

Time : 2 Hrs.

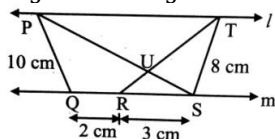
Marks : 40

**Q.1 A) Choose the correct alternative.**

4

1. For the figure given below, if line  $l \parallel$  line  $m$ , then  $\frac{A(\Delta PQS)}{A(\Delta TRS)} = \underline{\hspace{2cm}}$ .

a)  $\frac{2}{3}$       b)  $\frac{5}{3}$       c)  $\frac{5}{2}$       d)  $\frac{25}{12}$

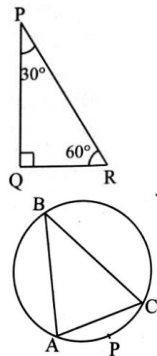


2. The slope of the line passing through the points  $P(-4, -7)$  and  $Q(-1, 2)$  is  
a) 3      b)  $\frac{1}{3}$       c) -3      d)  $-\frac{1}{3}$
3. If  $\cot \theta = \frac{7}{8}$ , then  $\tan^2 \theta =$   
a)  $\frac{7}{8}$       b)  $\frac{8}{7}$       c)  $\frac{49}{64}$       d)  $\frac{64}{49}$
4. A circle touches all sides of a parallelogram. So the parallelogram must be a \_\_\_\_\_.  
a) rectangle      b) rhombus      c) square      d) trapezium

**B) Solve the following questions.**

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1. If the ratio of circumference and area of a circle is 2 : 7, find its radius.
2. If  $15 \sin \theta - 8 \cos \theta = 0$ , where  $\theta$  is an acute angle, find the value of  $\tan \theta$ .
3. In the given figure, in  $\Delta PQR$ ,  $\angle Q = 90^\circ$ ,  $\angle P = 30^\circ$ ,  $\angle R = 60^\circ$ ,  $PR = 12$  cm, find  $PQ$ .



4. In the given figure, if  $m(\text{arc APC}) = 60^\circ$ , then find  $\angle ABC$ .

**Q.2 A) Complete the following activities. (Any two)**

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1. Read the following flow and draw a tangent to a circle at a point on the circle.

Draw a circle of radius 2.7 cm with O as centre.



Take any point P on the circle and draw ray OP.

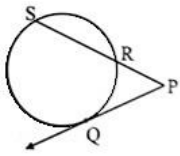


Draw a perpendicular line to the ray at point P.



Name the perpendicular line as  $l$ .  $l$  is the tangent at point P.

2. In the given figure, ray PQ touches the circle at point Q.  $PQ = 12$ ,  $PR = 8$ , complete the following activity to find PS and RS.



Ray PQ is a tangent to the circle at point Q and seg PS is the secant. ....[Given]

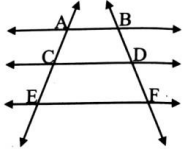
$$\therefore PR \times PS = PQ^2 \quad \dots \quad \underline{\hspace{2cm}}$$

$$\therefore PS = \underline{\hspace{2cm}}$$

$$\text{Now, } PS = \underline{\hspace{1cm}} + RS \quad \dots [P - R - S]$$

$$\therefore RS = \underline{\hspace{2cm}}$$

3. In the adjoining figure,  $AB \parallel CD \parallel EF$ . If  $AC = 5.4$ ,  $CE = 9$ ,  $BD = 7.5$ , then find  $DF$  by filling the blanks.



$$AB \parallel CD \parallel EF \quad \dots [\text{Given}]$$

$$\therefore \frac{AC}{CE} = \frac{\underline{\hspace{1cm}}}{DF} \quad \dots \underline{\hspace{2cm}}$$

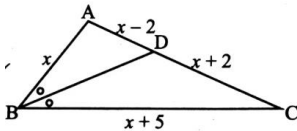
$$\therefore \frac{5.4}{9} = \frac{\underline{\hspace{1cm}}}{DF}$$

$$\therefore DF = \underline{\hspace{2cm}}$$

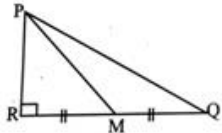
**B) Solve the following questions. (Any four)**

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1. In  $\triangle ABC$ , seg BD bisects  $\angle ABC$ . If  $AB = x$ ,  $BC = x + 5$ ,  $AD = x - 2$ ,  $DC = x + 2$ , then find the value of  $x$ .



2. Draw a circle with radius 3.4 cm. Draw a chord MN of length 5.7 cm in it. Construct tangents at points M and N to the circle.
3. Eliminate  $\theta$ , if  $x = a \sec \theta$ ,  $y = b \tan \theta$ .
4. In the adjoining figure, M is the midpoint of QR.  $\angle PRQ = 90^\circ$ . Prove that,  $PQ^2 = 4PM^2 - 3PR^2$ .



5.  $\triangle LMN \sim \triangle PQR$ ,  $9 \times A(\triangle PQR) = 16 \times A(\triangle LMN)$ . If  $QR = 20$ , then find  $MN$ .

**Q.3 A) Complete the following activities. (Any one)**

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1. Prove that opposite angles of a cyclic quadrilateral are supplementary by completing the following activity.

