GEOMETRY

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

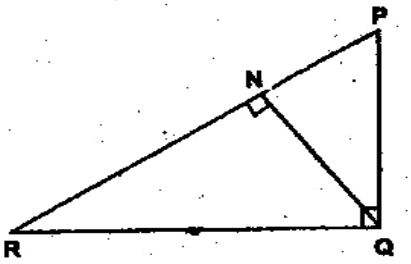
Note : *Please see to Question Paper March 2008.*

Q. 1 : Solve any six sub-questions : **(12)**

(i) Suppose points O, A, B, C, D, E are such that OA = 5 cm, OB = 6 cm, OC = 5 cm, OD = 4 cm, OE = 5 cm. Out of A, B, C, D, E state which points lie on same circle with centre O. Why? Radius of a circle is 5 cm.

(ii) Draw an $\angle ABC$ of measure 100° and bisect it.

(iii) In the given figure $\angle PQR = 90°$,
seg QN ⊥ seg PR, PN = 9, NR = 16. Find QN.

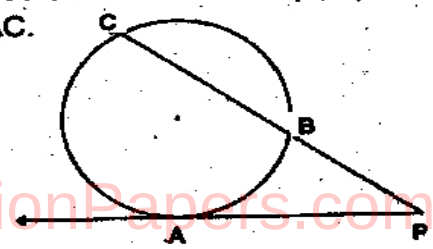


(iv) If $\cos\theta = \frac{4}{5}$, find $\sin\theta$.

(v) Find the distance between the points A and B whose co-ordinates are (5, 8) and (-3, 2).

(vi) $\triangle APQ \sim \triangle ABC$; AP = 6, AB = 15, AQ = 4. Find AC.

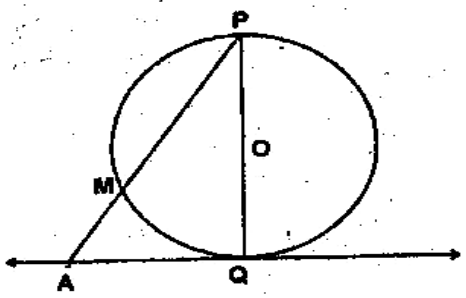
(vii) In the given figure a tangent segment PA touching a circle in A and a secant PBC are shown. If AP = 12 and BP = 10, find PC.



(viii) Find total surface area of a cube with side 6 cm.

Q. 2 : Solve any four sub-questions ; **(12)**

(i) In the figure given below, O is the centre of a circle, seg PQ is diameter, line AQ is a tangent. If OP = 3 and m(arc PM) 120°, determine AP.

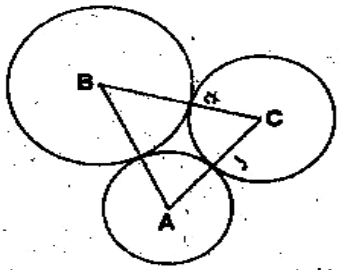


(ii) Find the volume of a cylinder whose radius is 21 cm and height 12 cm. $(\pi = \frac{22}{7})$

(iii) Prove that : $\text{cosec}^2 65 - \tan^2 25 = 1$.

(iv) Side of a rhombus is 10 cm and one of its diagonals is 12 cm. Find the length of the other diagonal.

(v) In the figure given below two circles with centres A, B are touching externally and a circle with centre C touches both externally. Suppose AB = 6 cm, AC = 5 cm, BC = 7 cm. Find the radius of each circle.



(vi) Draw the circumcircle of $\triangle KLM$ such that KL = 6.4 cm, LM = 6.7 cm and $\angle LKM = 65°$.
(Do not write contruction)

Q. 3 : Solve any four sub-questions ; **(12)**

(i) A circle of radius 2 cm touches a circle of radius 10 cm internally. Determine the length of a tangent segment drawn through the centre of the larger circle to the smaller circle.

(ii) Find the ratio in which the point P = (K, 7) divides the joint of A = (8, 9) and B = (1, 2) internally. Also find K.

(iii) $\triangle ABC \sim \triangle PQR$, A ($\triangle$ ABC) = 16 cm² and A ($\triangle$ PQR) = 25 cm². Find $\frac{AB}{PQ}$.

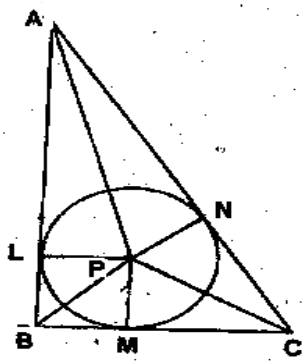
(iv) Prove that angles inscribed in the same arc are congruent.

(v) In $\triangle ABC$, $AB^2 + AC^2 = 122$, BC = 10, find the length of median on side BC.

(vi) Prove $\tan\theta \times \tan(90 - \theta) = 1$.

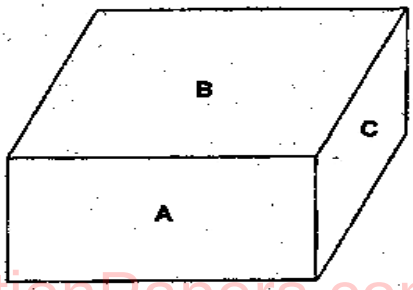
Q. 4 : Solve any three sub-questions : **(12)**

(i) In the figure given below 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) = $\frac{1}{2}$(perimeter of $\triangle$ ABC) × (radius of inscribed circle.)



(ii) Prove : If a line parallel to a side of a triangle intersects other sides in two distinct points then the other sides are divided in the same ratio by it.

(iii) The three faces A, B, C of a cuboid in the following figure have surface area 450 cm², 600 cm² and 300 cm² respectively. Find the volume of the cuboid.



(iv) $\triangle PQR$ is an equilateral triangle. Point S is on side QR such that QS = $\frac{1}{3}$ QR. Prove that $9PS^2 = 7PQ^2$. (Do not write contruction)

(v) Draw $\triangle ABC$ such that $\angle A = 60°$, $\angle B = 70°$, $\angle C = 50°$ and radius of its circumcircle is 3.4 cm. (Do not write contruction)

(vi) In a cyclic quadrilateral show that the sum of the products of the opposite sides is equal to the products of the diagonals.

Q. 5 : Solve any three sub-questions : **(12)**

(i) Construct $\triangle PQR$ such that PQ = 5 cm, QR = 6.2 cm, PR = 6.7 cm. and draw its circumcircle. Draw tangents to circle at P and R without using center. (Do not write contruction)

(ii) Find the coordinates of the circumcentre and radius of circumcircle of ABC if A ≡ (2, 3), B ≡ (4, - 1) and C ≡ (5, 2).

(iii) In $\triangle PQR$, $\angle Q = 2\angle R$. If angle bisector of $\angle Q$ intersects side PR in S, prove that :

$$\frac{QS}{SP} = \frac{QR}{QP}.$$

(iv) A tinmaker converts a cubical metallic box into 10 cylindrical tins. Side of the sube is 50 cm and radius of the cylinder is 7 cm. Find the height of each cylinder so made if the wastage of 12% is incurred in the process. ($\pi = \frac{22}{7}$)

(v) A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle of 60° with the ground. The distance from the foot of the tree to the point where the top touches the ground is 20 m. Find the height of the tree.

(vi) if PAB is a secant to a circle intersecting at points A and B and PT is a tangent at T, then prove that :

$PA \times PB = PT^2$.