Sl.No. 6241

12 (E)

(MARCH, 2019)
(NCERT SRT)

Time : 3 Hours]   *[Maximum Marks : 80*

Instructions :

1) There are four sections and total 30 questions.

2) All the questions are compulsory. Internal options are available in certain questions.

3) Draw figure, wherever necessary. Maintain the lines and arcs of the construction.

4) Use of calculator is not permitted.

SECTION - A

■ **Question numbers 1 to 6 carry one mark each:**

1) The HCF and LCM of two numbers are 9 and 360 respectively. If one number is 45, write the other number.   [1]

2) The nth term of an A.P. is $(2n-3)$. Find the common difference.   [1]

3) Find the distance of the point $(3, -4)$ from the origin.   [1]

4) Find the angle of elevation of the top of 15m high tower at a point 15m away from the base of the tower. [1]

5) A line intersecting a circle in two points is called a _____. [1]

6) Two dice are thrown at the same time. Find the probability of getting different numbers on the dice. [1]

SECTION - B

■ **Question numbers 7 to 12 carry 2 marks each:**

7) Prove that $6 + \sqrt{2}$ is irrational. [2]

8) If the zeros α and β of polynomial $x^2 - 7x + k$ are such that $\alpha - \beta = 1$, then find the value of k. [2]

OR

8) If the zeros of polynomial $3x^2 - 10x + k$ are multiplicative inverses of each other, find the value of k. [2]

9) The path of a train is given by the equation $x + 2y - 4 = 0$ and the path of another train is $2x + 4y - 12 = 0$, will the paths (rails) cross? Solve by the method of substitution. [2]

10) Find the nature of the roots of the given quadratic equation. If real roots exist, Find them. [2]

$$3x^2 - 4\sqrt{3}x + 4 = 0$$

11) Find the co-ordinates of the points which divide the line segment joining A $(-2,2)$ and B$(2,8)$ into four equal parts. [2]

12) The length of the minute hand of a clock is 14cm. Find the area swept by the minute hand in 5 minutes. $\left[\text{Take } \pi = \dfrac{22}{7} \right]$ [2]

SECTION - C

■ **Question numbers 13 to 22 carry 3 marks each:**

13) Obtain the HCF of 420 and 272 by using Euclid's division algorithm and verify the same by using fundamental theorem of arithmetic. [3]

14) The ratio of incomes of two persons is 11:7 and ratio of their expenditures is 9:5. If each of them manages to save ₹ 400 per month, find their monthly incomes. (Using elimination method) [3]

15) The sum S of first n even natural numbers is given by relation $S = n(n + 1)$.
Find n, if the sum is 420. [3]

16) Prove that the ratio of the areas of two similar triangles is equal to the square
of the ratio of their corresponding medians. [3]

17) Find the area of the triangle formed by joining the mid points of the sides of
the triangle whose vertices are (0,–1), (2,1) and (0,3). Find the ratio of this
area to the area of given triangle. [3]

18) Prove that [3]

$$\sqrt{\frac{(1+\sin\theta)}{(1-\sin\theta)}} + \sqrt{\frac{(1-\sin\theta)}{(1+\sin\theta)}} = 2\sec\theta$$

OR

18) If $4\sin\theta = 3\cos\theta$, find the value of $\dfrac{12\sin\theta - 7\cos\theta}{8\sin\theta + 3\cos\theta}$. [3]

19) In a right $\triangle ABC$, right angled at B, BC = 5cm and AB = 12cm. A circle is
touching the sides of $\triangle ABC$. Find the radius of the circle. [3]

20) Ami has a circular plot of radius 105m. She donates a 7m wide track along its boundary for community track. **[3]**

   a) Find the area of track $\left[\text{use } \pi = \dfrac{22}{7} \right]$

   b) Which mathematical concept is used in the above problem?

   c) By donating a community - track, which value is depicted by Ami?

21) If the median of the distribution given below is 28.5. Find the values of x and y. **[3]**

Class interval	Frequency
0-10	5
10-20	x
20-30	20
30-40	15
40-50	y
50-60	5
Total	60

22) A Jar contains 27 marbles, few of them are green and other are blue. If a marble is drawn at random from the Jar, the probability that it is green is $\dfrac{2}{3}$. Find the number of blue marbles in the Jar. **[3]**

SECTION - D

■ **Question numbers 23 to 30 carry 4 marks each:**

23) Obtain all other zeroes of the polynomial $x^4 + 2x^3 - 13x^2 - 38x - 24$, if two of its zeroes are -1 and -2. [4]

24) Find the roots of the equation $x^2 - 2(a^2 + b^2)x + (a^2 - b^2)^2 = 0$. [4]

25) State Basic proportionality theorem and prove it. [4]

OR

25) Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals. [4]

26) Prove that $(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \dfrac{1}{\tan A + \cot A}$. [4]

27) The angles of elevation of the top of a tower from two points at a distance of 4m and 9m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6m. [4]

28) Construct a triangle with sides 5cm, 6cm, and 7cm and then another triangle whose sides are 7/5 of the corresponding sides of the first triangle. Write the steps of construction. [4]

29) Metallic spheres of radii 6cm, 8cm, and 10cm, respectively, are melted to form a single solid sphere. Find the radius of the resulting sphere. **[4]**

30) The following table shows the ages of the patients admitted in hospital during a year: **[4]**

Ages (in years)	5-15	15-25	25-35	35-45	45-55	55-65
No. of Patients	6	11	21	23	14	5

Find the mode and the mean of above given data

✘ ✘ ✘