CHAPTER FOURTEEN

CONSTRUCTION

(Q1) Using a ruler and a pair of compasses only,

(a)

(i)   construct triangle ABC with sides |AB| = 7cm, |BC| = 8cm and |AC| = 9cm.

(ii)   draw the perpendicular bisectors of the three sides.

(iii)   locate the point of intersection, O, of the perpendicular bisectors.

(iv)   With centre O and radius OA, draw a circle to pass through the vertices of the triangle.

(b) Measure and write down the radius of the circle you have drawn in (a) (iv).

Soln:
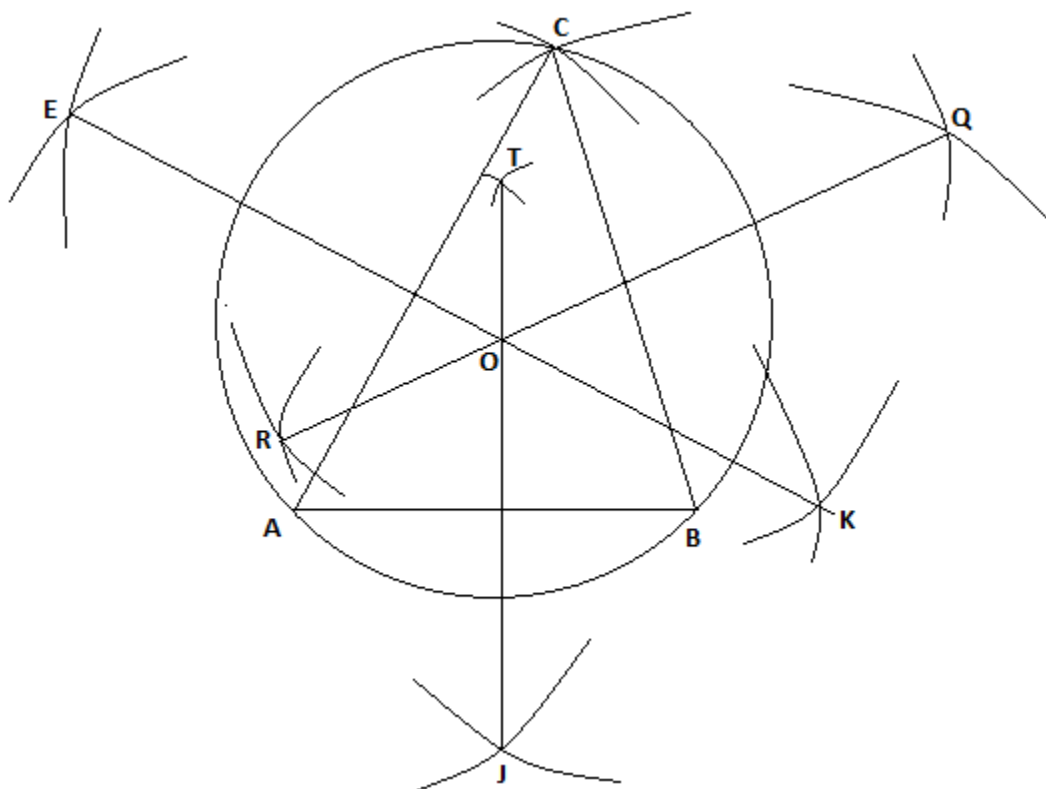
The radius = 4.2cm approx.

N/B:

(1) Given that |AB| = 7cm, |BC| = 8cm and |AC| = 9cm and to locate the point C, first open our compass to a length of 8cm and with the pin at B, draw the first arc. Then with a length of 9cm and the pin at A, draw the second arc. The point of intersection of these two arcs will be the point C.

(2) (i) To draw the perpendicular bisector of AC, position the pin at A and then at C, and draw two arcs to meet at the point M.

(ii) With the same length and the pin at A and then at C, draw two other arcs to meet at K.
(iii) Finally draw a straight line through the points M and K.

(3) (i) To construct the perpendicular bisector of CB, position the pin at C and then at B, and draw two arcs to meet at Q.
(ii) Using the same length and positions, draw two arcs to meet at R.
(iii) The bisector is the line drawn to pass through the points R and Q.

(4) (i) With the pin positioned at A and then at B, draw two arcs to meet at T.
(ii) Using the same length and positions, draw two other arcs to meet at the point J.
(iii) The bisector is the line drawn through these points T and J.

