

This Question Paper contains 8 printed pages.

(Section - A, B, C & D)

Sl.No. 0392

12 (E)

(JULY, 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.
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SECTION-A

■ Question numbers 1 to 6 carry one mark each:

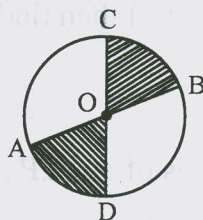
- 1) $0.\overline{6} = \frac{2}{3}$, both $0.\overline{6}$ & $\frac{2}{3}$ are rational numbers. Express $0.\overline{6}$ into p/q form. [1]
- 2) If -4 is a zero of the polynomial $x^2 - x - (2 + 2k)$ then find the value of k . [1]
- 3) If k , $2k-1$ and $2k+1$ are three consecutive terms of an A.P., find the value of k . [1]

- 4) Write the formula for the area of a sector of a circle, with radius r and sector angle θ . [1]
- 5) The volumes of two spheres are in the ratio 27:8, find the ratio of their radii. [1]
- 6) A die is thrown once. Find the probability of getting a number which is not a factor of 36. [1]

SECTION - B

■ Question numbers 7 to 12 carry 2 marks each:

- 7) Find the least positive integer divisible by first five natural numbers. [2]
- 8) If the sum of two positive numbers is 108 and the difference of these numbers is 8 then find the numbers. [2]
- 9) If the product of zeros of the polynomial $ax^2 - 6x - 6$ is 4 then find the value of a . Also find the sum of zeros of the polynomial. [2]
- 10) Find the area of the shaded portion in the given figure, where AB and CD are diameters, $\angle COB = 30^\circ$ and $OC = 2.1$ cm. [2]



- 11) An observer 1.5m tall is 28.5m away from a chimney. The angle of elevation of the top of the chimney from her eyes is 45° . What is the height of the chimney? [2]

OR

- 11) A tower of height $15\sqrt{3}$ m stands vertically on the ground. Find the angle of elevation of the top of the tower, from a point 15m away from the foot of the tower. [2]
- 12) If the point (x, y) is equidistant from the points $(a - b, a + b)$ and $(a + b, a + b)$ then prove that $x - a = 0$. [2]

SECTION - C

■ Question numbers 13 to 22 carry 3 marks each:

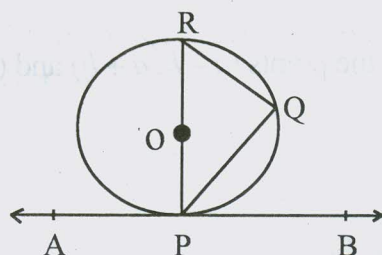
- 13) The HCF of 65 and 117 is expressible in the form $65m - 117$. Find the value of m . Also find the LCM of 65 and 117 using prime factorization method. [3]
- 14) The first and the last terms of an A.P. are 17 and 350 respectively. If the common difference is 9, how many terms are there and what is their sum? [3]
- 15) Solve the following pair of linear equations: [3]

$$\frac{5}{x-1} + \frac{1}{y-2} = 2 \text{ and } \frac{6}{x-1} - \frac{3}{y-2} = 1$$

- 16) If $\cot B = \frac{12}{5}$, show that

$$\tan^2 B - \sin^2 B = \sin^2 B \tan^2 B \quad [3]$$

- 17) An adult and a minor boy, standing on the ground are two metres apart. The height of the adult is 4 times the height of the minor boy. If at the midpoint of the line segment joining their feet, the angles of elevation of their tops are complementary, then find the height of the minor boy. [3]
- 18) Prove that the parallelogram circumscribing a circle is a rhombus. [3]
- OR
- 18) In the figure, AB is a tangent to a circle with centre O. Prove that $\angle BPQ = \angle PRQ$. Also find $\angle RPQ$, if $\angle BPQ = 60^\circ$ [3]



- 19) In an equilateral triangle ABC, AD is drawn perpendicular to BC meeting BC in D. Prove that $AD^2 = 3BD^2$. [3]
- 20) A student noted the number of cars passing through a spot on a road for 100 periods each of 3 minutes and summarised it in the table given below. Find the mode of the data: [3]

No. of Cars	Frequency
0-10	7
10-20	14
20-30	13
30-40	12
40-50	20
50-60	11
60-70	15
70-80	8

- 21) From a pack of 52 playing cards kings, queens, jacks and aces of black colour were removed. From the remaining cards a card is drawn at random. Find the probability that the card drawn is

[3]

- a) a face card
b) a red card

- 22) A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1cm and the height of the cone is equal to its radius. Find the volume of the solid in terms of π .

[3]

SECTION - D

- Question numbers 23 to 30 carry 4 marks each:

- 23) Quadratic polynomial $x^2 - 2x - 8$ has zeros α and β . Now form a quadratic polynomial whose zeros are $\frac{2}{\alpha}$ and $\frac{2}{\beta}$.

[4]

- 24) Solve the following for x :

[4]

$$\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$$

- 25) Prove that the area of an equilateral triangle described on one side of a square is equal to half the area of the equilateral triangle described on one of its diagonals.

[4]

OR

- 25) State and prove the Pythagoras Theorem.

[4]

- 26) If the co-ordinates of the midpoints of the sides of a triangle ABC are $\left(\frac{9}{2}, -6\right)$, $(4, 1)$ and $\left(\frac{7}{2}, -1\right)$, find the co-ordinates of the vertices of ΔABC . [4]

- 27) If $\sin A = \frac{1}{\sqrt{5}}$ and $\sin B = \frac{1}{\sqrt{10}}$, find the values of $\cos A$ and $\cos B$.

Hence using the formula $\cos(A + B) = \cos A \cdot \cos B - \sin A \cdot \sin B$ show that $A + B = 45^\circ$. [4]

- 28) Draw a circle of radius 2.5 cm. From a point 7 cm away from its centre, construct the pair of tangents to the circle. Write the steps of construction. [4]

- 29) Milk is in a container, which is in the form of a frustum of a cone of height 30 cm and the radii of whose lower and upper circular ends are 20 cm and 40 cm respectively is to be distributed in a camp for flood victims. If this milk is available at the rate of Rs. 35 per litre and 880 liters of milk is needed daily for a camp, find how many such containers of milk are needed for a camp daily? The cost will be put up by the donor agency for this. What value is indicated through this by the donor agency? [4]

- 30) The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is Rs. 18. Find the missing frequency f . [4]

Daily pocket allowance in Rs.	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Number of children	7	6	9	13	f	5	4

x x x