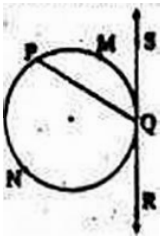
GEOMETRY

Time : 2½ Hours) QUESTION PAPER : OCTOBER-2009 (Max. Marks : 60

1. Solve any six sub - questions : **12**

(i) A circle of radius 6 cm has two tangents AB and CD parallel to each other. What is the distance between these tangents ?

(ii) In the given figure,
m (arc PMQ) = 120°.
Find m∠PQS and m∠PQR.



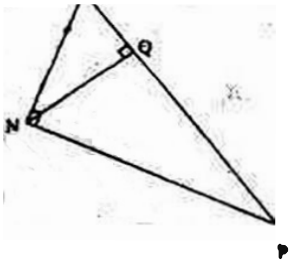
(iii) ΔABC ~ ΔPQR, then

(a) State which ratios of sides are equal to $\frac{AB}{PQ}$.

(b) State which angles are congruent to ∠B and ∠R respectively.

(iv) Find the distance between the points A (0, 0) and B (-5, 12).

(v) In the given figure,
m∠MNP = 90°,
seg NQ ⊥ side MP,
MQ = 4, PQ = 18.
Find NQ.



(vi) Draw a tangent to a circle of radius 3.5 cm at a point P on it. (Do not write the steps of construction.)

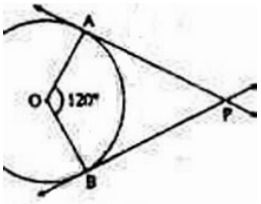
(vii) If cos A = $\frac{3}{5}$, then find the value of sin A.

(viii) The length, breadth and height of a cuboid are 20 cm, 18 cm and 10 cm respectively. Find its volume.

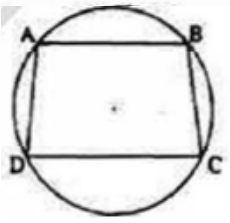
2. Solve *any four* sub-questions : **12**

(i) In ΔABC, $AB^2 + AC^2 = 122$, BC = 10. Find the length of the median on side BC.

(ii) In the given figure, angle between two radii of a circle is 120°. Tangents to the circle are drawn at the outer ends of these radii. Find the measure of the angle between the tangents.



(iii) In the given figure,
□ ABCD is cyclic.
Prove that :
m∠ABC + m∠ADC = 180°



(iv) Draw the circumcircle of ΔABC, such that m∠B = 90°, BC = 5.4 cm, AB = 6 cm. (Do not write the steps of construction.)

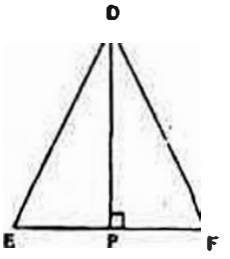
(v) Evaluate: $\text{cosec}^2 67 - \tan^2 23$.

(vi) The volume of a cube is 512 cm^3. Find the total surface area of the cube.

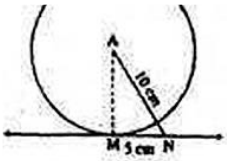
3. Solve *any four* sub-questions : **12**

(i) The sides of the smaller triangle out of two similar triangles are 4, 5 and 6. If the perimeter of a larger triangle is 90, then what are the lengths of the sides of the larger triangle?

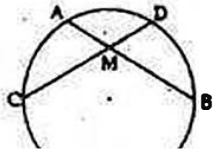
(ii) In the given figure,
ΔDEF is an equilateral triangle.
seg DP ⊥ side EF and E - P - F.
Prove that : $DP^2 = 3EP^2$.



(iii) In the given figure,
A is the centre of the circle,
AN = 10 cm. Line NM is tangent at M.
Determine the radius of
the circle, if MN = 5 cm.



(iv) In the given figure, point M in the interior of the circle, is a point of intersection of two chords AB and CD of the same circle. Show that :
CM x BD = BM x AC.



(v) Show that : $(\sec\theta + \tan\theta)(1 - \sin\theta) = \cos\theta$.

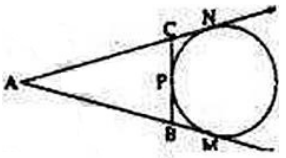
(vi) If A ≡ (6, 8), B ≡ (3, 2) and P divides seg AB internally in the ratio 4 : 3, find the coordinates of P.

4. Solve *any three* sub questions : **12**

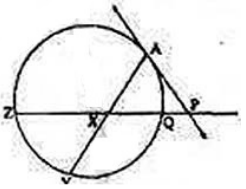
(i) Prove : In a right-angled triangle, the square of the hypotenuse is equal to the sum of the squares of the remaining two sides.

(ii) Construct ΔABC such that BC = 8 cm, m∠BAC = 40° and altitude AD is of length 3 cm. (Do not write the steps of construction.)

(iii) In the given figure, a circle touches side BC of the ΔABC from outside of the triangle at point P. Further extended lines AC and AB are tangents to the circle at N and M respectively. Prove that : AM = ½(Perimeter of ΔABC).



(iv) In the given figure,
line AP is a tangent to the circle at A,
secant through P intersects chord AY
in a point X such that AP = PX = XY.
If PQ = 1 and QZ = 8, find AX.



(v) A road roller of diameter 0.9 m and length 1.8 m is used to press the ground. Find the area of the ground pressed by it in 500 revolutions. (Given : $\pi = 3.14$)

(vi) If the area of two similar triangles are equal, then prove that they are congruent.

5. Solve *any three* sub-questions : **12**

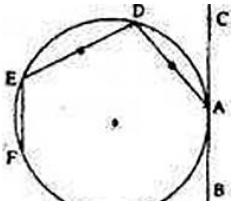
(i) Prove : If a line parallel to a side of a triangle intersects other two sides in two distinct points then the other sides are divided in the same ratio by it.

(ii) G (x, y) is the centroid of ΔABC, where A ≡ (-1, - 7), B ≡ (3, 5) and C ≡ (-14, -19). Find the coordinates of G. Also find the distance between the points B and G.

(iii) 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 metres. Find the height of the tree.

(iv) A cylindrical ice-cream pot of radius 20 cm and height 60 cm is filled completely with ice-cream. It was packaged in ready to sell cones of radius 2 cm and height 10 cm. How many such cones can be filled ?

(v) In the given figure, points B and C
lie on tangent to the circle drawn at point A.
Chord AD ≅ Chord ED.
If m(arc EF) = ½m(arc AD) and m(arc DE) = 84°,
then determine
(a) m∠DAC (b) m∠FDA (c) m∠FED (d) m∠BAF.



(vi) 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 circle and the tangents.
(Do not write the steps of construction.)