

Time : 2 Hrs

Mrks : 40

Q.1 A. Choose the correct alternative.

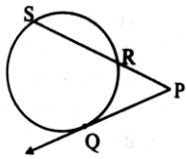
[4]

- i) The tangents drawn at the end points of the diameter of a circle will be
 - a) perpendicular to each other
 - b) parallel to each other
 - c) inclined to each other at 45°
 - d) inclined to each other at 60°
- ii) Find the perimeter of a sector of a circle if its measure is 90° and radius is 7 cm.
 - a) 44 cm
 - b) 25 cm
 - c) 36 cm
 - d) 56 cm
- iii) Points A, B, C are on a circle, such that $m(\text{arc BC}) = 120^\circ$. No points, except point B, is common to the arcs. Which is the type of $\triangle ABC$?
 - a) Equilateral triangle
 - b) Scalene triangle
 - c) Right angled triangle
 - d) Isosceles triangle
- iv) Out of the following which is a Pythagorean triplet?
 - a) (1, 5, 10)
 - b) (3, 4, 5)
 - c) (2, 2, 2)
 - d) (5, 5, 2)

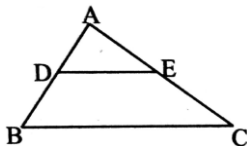
Q.1 B. Solve the following questions.

[4]

- i) In the adjoining figure, ray PQ touches the circle at point Q. $PQ = 12$, $PR = 8$, find PS.



- ii) In the given figure, $DE \parallel BC$. If $AD = 3$ cm, $DB = 4$ cm and $AE = 6$ cm, then find EC.



- iii) Find the diagonal of a square whose side is 10 cm.
- iv) Volume of a cylindrical reservoir is 86.24 m^3 . Find its capacity in litres.

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

[4]

- i) Find the slope of line l (shown in the figure) which is parallel to X-axis. Also, find the slope of line n which is parallel to Y-axis.

line $l \parallel$ X-axis

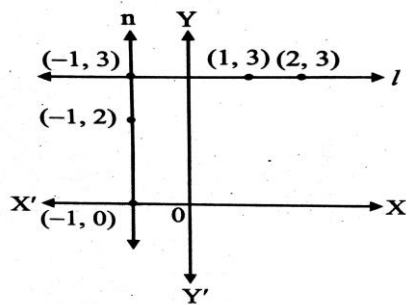
Slope of line $l = \square$

$\therefore$ Slope of any line parallel to X-axis is $\square$.

line $n \parallel$ Y-axis

Slope of line $n = \square$

$\therefore$ Slope of any line parallel to Y-axis $\square$.



ii) $\triangle ABC$ and $\triangle DEF$ are equilateral triangles.

If $A(\triangle ABC) : A(\triangle DEF) = 1 : 2$ and $AB = 4$, complete the activity to find DE .

In $\triangle ABC$ and $\triangle DEF$,

$$\left. \begin{array}{l} \angle A \cong \angle D \\ \angle B \cong \angle E \end{array} \right\}$$

...

$\therefore \triangle ABC \sim \triangle DEF$

...[AA test of similarity]

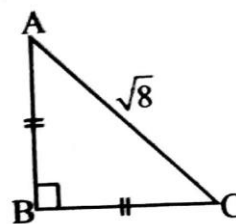
$$\therefore \frac{\text{Area of } \triangle ABC}{\text{Area of } \triangle DEF} = \frac{AB^2}{DE^2}$$

...[Theorem of areas of similar triangles]

$$\therefore DE = \text{ }$$

iii) For finding AB and BC with the help of information given in the given figure, complete the following activity.

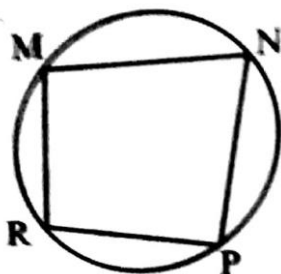
$$\begin{aligned} & AB = BC && \dots[\text{Given}] \\ \therefore & \angle BAC = \angle BCA && \dots[\text{Isosceles triangle theorem}] \\ \therefore & \angle BAC = \text{ } \\ \therefore & AB = BC = \text{ } \times AC && \dots[\text{Side opposite to } 45^\circ] \\ & = \text{ } \times \sqrt{8} \\ \therefore & AB = BC = \text{ } \end{aligned}$$



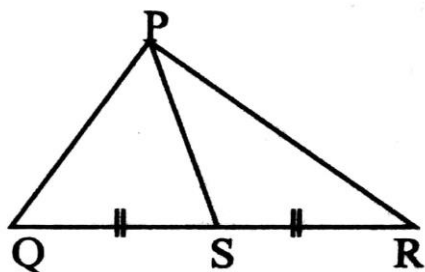
Q.2 B. Solve the following questions. (Any four)

[8]

- Draw a circle with centre P . Draw an arc AB of 100° measure. Draw tangents to the circle at point A and point B .
- The dimensions of a cuboid are 44 cm, 21 cm, 12 cm. It is melted and a cone of height 24 cm is made. Find the radius of its base.
- $\square MRPN$ is cyclic, $\angle R = (5x - 13)^\circ$, $\angle N = (4x + 4)^\circ$. Find the measures of $\angle R$ and $\angle N$.



