

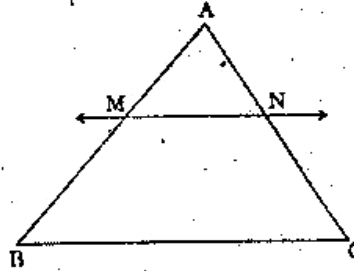
## GEOMETRY (Set A)

Time : 2.30 Hrs.) **Question Paper : September 2009** (Max. Marks : 60)

Note : Please see to Question Paper March 2009.

Q. 1 : Solve any six sub-questions :

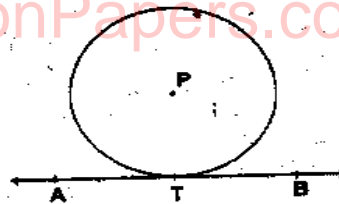
- (i) In the  $\triangle ABC$ , a line parallel to the side BC intersects the sides AB and AC in the points M and N respectively, such that  $AM = 8$ ,  $MB = 12$ ,  $AN = 6$ . Find NC.



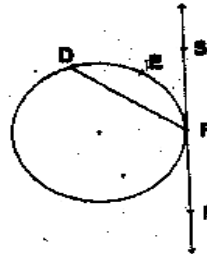
(12)

(ii) Find the diagonal of a square whose side is 20 cm.

(iii) In the figure, P is the centre of the circle and line AB is the tangent to the circle at the point T. The radius of the circle is 5 cm. Find the distance of P from the line AB. Give reason.



(iv) In the given figure,  $m(\text{arc DEF}) = 140^\circ$ , then find  $m\angle DFS$ . Give reason.



(v) Draw  $\angle ABC = 65^\circ$ . Construct the bisector of  $\angle ABC$ . (Do not write construction)

(vi) If  $\cos A = \frac{3}{5}$ , find  $\sin A$ .

(vii) The length, breadth and height of a cuboid are 11 m, 9.5 m and 3 m respectively. Find its volume.

(viii) Find the distance between the points P (2, 1) and Q (-1, 5).

**Q. 2 : Solve any four sub-questions :**

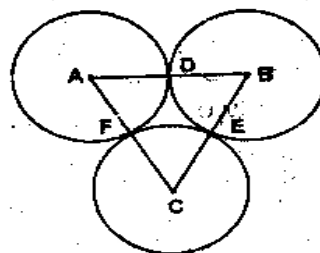
(i) In a right-angled triangle, hypotenuse is 61 cm and one side is 11 cm. Find its other side and the area of the triangle. (12)

(ii) Three congruent circles with centres A, B and C and with radius 4 cm each, touch each other in points D, E, F as shown the figure.

(a) What is the perimeter of  $\triangle ABC$ ?

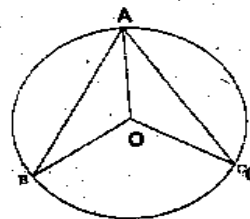
(b) What is the length of side DE of  $\triangle DEF$ ?

(iii) Evaluate :  $\sin^2 38^\circ + \sin^2 52^\circ$ .



(iv) What is the volume of a cylinder with radius 8 cm and height 28 cm? ( $\pi = \frac{22}{7}$ )

(v) In the given figure, A, B and C are three points on a circle with centre O such that  $m\angle AOB = 110^\circ$ ,  $m\angle AOC = 120^\circ$ . Find  $m\angle BAC$ .



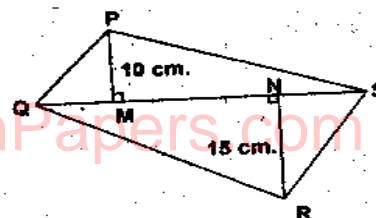
(vi) Draw a tangent to a circle with centre O and radius 3.2 cm at any point K on the circle.

**Q. 3 : Solve any four sub-questions :**

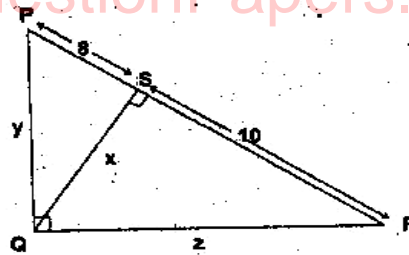
(i) In the given figure,

$A(\triangle PQS) = 100 \text{ cm}^2$ .

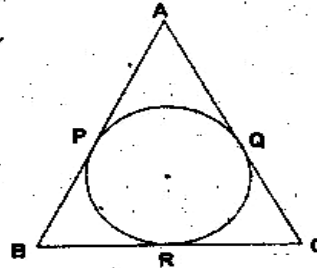
Find  $A(\triangle QRS)$ .