(Q2) Using a ruler and a pair of compasses only, construct

(a)
(i)   triangle XYZ with |XY| = 7cm, |YZ| = 12cm and |XZ| = 8cm.
(ii)   the perpendicular bisector of line XZ.

(b)
(i)   Label the point of intersection of the two bisectors as T.
(ii)   With Point Tas centre, draw a circle of radius 4.7cm.

(c) Measure   (i) |TX|
(iii)   angle XYZ.

Soln:
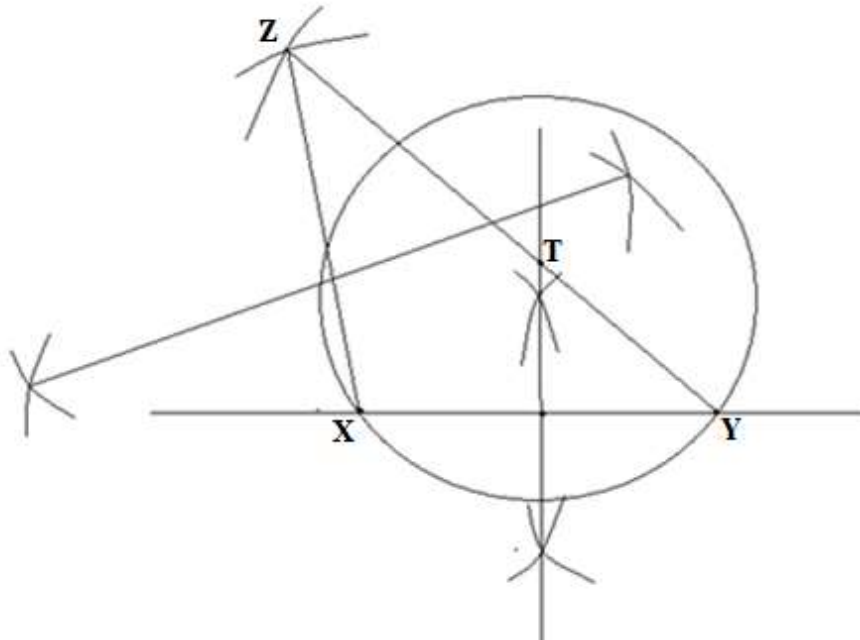
N/B:(i) Since |XY|| =7cm, |YZ| = 12 and |XZ| = 8cm, first with a length of 12cm and the pin positioned at Y, draw the first arc.

(ii) With a length of 8cm and the pin now positioned at X, draw the second arc to cut the first one.

(iii) The point of intersection of these two arcs is the point Z.

(Q3) Using a ruler and a pair of compasses only,

(i)   construct triangle PQR with length PQ = 10cm, angle QPR = 45^0 and angle PQR = 60^0.
(ii)   construct the perpendicular bisector of PR and RT to meet at T.
(iii)   Measure the length of TP.

