BOARD QUESTION PAPER : JULY 2015
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.
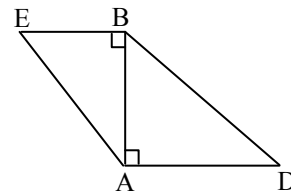v.   Diagram is essential for writing the proof of the theorem.

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

   i.   In the figure drawn alongside,

           seg BE $\perp$ seg AB and seg BA $\perp$ seg AD.

   If BE = 6 and AD = 9, find $\dfrac{A(\triangle ABE)}{A(\triangle BAD)}$.

   ii.   Find the diagonal of a square whose side is 16 cm.

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

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

   v.   If the slope of a line is 2 and *y* intercept is 5, then write the equation of that line.

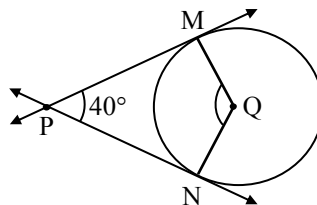   vi.   Find the total surface area of a cube with side 9 cm.

2.   **Solve any four sub-questions:**   **[8]**

   i.   In the given figure, line *l* ∥ side BC, AP = 4, PB = 8, AY = 5 and YC = *x*. Find *x*.
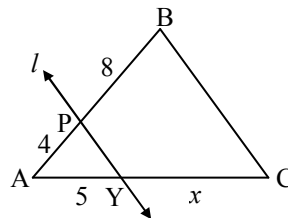
   ii.   In the figure alongside, Q is the centre of a circle and PM, PN are tangent segments to the circle. If $\angle$MPN = 40°, find $\angle$MQN.

   iii.   Draw a tangent at any point R on a circle of radius 3.5 cm and centre P.

   iv.   Draw the figure for an angle in standard position. If the intial arm rotates 220° in the clockwise direction, then state the quadrant in which the terminal arm lies.

   v.   The radius of the base of a right circular cylinder is 3 cm and its height is 7 cm, find the curved surface area.
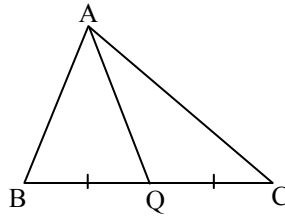
vi.   A sector of a circle with radius 10 cm has central angle 72°. Find the area of the sector.
      $(\pi = 3.14)$

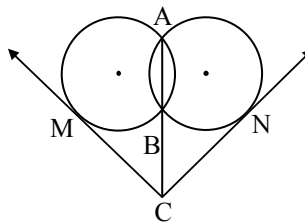3.   **Solve any three sub-questions:** [9]

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

ii. In the figure, two circles intersect each other in points A and B. Seg AB is the chord of both circles. The point C is the exterior point of both the circles on the line AB. From the point C, tangents have been drawn to the circles touching at M and N. Prove that CM = CN.

iii. Draw the circumcircle of ΔPMT in which PM = 5.4 cm, ∠P = 60°, ∠M = 70°.
iv. Show that: $\sec^2\theta + \operatorname{cosec}^2\theta = \sec^2\theta \cdot \operatorname{cosec}^2\theta$.
v.   Find the value of k if (–3, 11), (6, 2) and (k, 4) are collinear points.

4.   **Solve any two sub-questions:** [8]
i.   Prove that "the opposite angles of a cyclic quadrilateral are supplementary".
ii. A ship of height 24 m is sighted from a lighthouse. From the top of the lighthouse, the angles of depression to the top of the mast and base of the ship are 30° and 45° respectively. How far is the ship from the lighthouse? $(\sqrt{3} = 1.73)$
iii. In triangle ABC, the coordinates of vertices A, B and C are (4, 7), (–2, 3) and (0, 1) respectively. Find the equations of the medians passing through the vertices A, B and C.
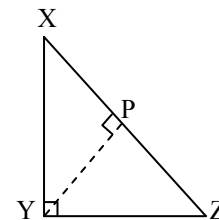
5.   **Solve any two sub-questions:** [10]
i.   In the figure drawn algonside, ΔXYZ is a right triangle, right angled at Y such that YZ = b and A(ΔXYZ) = a.
     If YP ⊥ XZ, then show that
     $$YP = \frac{2ab}{\sqrt{b^4 + 4a^2}}$$

ii. ΔABC ~ ΔLMN. In ΔABC, AB = 5.1 cm, ∠B = 55°, ∠C = 65° and $\dfrac{AC}{LN} = \dfrac{3}{5}$, then construct ΔLMN.

iii. An ink container of cylindrical shape is filled with ink upto 71%. Ball pen refills of length 12 cm and inner diameter 2 mm are filled upto 84%. If the height and radius of the ink container are 14 cm and 6 cm respectively, find the number of refills that can be filled with this ink.