 and 3 by inspection and then using synthetic division solve the equation $x^3 - 2x^2 - 5x + 6 = 0$.
39. A person borrowed 65,000 at 8% p.a. simple interest for 4 years and lent out the money for 10% compound interest for 4 years. How much did the person gain?
40. Rahul wants to invest a lump sum amount in the bank so that he can get an annual income of ₹15,000 every year for the next 10 years. If the bank offers 16% p.a compound interest, what is amount he should invest today?
41. A dealer sold 3 T.V sets at ₹11,500 each. He sold one at a profit of 15% and the other two at a loss of 8%. Find his gain or loss percentage.
42. If the mid points of the sides of the triangle are (2,6), (4,6) and (3,5) then find the vertices of the triangle.
43. Find the coordinate of the foot of the perpendicular from (-6, 2) on the line $3x - 4y + 1 = 0$.

PART-E

V. Answer any TWO questions:

2 × 4 = 8

44. A relation R on a collection of set of integers defined by
 $R = \{(x, y) : x - y \text{ is a multiple of } 3\}$. Show that R is an equivalence relation on Z.
45. Find the sum to n terms of the series $0.3 + 0.33 + 0.333 + \dots$
46. If $\sin \theta = -\frac{3}{5}$ and θ lies in IV quadrant then prove that $\frac{3 \tan \theta - 4 \cos \theta}{4 \tan \theta + 3 \cos \theta} = \frac{109}{12}$