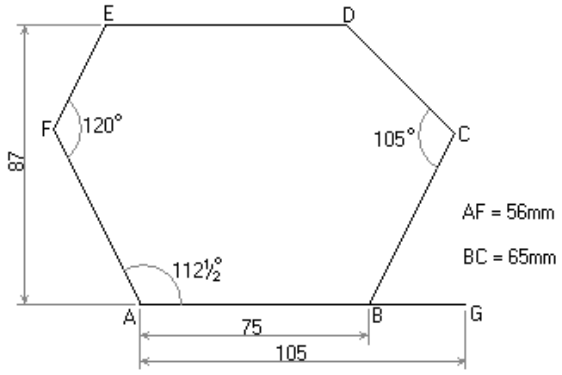
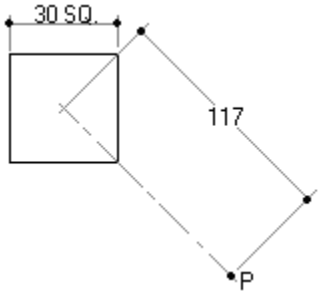
SECTION I – SOLID GEOMETRY

1. Without the use of a protractor, construct the plane figure shown below and transform it into a triangle of equal area.

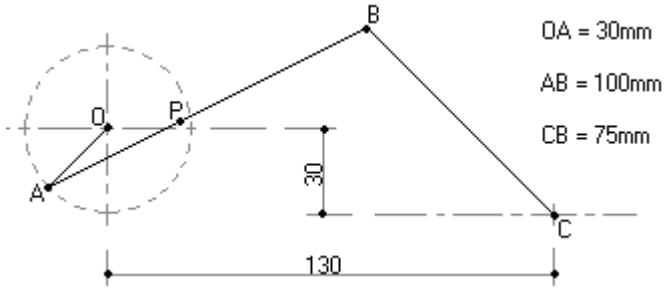


2. Construct a regular pentagon within a circle of 70mm diameter and;
   (i) Enlarge it to a similar figure of ratio of side 2.5 : 1.
   (ii) Reduce it to a similar figure of ratio of side 1 : 2.

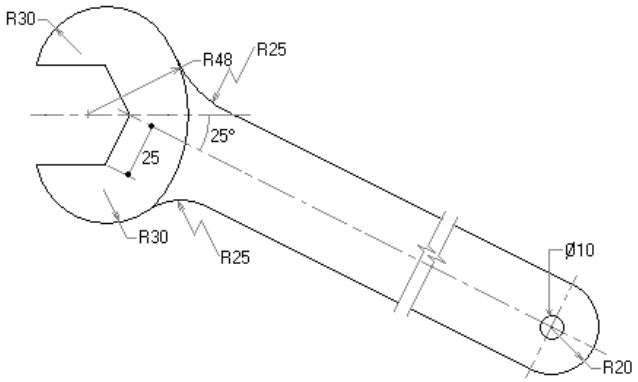
3. Draw an involute of the square given in the figure below and construct a tangent to it at P.



4. The figure below shows a kind of a link mechanism. Crank OA rotates about the fixed centre O whilst crank CB oscillates about the fixed centre C. The lever AB is pin-jointed at both ends.
   (i) Construct the locus of P, which is 60mm from B on the lever AB, for a complete revolution of crank OA.
   (ii) State the total angle of oscillation of crank CB.