- In $\triangle PQR$, points S is the midpoint of side QR . If $PQ = 11$, $PR = 17$, $PS = 13$, find QR .



- v) Find the co-ordinates of midpoint of the segment joining the points (22, 20) and (0, 16).

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

3

- i) Find the type of the quadrilateral if points A(-4, -7), B(-1, 2), C(8, 5) and D(5, -4) are joined serially by completing the following activity.

We know that, slope of line = ...[Formula]

Slope of side AB = $\frac{2 - (-7)}{-1 - (-4)} = \frac{2+7}{-1+4} = \frac{9}{3} = 3$

Slope of side BC =

Slope of side CD =

Slope of side AD = $\frac{-4 - (-7)}{5 - (-4)} = \frac{-4+7}{5+4} = \frac{3}{9} = \frac{1}{3}$

∴ Slope of side AB = Slope of side

∴ side AB || side CD

Slope of side = Slope of side AD

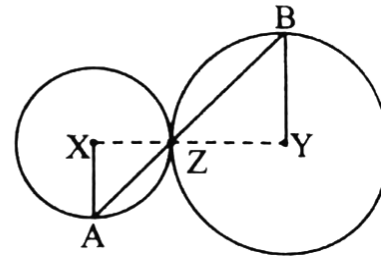
∴ side BC || side AD

Both the pairs of opposite sides of □ABCD are parallel.

∴ The quadrilateral formed by joining the points A, B, C and D is a .

ii)

In the adjoining figure, circles with centres X and Y touch each other at point Z. A secant passing through Z intersects the circles at points A and B respectively.



Prove that, radius $XA \parallel$ radius YB .

Fill in the blanks and complete the proof.

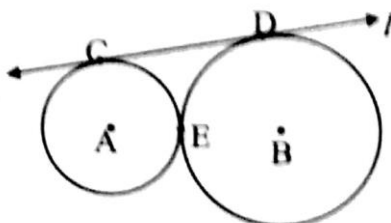
By theorem of touching circles, points X, Z, Y are collinear.

- $\therefore \angle XZA \cong \square$...[Vertically opposite angles]
 Let $\angle XZA = \angle BZY = a$... (i)
 Now, seg $XA \cong$ seg XZ ... $\square$
 $\therefore \angle XAZ \cong \square = a$... (ii) [Isosceles triangle theorem]
 Similarly, seg $YB \cong$ seg YZ ... $\square$
 $\therefore \angle BZY = \angle ZBY = a$... (iii) $\square$
 $\therefore \angle XAZ = \angle ZBY$... [From (i), (ii) and (iii)]
 $\therefore$ radius $XA \parallel$ radius YB ... $\square$

Q.3 B. Solve the following questions. (Any two)

[6]

- i) The diameter and length of a roller is 120 cm and 84 cm respectively. To level the ground, 200 rotations of the roller are required. Find the expenditure to level the ground at the rate of Rs. 10 per sq.m.
- ii) $\triangle ABC \sim \triangle LMN$. In $\triangle ABC$, $AB = 5.5$ cm, $BC = 6$ cm, $CA = 4.5$ cm. Construct $\triangle LMN$ such that $\frac{BC}{MN} = \frac{5}{4}$.
- iii) Two buildings are in front of each other on a road of width 15 metres. From the top of the first building, having a height of 12 metre, the angle of elevation of the top of the second building is 30° . What is the height of the second building?
- iv) In the adjoining figure, the circles with centres A and B touch each other at E. Line l is a common tangent which touches the circles at C and D respectively. Find the length of seg CD if the radii of the circles are 4 cm, 6 cm.



Q.4 Solve the following questions. (Any two)

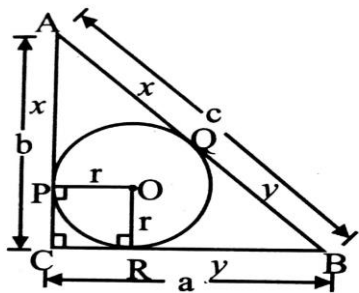
[8]

- i) A cylindrical jar of radius 10 cm is filled with water upto a height of 15 cm. 14 spherical balls of radius 3 cm each are immersed in the jar. Find the new level to which water is filled in the jar.
- ii) Prove that $(1 + \tan \theta)^2 + (1 + \cot \theta)^2 = (\sec \theta + \operatorname{cosec} \theta)^2$.
- iii) The sides LM and LN of $\triangle LMN$ are congruent. MP and MQ are drawn from M to make congruent angles with MN and meet LN in points P and Q respectively.

Prove that : $\frac{LM^2}{LQ^2} = \frac{LP}{LQ}$.

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

- i) In a right angled $\triangle ABC$, $\angle ACB = 90^\circ$. A circle is inscribed in $\triangle ABC$, $\angle ACB = 90^\circ$. A circle is inscribed in the triangle with radius r . a, b, c are the lengths of the sides BC, AC and AB respectively. Prove that $2r = a + b - c$.



- ii) In the adjoining figure, the vertices of square $DEFG$ are on the sides of $\triangle ABC$, If $\angle A = 90^\circ$, then prove that $DE^2 = BD \times EC$.