**Given:** □ABCD is cyclic.

**To prove:**  $\angle B + \angle D = 180^\circ$

$\angle A + \angle C = 180^\circ$

**Proof:** arc ABC is intercepted by the inscribed angle  $\angle ADC$ .

$$\therefore \angle ADC = \frac{1}{2} \boxed{\phantom{000}} \quad \dots(i) [\text{Inscribed angle theorem}]$$

Similarly,  $\boxed{\phantom{000}}$  is an inscribed angle. It intercepts arc ADC.

$$\therefore \boxed{\phantom{000}} = \frac{1}{2} m(\text{arc ADC}) \quad \dots(ii) [\text{Inscribed angle theorem}]$$

$$\therefore \angle ADC + \boxed{\phantom{000}} = \frac{1}{2} \boxed{\phantom{000}} + \frac{1}{2} m(\text{arc ADC})$$

...[Adding (i) and (ii)]

$$\therefore \angle D + \angle B = \frac{1}{2} [\boxed{\phantom{000}} + m(\text{arc ADC})]$$

$$\therefore \angle B + \angle D = \frac{1}{2} \times 360^\circ \quad \dots[\text{arc ABC and arc ADC constitute a complete circle}]$$

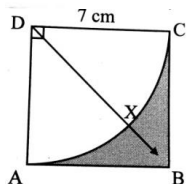
$$= 180^\circ$$

$$\therefore \angle B + \angle D = 180^\circ$$

Similarly we can prove,

$$\angle A + \angle C = 180^\circ$$

2.



Area of a square =  $\boxed{\phantom{000}}$  ...[Formula]

=  $\boxed{\phantom{000}}$  cm<sup>2</sup>

Area of sector (D-AXC) =  $\frac{\theta}{360} \times \pi r^2$

$$= \frac{\boxed{\phantom{000}}}{360} \times \frac{22}{7} \times \boxed{\phantom{000}}$$

$$= \boxed{\phantom{000}} \text{ cm}^2$$

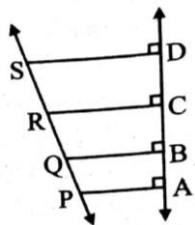
$\therefore$  A (shaded region) = Area of square ABCD – Area of sector (D-AXC)

=  $\boxed{\phantom{000}}$  cm<sup>2</sup>

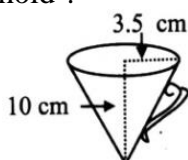
**B) Solve the following questions. (Any two)**

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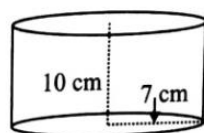
1. In the adjoining figure, seg PA, seg QB, seg RC and seg SD are perpendicular to line AD. AB = 60, BC = 70, CD = 80, PS = 280, then find PQ and QR.



2.  $\Delta PQR \sim \Delta LTR$ . In  $\Delta PQR$ , PQ = 4.2 cm, QR = 5.4 cm, PR = 4.8 cm. Construct  $\Delta PQR$  and  $\Delta LTR$ , such that  $\frac{PQ}{LT} = \frac{3}{4}$ .
3. Observe the measures of pots in the given figures. How many jugs of water can the cylindrical pot hold ?



Conical water jug



Cylindrical water pot

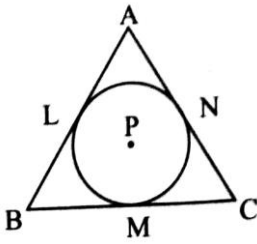
4. Show that the points  $A(1, 2)$ ,  $B(1, 6)$ ,  $C(1 + 2\sqrt{3}, 4)$  are vertices of an equilateral triangle.

**Q.4 Solve the following questions. (Any 2)**

- i) A circle with centre  $P$  is inscribed in the  $\triangle ABC$ . Side  $AB$ , side  $BC$  and side  $AC$  touch the circle at points  $L$ ,  $M$  and  $N$  respectively. Radius of the circle is  $r$ .

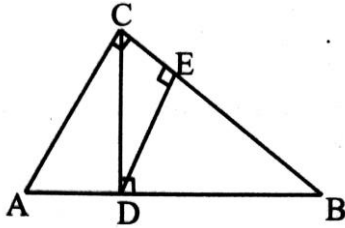
Prove that:

$$A(\triangle ABC) = \frac{1}{2} (AB + BC + AC) \times r.$$



- ii) In  $\triangle ABC$ ,  $\angle ACB = 90^\circ$  seg  $CD \perp$  seg  $AB$  seg  $DE \perp$  seg  $CB$ . Show that:

$$CD^2 \times AC = AD \times AB \times DE$$



- iii) The angle of elevation of a jet plane from a point on the ground is  $60^\circ$ . After a flight of 30 seconds, the angle of elevation changes to  $30^\circ$ . If the jet plane is flying at a constant height of  $3600\sqrt{3}$  m, find the speed of the jet plane.

**Q.5 Solve the following questions. (Any one)**

- i) As shown in the adjacent figure, a sphere is placed in a cylinder. It touches the top, bottom and the curved surface of the cylinder. If radius of the base of the cylinder is ' $r$ ',
- what is the ratio of the radii of the sphere and the cylinder?
  - what is the ratio of the curved surface area of the cylinder and the surface area of the sphere?
  - what is the ratio of the volumes of the cylinder and the sphere?



- ii)  $A(15, 5)$ ,  $B(9, 20)$ , and  $A-P-B$ . Find the ratio in which point  $P(11, 15)$  divides segment  $AB$ . Find the ratio using  $x$  and  $y$  co-ordinates. Write the conclusion.