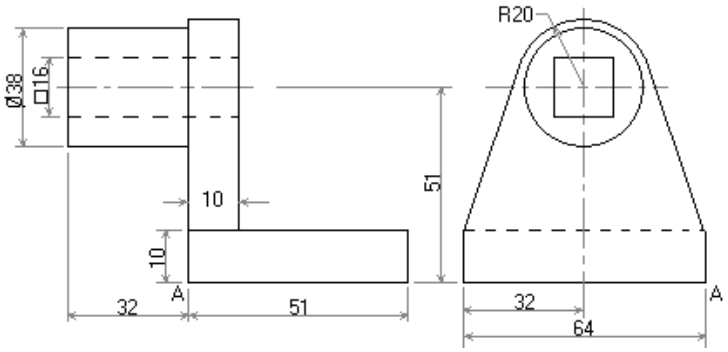


5. The figure below shows a spanner for a hexagonal nut. Draw the spanner showing clearly all construction lines.

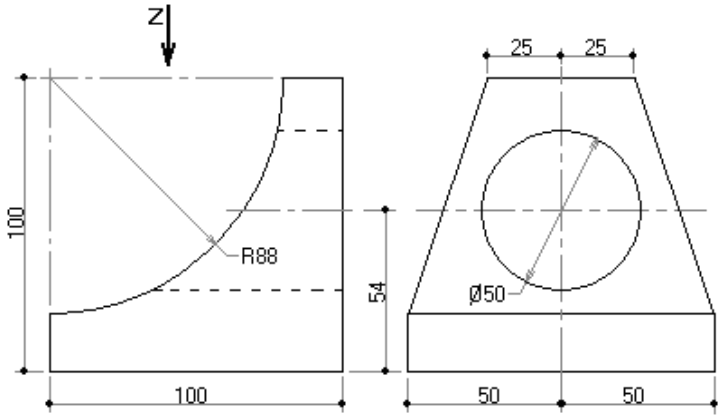


SECTION II – SOLID GEOMETRY.

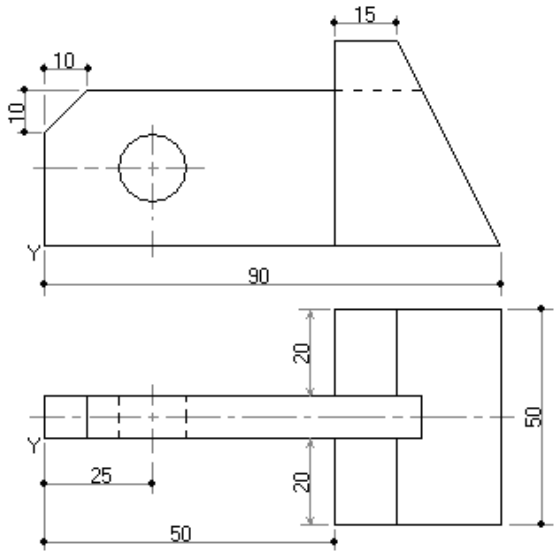
5. The figure below shows two views of a bracket drawn in first angle projection. Draw an isometric view of the bracket making corner A the lowest point. Do not use an isometric scale.



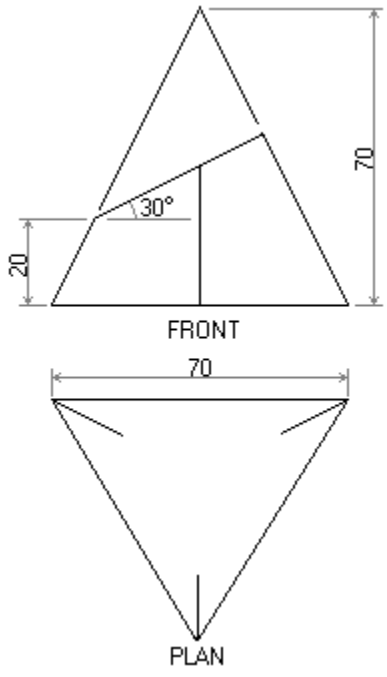
6. Two elevations of a wheel stop are shown in the figure below. Draw full size;
   (a) The given elevations.
   (b) A plan looking in the direction of arrow Z.



7. The figure below shows two views of a bracket. Draw full size an isometric view of the bracket, taking corner Y as the lowest point. Hidden edges are not to be shown.

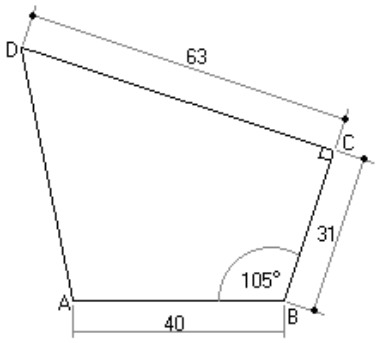


8. The front and incomplete plan views of a triangular base pyramid are given in the figure below.
   (a) Complete plan.
   (b) Project an end view.
   (c) Develop the vertical surfaces.
   (d) Show the true shape of the cut surface.

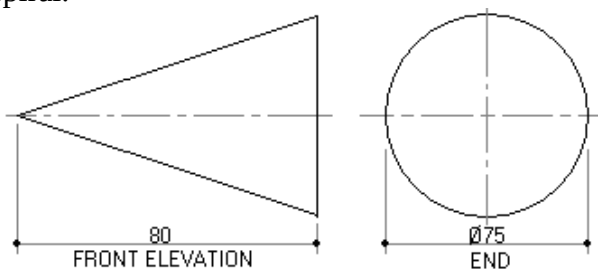


BSSM S.3/TD RECESS PACKAGE

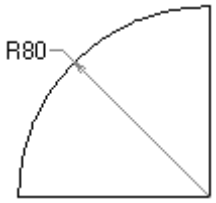
1. The figure below shows a quadrilateral ABCD. Draw a figure similar to the given one but only half its area.



