BOARD QUESTION PAPER : MARCH 2014
GEOMETRY

**Time: 2 Hours**   **Max. Marks: 40**

Note:
i.   Solve *All* questions. Draw diagrams wherever necessary.
ii.   Use of calculator is not allowed.
iii.   Figures to the right indicate full marks.
iv.   Marks of constructions should be distinct. They should not be rubbed off.
v.   Diagram is essential for the proof of the theorem.

Q.1. Solve any five sub-questions: [5]

i.   In the following figure, RP : PK = 3 : 2, then find the value of A(ΔTRP) : A(ΔTPK)
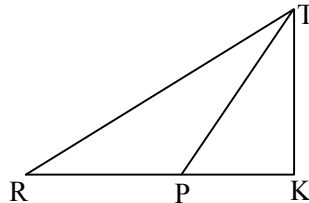

ii.   If two circles with radii 8 cm and 3 cm respectively touch internally, then find the distance between their centres.

iii.   If the angle $\theta = -60°$, find the value of sin θ.

iv.   Find the slope of the line passing through the points A(2, 3) and B(4, 7).

v.   The radius of a circle is 7 cm. Find the circumference of the circle.

vi.   If the sides of a triangle are 6 cm, 8 cm and 10 cm respectively, determine whether the triangle is right angled triangle or not.
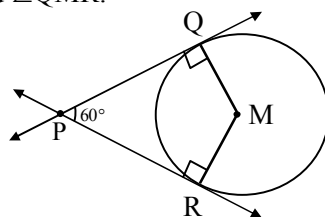
Q.2. Solve any four sub-questions: [8]

i.   In the following figure, ray AD is a bisector of ∠BAC. If AB = 4.8 cm, BD = 4 cm and DC = 5 cm, find the value of *x*.
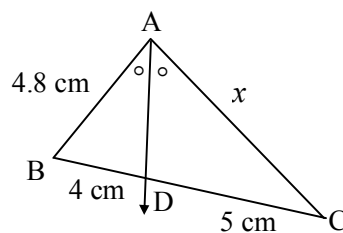
ii.   In the following figure, M is the centre of the circle. PQ and PR are tangents to the circle. If ∠QPR = 60°, find ∠QMR.

iii. Write the equation $3x - 2y - 4 = 0$ in the slope-intercept form. Hence write the slope and y-intercept of the line.

iv. If $\sin \theta = \dfrac{\sqrt{3}}{2}$, where θ is an acute angle, then find the value of $\cos \theta$.

v. If $(5, -2)$ is a point on the line PQ and slope of the line PQ is (2), write the equation of the line PQ.

vi. Draw a tangent at a point 'A' on the circle of radius 3.5 cm and centre P.

Q.3. Solve any three sub-questions: [9]

i. In triangle RST, line $l \parallel$ side ST and line l intersects side RS and side RT in points P and Q respectively. R–P–S and R–Q–T, then prove that:

$$\frac{RP}{PS} = \frac{RQ}{QT}.$$
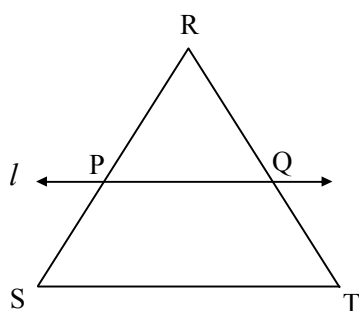
ii. In the following figure, $\triangle ABC$ is an isosceles triangle with perimeter 40 cm. The base AC is of length 10 cm. Side AB and side BC are congruent. A circle touches the three sides as shown in the figure below.

Find the length of the tangent segment from point B to the circle.
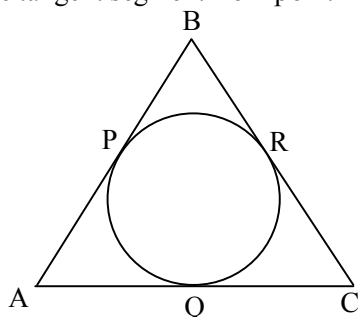
iii. Draw a tangent to the circle with centre 'P' and radius 3.4 cm, from a point Q at a distance of 7.2 cm from the centre of the circle.

iv. Prove that:

$\sec^2 A + \operatorname{cosec}^2 A = \sec^2 A \times \operatorname{cosec}^2 A$.

v. Write the equation of each of the following lines:

1. The line passing through the origin and the point $(-3, 4)$.
2. The line passing through the point $(-3, 5)$ and parallel to X-axis.
3. The X-axis and the Y-axis.

Q.4. Solve any two sub-questions: [8]

i. From the top of a lighthouse, an observer looks at a ship and finds the angle of depression to be 60°. If the height of the lighthouse is 90 metres, then find how far is that ship from the lighthouse? ($\sqrt{3} = 1.73$)

ii. Prove that "the opposite angles of the cyclic quadrilateral are supplementary".

iii. The sum of length, breadth and height of a cuboid is 38 cm and the length of its diagonal is 22 cm. Find the total surface area of the cuboid.

Q.5. Solve any two sub-questions: [10]

i. In triangle ABC, $\angle C = 90°$. Let BC = a, CA = b, AB = c and let 'p' be the length of the perpendicular from 'C' on AB,
Prove that:

1. cp = ab

2. $\dfrac{1}{p^2} = \dfrac{1}{a^2} + \dfrac{1}{b^2}$.

ii. Construct the circumcircle and incircle of an equilateral triangle ABC with side 6 cm and centre O. Find the ratio of radii of circumcircle and incircle.

iii. There are three stair-steps as shown in the figure below. Each stair-step has width 25 cm, height 12 cm and length 50 cm. How many bricks have been used in it, if each brick is 12.5 cm × 6.25 cm × 4 cm?