

This Question Paper contains 7 printed pages.

(Section - A, B, C & D)

Sl.No. 2461

12 (E)

(MARCH, 2018)

(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 1 to 6 carry one mark each:

- 1) Which among $\frac{3}{6}, \frac{2}{6}$ and $\sqrt{3}$ has non-terminating recurring decimal expansion? [1]
- 2) Find the discriminant of $3x^2 - 2x + \frac{1}{3} = 0$ and discuss the nature of roots. [1]

- 3) What is the sum of first 'n' odd positive integers? [1]
- 4) Angle of elevation of the top of a tower from a point on the ground, which is 'a' metre away from the foot of the tower is 45° . What is the height of the tower? [1]
- 5) Write the formula to find the volume of a frustum of a cone. [1]
- 6) A jar contains 12 marbles, some are red and some are blue. If a marble is drawn at random from the jar, the probability that it is red is $\frac{2}{3}$. How many red marbles are there in the jar? [1]

SECTION - B

■ Question numbers 7-12 carry 2 marks each:

- 7) Find the smallest four digit number divisible by both 72 and 120. [2]
- 8) Find the zeros of $P(x) = 2x^2 - 8x + 6$ and verify the relationship between the zeros and the coefficients. [2]

- 9) Solve the pair of equations, $8x + 7y = 15xy$, $7x - 2y = 5xy$ by reducing them to a pair of linear equations in two variables. [2]
- 10) Is it possible to design a rectangular park whose perimeter is six times its breadth and the area is 800m^2 . If possible find its length and breadth. [2]
- 11) Find the co-ordinates of the points of trisection of the line segment joining the points $A(2, -2)$ and $B(-7, 4)$. [2]
- OR
- 11) Find the ratio in which the line segment joining $A(1, -5)$ and $B(-4, 5)$ is divided by X-axis. [2]
- 12) A chord of a circle of radius 10cm subtends a right angle at the centre. Find the area of minor segment formed by the chord. [use $\pi = 3.14$] [2]

SECTION - C

■ Question numbers 13 to 22 carry 3 marks each:

- 13) Prove that $\sqrt{2}$ is irrational. [3]
- 14) On dividing $3x^3 + x^2 + 2x + 5$ by a polynomial $g(x)$ the quotient and remainder were $3x - 5$ and $9x + 10$ respectively. Find $g(x)$ [3]
- 15) Five years ago Ramya was 5 times as old as her daughter. Ten years later she will be twice old as her daughter. What was Ramya's age when her daughter was born? [3]

- 16) If the roots of the equation $x - 1 + \frac{1}{kx} = 0$ where $k \neq 0$, $x \neq 0$, are equal, find the value of k . Also find the roots. [3]

- 17) Find the sum given below $3 + 4\frac{1}{2} + 6 + 7\frac{1}{2} + \dots + 31\frac{1}{2}$. [3]

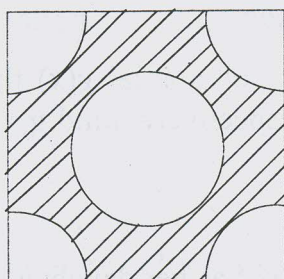
OR

- 17) Find the sum of all three digit numbers which are divisible by 11. [3]

- 18) Evaluate : $\frac{\sec 30^\circ + \cos 60^\circ + \cot 45^\circ}{\sin 30^\circ - \operatorname{cosec} 60^\circ + \tan 45^\circ}$ [3]

- 19) The bisector of $\angle A$ of triangle ABC intersects BC at D. Prove that $\frac{AB}{AC} = \frac{BD}{DC}$ [3]

- 20) From each corner of a square of side 4cm, a quadrant of a circle of radius 1cm is cut and also a circle of diameter 2cm is cut as shown in figure. Find the area of the remaining portion of the square. [3]



- 21) Consider the following frequency distribution of daily wages of 25 workers of a factory

Daily wages (in ₹)	100-150	150-200	200-250	250-300	300-350
No. of workers	4	5	12	2	2

Find the mean daily wages of the workers of the factory by using an appropriate method.

[3]

- 22) Two balanced dice are thrown at the same time. Write down all the possible outcomes. What is the probability that

[3]

- The sum of the two numbers appearing on the top of the dice is less than or equal to 6
- The product of the numbers appearing on the top of the dice is an odd number.

SECTION - D

■ Question numbers 23 to 30 carry 4 marks each:

- 23) Determine if A(3,0), B(-1,4) and C(5,-2) are collinear. If yes, which point is between the other two? Also find the ratio in which the point divides the line segment joining the other two points.

[4]

- 24) Prove the following trigonometric identities

[4]

(i) $(1 + \tan \theta + \sec \theta)(1 + \cot \theta - \operatorname{cosec} \theta) = 2$

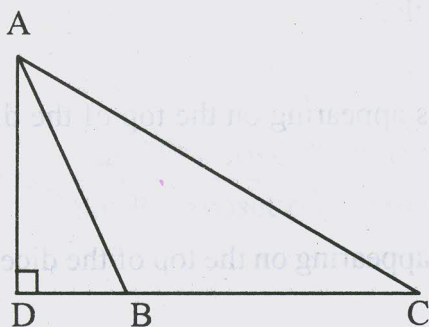
(ii) $3(\sin^4 A + \cos^4 A) - 2(\sin^6 A + \cos^6 A) = 1$

- 25) When the angle of elevation of the sun increases from 30° to 60° , the length of shadow of a tower decreases by 40m. Find the height of the tower. [4]

- 26) State and prove Pythagoras' theorem. [4]

OR

- 26) In the given figure ABC is a triangle in which $\angle ABC > 90^\circ$ and $AD \perp CB$ produced. Prove that $AC^2 = AB^2 + BC^2 + 2BC \cdot BD$ [4]



- 27) A triangle ABC is drawn to circumscribe a circle. If $AB = 6\text{cm}$, $BC = 8\text{cm}$ and $\angle ABC = 90^\circ$, find the radius of the circle. [4]

- 28) Draw triangle ABC with side $BC = 6\text{cm}$, $AB = 5\text{cm}$ and $\angle ABC = 60^\circ$. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of triangle ABC. Write the steps of construction. [4]

- 29) Due to sudden floods an NGO requested the government to get 100 tents fixed immediately and offered to contribute 50% of the cost. If the lower part of each tent is of the form of a cylinder of diameter 4.2m and height 4m, with conical upper part of the same diameter but of height 2.8m, and the canvas to be used cost ₹100 per m^2 . Find the amount the NGO will have to pay. What values are shown by the NGO? [4]

- 30) If the mode of the distribution given below is 52, find the values of 'a' and 'b'

[4]

Class Interval	Frequency
10-25	2
25-40	a
40-55	7
55-70	b
70-85	6
85-100	6
Total	30

x x x