2. The front and end views of a cone are shown in the figure below.
Draw its conical spiral.



3. A quadrant is given in the figure below.
   (i) Draw an inscribed circle of the quadrant.
   (ii) Draw a tangent to pass through any point on this inscribed circle.



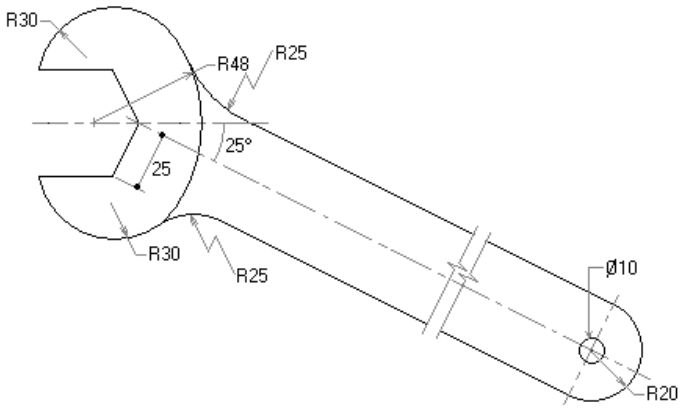
4. The base of a triangle is given as 80mm, the base angle BAC = 80^0 and the sum of the two remaining sides of the triangle is given as 150mm.
   (a) Draw the triangle.
   (b) Divide the triangle into two equal areas.

5. Construct a square of side length 65mm, inscribe four equal circles in this square where each circle touches one side of the square and two other circles.
Measure and state the radius of the inscribed circles.

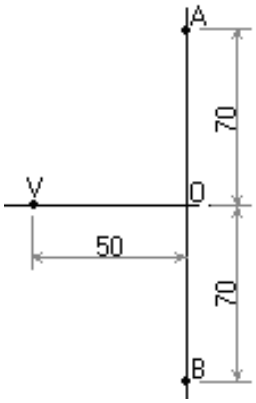
6. Construct a square of side length 65mm, inscribe four equal circles in this square where each circle touches two sides of the square and two other circles.

Measure and state the radius of the inscribed circles.

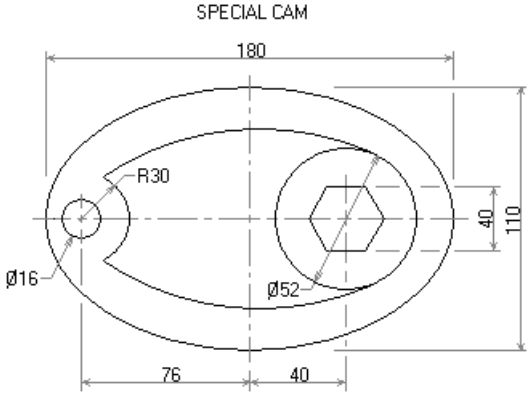
7. The figure below shows a spanner for a hexagonal nut. Draw the spanner showing clearly all construction lines.



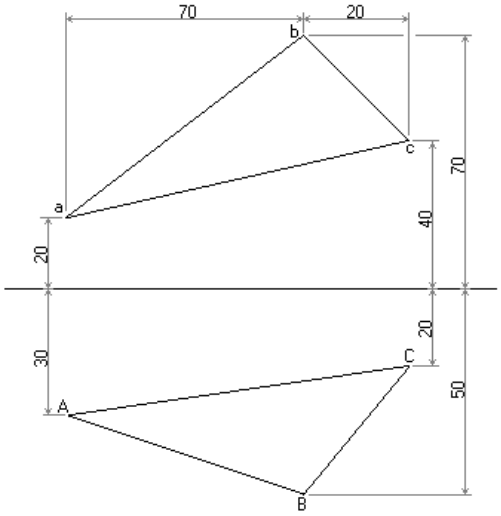
8. The ordinates OA and OB and the vertex V of a parabolic curve are given in the figure below.
   (a) Draw the curve.
   (b) Determine the position of the focus of the curve.
   (c) Draw a tangent to the curve from any point P on it.



9. The figure below shows the features of a special cam. Draw the cam showing clearly how the features have been obtained.



10. The front elevation and plan view of a triangular lamina drawn in first angle projection, are shown in the figure below.
    (a) Draw the given views.
    (b) Determine the true length of the sides of the lamina.
    (c) Draw the true shape of the lamina.
    (d) Measure and state the true lengths and angles of the lamina.



11. Draw the tool handle shown in the figure below showing all construction lines. (25 marks)