## Section – A

**1.** Find sum of 10 terms of following A.P. : $\frac{3}{\sqrt{5}}, \sqrt{5}, \frac{7}{\sqrt{5}}, \ldots\ldots\ldots\ldots$

**2.** A tower stands near an airport. The angle of elevation $\theta$ of the tower from a point on the ground is such that its tangent is $\frac{5}{12}$, find the height of the lower, if the distance of the observer from the tower is 120 meters.

**3.** A die is thrown once. Find the probability of getting "at most 2."

**4.** $A(-1,-1), B(6,1), C(8,8), D(x,y)$ are the four vertices of a rhombus taken in order. Find the co-ordinates of point D.

## Section – B

**5.** Ram Prasad saved `10 in the first week of a year and then increased his weekly savings by `2.75. If in the nth week, his savings become `59.50, find n.

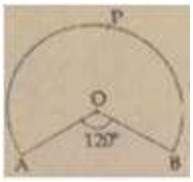
**6.** Find the roots of the quadratic equation $5x^2 - 2\sqrt{10}x + 2 = 0.$

**7.** Two tangents PA and PB are drawn to the circle with centre O such that $\angle APB = 120^0$ Prove that OA= $\sqrt{3}$ AP.

**8.** Draw a circle of radius 3.6 cm. Take a point P outside the circle and construct a pair of tangents to the circle from that point.

**9.** In two concentric circles, a chord of length 24 cm of larger circle becomes a tangent to the smaller circle whose radius is 5 cm. Find the radius of the larger circle.

**10.** In the given figure, OAPB is a sector of a circle of radius 3.5 cm with the centre at O. If $\angle AOB = 120^0$, then find the length of OAPBO. (use $\pi = \frac{22}{7}$)




## Section - C

**11.** Find the sum of n terms of the sequence $< a_n >$ where $a_n = 5 - 6n$ and n is a natural number.

**12.** The sum of a number and its reciprocal is $\frac{10}{3}$, find the number.

**13.** Draw a circle of radius 3 cm. Construct two tangents at the extreme ties of a diameter of this circle.

**14.** A man observes the angle of elevation of a bird to be $30^0$. He then walks 100 m towards the birds which is stationary and finds that the angle of elevation is $60^0$. Find the height at which the bird is sitting.

**15.** From a well shuffled pack of 52 cards, two black queens and two kings are removed. From the remaining cards, a card is drawn at random. What is the probability that drawn card is :
**a)** a face card
**b)** an ace

**16.** Show that the line-segments joining the points (4, 2) and (-6,4) and (-10, 5) and (8, 1) bisect each other.

**17.** The coordinates of the vertices of $\triangle ABC$ are A( 7, 2), B (9,10) and C(1, 4). If E and F are the mid points of AB and AC respectively, prove that $EF = \frac{1}{2}BC$.

**18.** In a cylinder of base radius 10 cm, liquid is filled to the height of 9 cm. A metal cube of diagonal $8\sqrt{3}$ cm is immersed completely in the liquid. Find the height by which the water will rise in the cylinder.

**19.** The wheel of a motor cycle is of radius 21 cm. How many revolutions per minute must the wheel make so as to keep a speed of 77 km/h?

**20.** A solid metallic sphere of radius 10.5 cm is melted and recast into a number of smaller solid cones, each of radius 3.5 cm and height 3 cm. Find the number of cones so formed.

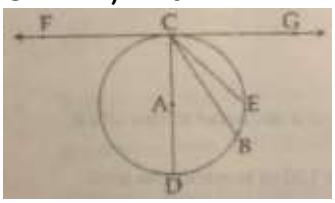
## SECTION – D

**21.** If $p^{th}, q^{th}$ and $r^{th}$ term of an A. P. are a, b and c respectively, then show that: $a(q-r)+(r-p)+c(p-q)=0$

**22.** Solve: $\frac{2y}{y-4}+\frac{2y-5}{y-3}=\frac{25}{3}; y \neq 3, 4$

**23.** If the equation $(1+m^2)x^2+2mcx+(c^2-a^2)=0$ has equal roots, prove that $c^2=a^2(1+m^2)$

**24.** In the figure FG is a tangent to the circle with centre A. If $\angle DCB = 15^0$ and CE=DE, find $\angle GCE$ and $\angle BCE$.




**25.** Draw $\Delta ABC$ such that BC=5 cm, $\angle ABC = 60^0$ and $\angle ACB = 30^0$, now construct $\Delta ABC' \sim \Delta ABC$ with $A'B : AB = 3:2$.

**26.** Two pillars of equal heights stand on either side of a road, which is 200 m wide. The angles of elevation of the top of the pillars are $60^0$ and $30^0$ at a point

on the road between the pillars. Find the position of the point between the pillars and height of each pillar.

**27.** 17 cards numbered 1, 2, 3 …… , 16, 17 are put a box and mixed thoroughly . One person draws a card from the box. Find the probability that the number on the card is
**(a)** odd
**(b)** a prime
**(c)** divisible by 3.
**(d)** divisible by 3 and 2 both.

**28.** Prove that the points A(0, 0), B( 0, 2 ) C (2, 0) are the vertices of an isosceles right triangle. Also, find its area.

**29.** If h, C and V respectively represent the height, curved surface area and volume of a cone, prove that $C^2 = \frac{3\pi V h^3 + 9V^2}{h^2}$

**30.** The area of equilateral triangle is $196\sqrt{3}\,m^2$. Three circles are drawn at the vertices of the triangle with radius equal to the half of side of triangle. Find the area of the triangle not included in the sectors.

**31.** A school thought to collect the rainwater from the roof of the building, whose dimensions are $22m \times 20m$ by draining into a cylindrical vessel having diameter 7 m and height 4.2 m. If the vessel is just full, find the rainfall recorded in cm.

Why it is necessary to conserve water by doing, these type of activities?