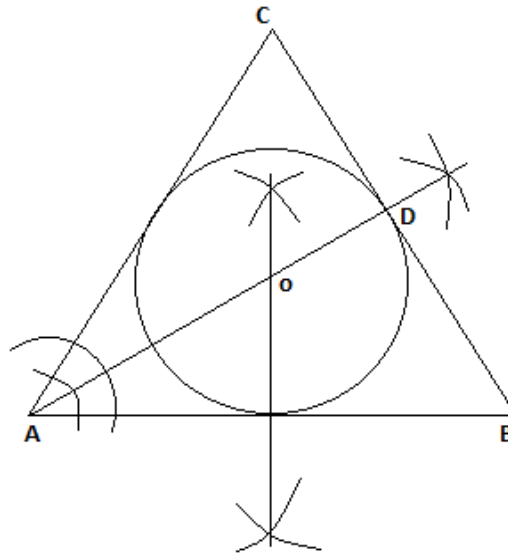Soln:
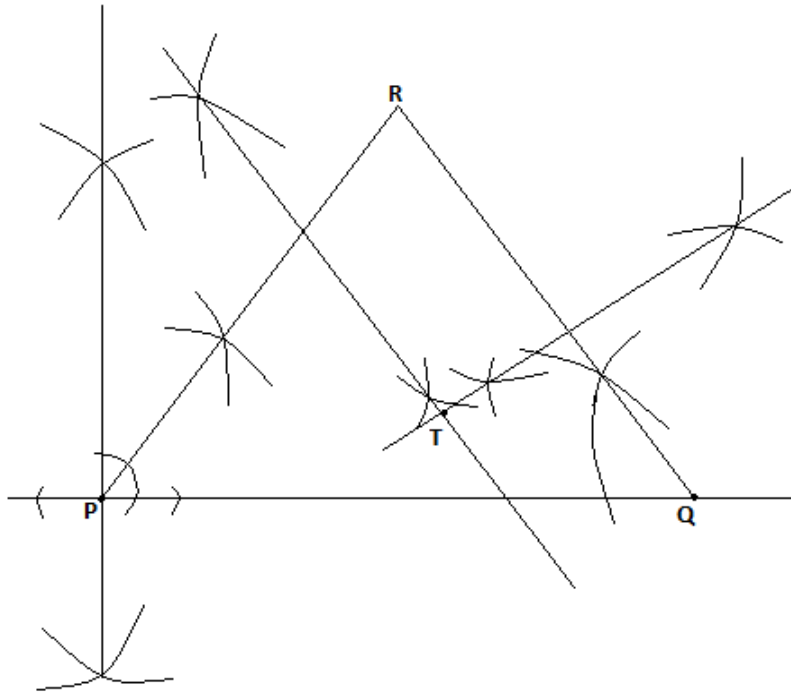
(Q4)(a) Using a ruler and a pair of compasses only,

    (i)   construct triangle ABC such that |AB| = 8cm, |BC| = 8cm and <BAC = 60^0.

    (ii)   What type of triangle is triangle ABC?

 (b) Construct the bisector of <BAC to meet BC at D. Measure AD.

 (c) Construct the perpendicular bisector of AB to meet AD at O.

 (d) Using O as centre and radius OD, draw a circle which touches the three sides of the triangle.
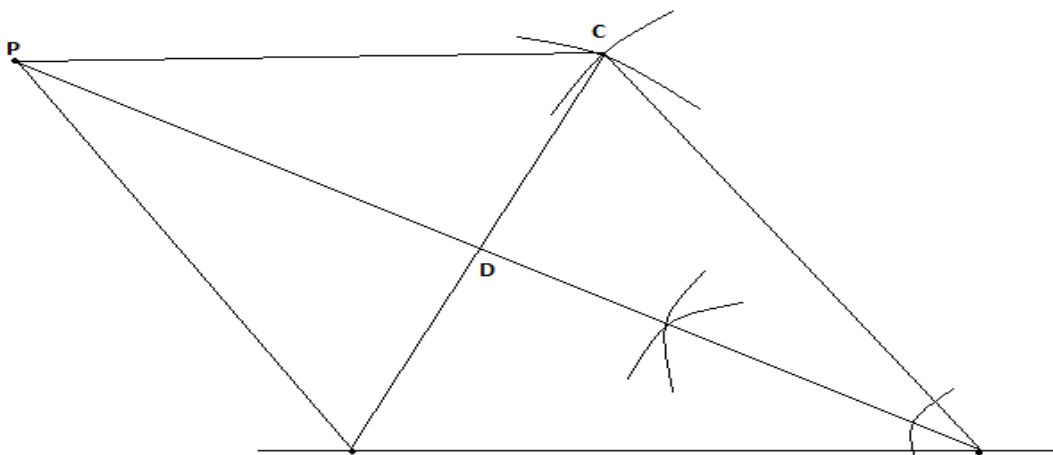
Soln:

N/B:

    (I)   The bisector of <BAC drawn must be extended to meet line CB at D.

    (II)   The compass must be opened to the length OD, before drawing the circle.

(Q5) Using a pair of compasses and draw ruler only,

    (a) construct the triangle ABC with |AB| = 8cm, |BC| = 8cm and |AC| = 7cm.

    (b) Bisect <ABC and let the bisector meet AC at D. Produce |BD| to P such that |BD| = |DP|. Join AP and CP.

    Soln:

N/B:

    (I)   Since ||BD| = |DP| and the length BD = 7cm, then the distance from D to P must also be = 7cm.

    (II)   The perpendicular bisector may also be referred to as the mediator.