

**Very Short Answer Type Questions [ 1 Mark each ]**

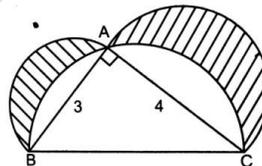
- Find the values of  $k$  for which the roots of the quadratic equation  $3x^2 - 5x + 2k = 0$  is real and equal.
- If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of  $80^\circ$ , then  $\angle POA$  is equal to \_\_\_\_\_.
- The tops of two poles of height 20m and 14m are connected by a wire. If the wire makes an angle of  $30^\circ$  with horizontal, then the length of the wire is \_\_\_\_\_.
- Find the probability that a leap year selected at random will contains 53 Sundays

**Short Answer Type Questions - I [ 2 Marks each ]**

- Solve for  $x$ :  $\frac{1}{2a} + \frac{1}{b} + \frac{1}{x} = \frac{1}{2a+b+x}$ ;  $a \neq 0, b \neq 0, x \neq 0$ .
- The vertices of a triangle are (2, 1), (5, 2) and (3, 4). Find the coordinates of the centroid.
- Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact
- Find the volume of the largest right circular cone that can be cut out of a cube whose edge is 9 cm.
- How many multiples of 4 lie between 10 and 250
- Find the length of the line AB formed by joining two points  $A(a\cos\theta, 0)$  and  $B(0, a\sin\theta)$ .

**Short Answer Type Questions - II [ 3 Marks each ]**

- If (-5) is a root of the quadratic equation  $2x^2 + px - 15 = 0$  and the quadratic equation  $p(x^2 + x) + k = 0$  has equal roots, then find the value of  $p$  and  $k$ .
- In figure, ABC is a right angled triangle, right angled at A. Semicircles are drawn on AB, AC and BC as diameters. Find the area of the shaded region.

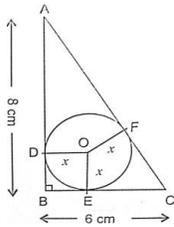


- Find the sum of the first 25 terms of an A.P. whose  $n^{\text{th}}$  term is given by  $a_n = 7 - 3n$ .
- Prove that the parallelogram circumscribing a circle is a rhombus.
- Draw a circle of radius 6 cm. From a point 10 cm away from the centre, construct a pair of tangents to the circle and measure of their lengths.
- A statue 1.6m tall stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is  $60^\circ$  and from the same point the angle of elevation of the top of the pedestal is  $45^\circ$ . Find the height of the pedestal.
- A bag contains card which are numbered from 2 to 90. A card is drawn at random from the bag. Find the probability that it bears (i) a two digit number (ii) a number which is a perfect square.
- Point P divides the line segment joining the points  $A(-1, 3)$  and  $B(9, 8)$  such that  $\frac{AP}{PB} = \frac{k}{1}$ . If P lies on the line  $x - y + 2 = 0$ , find the value of  $k$ .
- Two circles touch internally. The sum of their area is  $116\pi \text{ cm}^2$  and distance between their centres is 6cm. Find radii of the circles.

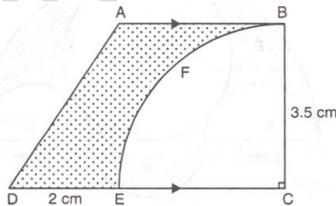
20. Water is flowing at the rate of 3 km/hr through a circular pipe of 20 cm internal diameter into a circular cistern of diameter 10 m and depth 2m. In how much time will the cistern be filled?

**Long Answer Type Questions [ 4 Marks each ]**

21. Two pipes running together can fill a cistern in  $3\frac{1}{13}$  minutes. If one pipe takes 3 minutes more than the other to fill it, find the time in which each pipe would fill the cistern.
22. If the  $p^{\text{th}}$  term of an A.P. is  $\frac{1}{q}$  and the  $q^{\text{th}}$  term is  $\frac{1}{p}$ , show that the sum of  $pq$  terms is  $\frac{1}{2}(pq+1)$ .
23. ABC is a right angled triangle (as Shown in figure) with  $AB = 8\text{cm}$  and  $BC=6\text{cm}$ . A circle with centre O and radius  $x$  is inscribed in  $\Delta ABC$ . Find the value of  $x$ .



24. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then another triangle whose side are  $1\frac{1}{2}$  times corresponding sides of the isosceles triangle. Write steps of construction.
25. The angle of elevation of a jet plane from a point A on the ground is  $60^\circ$ . After a flight of 15 seconds, the angle of elevation changes to  $30^\circ$ . If the jet plane is flying at a constant height of  $1500\sqrt{3}$  m, find the speed of the jet plane.
26. A hemispherical depression is cut out from one face of a cubical block of side 7 cm, such that the diameter of the hemisphere is equal to the edge of the cube. Find the surface area of the remaining solid. [use  $\pi = \frac{22}{7}$ ].
27. From a thin metallic piece, in the shape of a trapezium ABCD, in which  $AB \parallel CD$  and  $\angle BCD = 90^\circ$ , a quarter circle BFEC is removed (see figure). Given  $AB = BC = 3.5$  cm and  $DE = 2$  cm, calculate the area of the remaining piece of the metal sheet. [ use  $\pi = \frac{22}{7}$ ].



28. A card is drawn at random from a pack of 52 cards. Find the probability that the card drawn is  
 (i) a black king (ii) either a black card or a king (iii) a jack, queen or a king (iv) neither an ace nor a king.
29. Find the coordinates of the vertices of the triangle, the midpoints of whose sides are  $(1, 2)$ ,  $(0, -1)$  and  $(2, -1)$ .
30. There are 25 trees at equal distances of 5 meters in a line with a well, the distance of the well from the nearest tree being 10 meters. A gardener waters the entire tree separately starting from the well and he returns to the well after watering each tree to get water for the next. Find the total distance the gardener will cover in order to water all the trees. What is the values of planting trees?
31. A bucket made of aluminium is of height 20 cm and has its upper and lower ends of radii 36cm and 21cm respectively. Find the cost of making the bucket if the cost of aluminium sheet ₹50 per  $100\text{cm}^2$ .

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