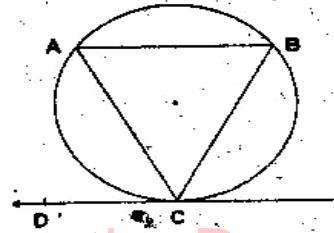
- (ii) In the figure,  $\angle PQR = 90^\circ$ . Seg QS  $\perp$  side PR. Find values of x, y, z, if PS = 8, SR = 10.



- (iii) In the given figure,  $\triangle ABC$  is an isosceles triangle with perimeter 44 cm. The base BC is of length 12 cm. Sides AB and AC are congruent. A circle touches the three sides as shown. Find the length of tangent segment from AS to the circle.



- (iv) In the given figure, Chord AB of the circle is parallel to the tangent at C. Prove that AC = BC.



- (v) Prove that :  $\frac{\sin \theta + \tan \theta}{\cos \theta} = \tan \theta (1 + \sec \theta)$ .

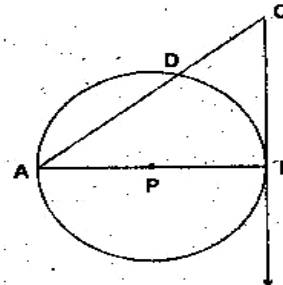
- (vi) G (-4, -7) is the centroid of  $\triangle ABC$ , where A  $\equiv$  (-1, -7) and B  $\equiv$  (3, 5). Find the coordinates of C.

**Q: 4 : Solve any three sub-questions :**

**(12)**

- (i) If a line divides two sides of a triangle in the same ratio, then the line is parallel to the third side. Prove it.  
 (ii) Adjacent sides of a parallelogram are 11 cm and 17 cm. Its one diagonal is 26 m. Find its other diagonal.

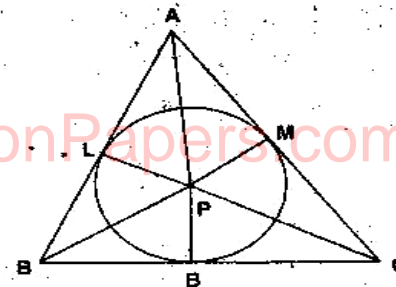
- (iii) In the figure, AB is the diameter of the circle with centre P. Line CB is a tangent and line ADC is a secant. Prove that  $AC \times AD = 4 (\text{radius})^2$ .



- (iv) Oil tins of cuboidal shape are made from a metallic sheet with length 8 m and breadth 4 m. Each tin has dimensions  $60 \times 40 \times 20$  in cm and is open from the top. Find the number of such tins that can be made.

- (v) The inscribed circle of  $\triangle ABC$  touches side AB at L, side BC at M and side AC at N. Prove that

$A(\triangle ABC) = \frac{1}{2} (\text{perimeter of } \triangle ABC \times \text{radius of inscribed circle.})$



(vi) In  $\Delta ABC$ ,  $BC = 5.8$  cm,  $BP \perp AC$ ,  $CQ \perp AB$ ,  $BP = 5$  cm,  $CQ = 4.8$  cm. Construct  $\Delta ABC$  (Do not write construction)

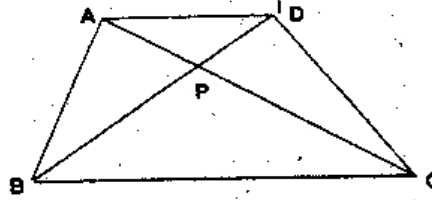
**Q. 5 : Solve any three sub-questions :**

(12)

(i) In  $\square ABCD$ , side  $BC \parallel$  side  $AD$ . Diagonals  $AC$  and  $BD$  intersect each

other at the point  $P$ . If  $AP = \frac{1}{3} AC$ ,

then prove that  $DP = \frac{1}{2} BP$ .



(ii) Prove that the opposite angles of a cyclic quadrilateral are supplementary.

(iii) Draw a circle with centre  $M$  and radius  $2.7$  cm. Take a point  $P$  such that length of seg  $PM$  is  $7.5$  cm. Draw tangents to the circle through  $P$ . Draw a circle that touches the given circle and the tangents. (Do not write construction)

(iv) A tree breaks due to a storm and the broken part bends so that the top of the tree touches the ground making an angle of  $30^\circ$  with the ground. The distance from the foot of the tree to the point where the top touches the ground is  $10$  m. Find the height of the tree.

(v) Plastic drum of a cylindrical shape is made by melting spherical solid plastic balls of radius  $1$  cm. Find the number of balls required to make a drum of thickness  $2$  cm, height  $90$  cm and other radius  $30$  m. (Drum has no lid.)  $(\pi = \frac{22}{7})$

(vi) If  $(-7, 6)$ ,  $(8, 5)$  and  $(2, -2)$  are the midpoints of the sides of triangle, find the coordinates of its centroid.

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