AN ROINN OIDEACHAIS

M.115

INTERMEDIATE CERTIFICATE EXAMINATION, 1990

MECHANICAL DRAWING

FRIDAY, 15 JUNE - AFTERNOON, 2.00 to 5.00

400 marks

INSTRUCTIONS

(a) Five questions to be answered; one of these <u>must</u> be question No. 1, Section A. <u>Two</u> must be selected from Section B and <u>two</u> must be selected from Section C.
(b) All questions carry equal marks.
(c) The number of the question must be distinctly marked by the side of each question.
(d) Work on one side of the paper only.
(e) Examination number must be distinctly marked on each sheet of paper used.
(f) All construction lines must be clearly shown.
(g) All measurements are in millimetres.

SECTION A

(This question must be attempted.)
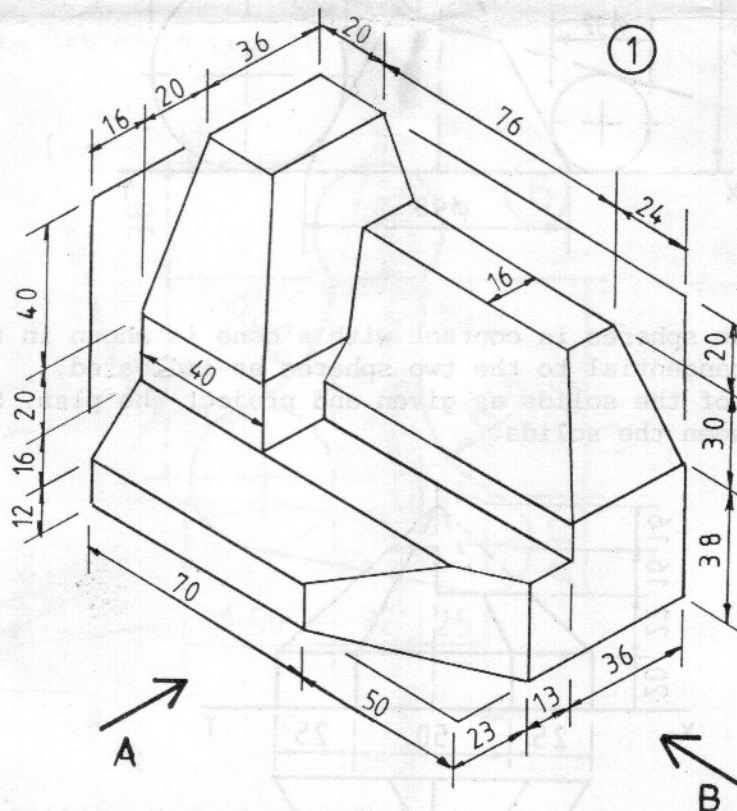
1. A shaped solid is shown in fig. 1. Make a full-size drawing of this solid in orthographic projection showing:-
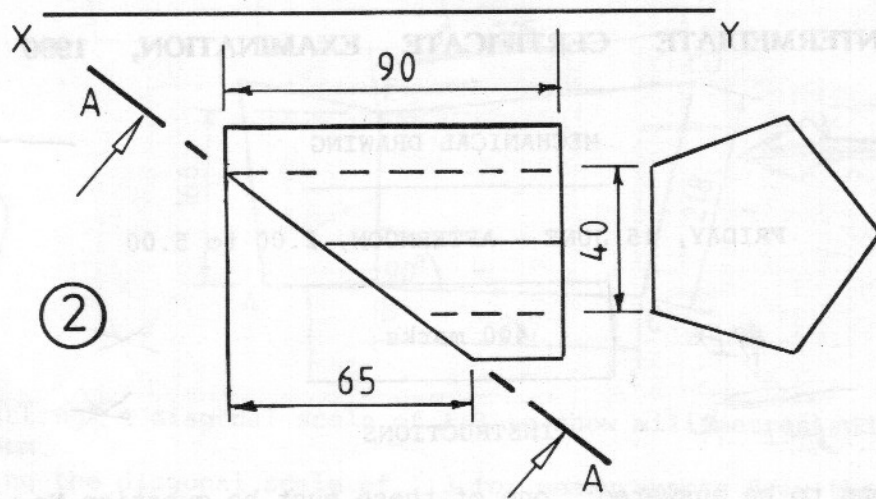
    (i)   An elevation looking in the direction of arrow A.
    (ii) An end-view looking in the direction of arrow B.
    (iii) A plan projected from (i) above.
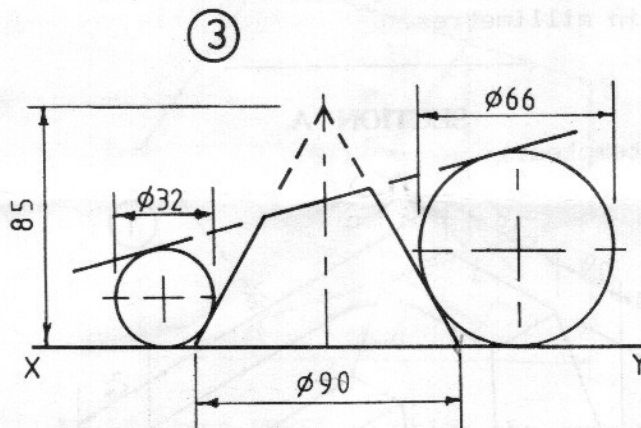   First ~~of~~ Third Angle projection may be used.

<center>OR</center>

<div align="right">Over→</div>

2. Fig. 2 shows the plan of a regular pentagonal prism which is cut by the
   plane A - A. The cross-section of the prism is also shown.
   (i)   Draw the cross-section and complete the plan as given.
   (ii) Project the elevation of the cut prism.
   (iii) Project a sectional elevation of the cut prism when <u>viewed in the
         direction of the arrows.</u>

3. The elevation of two spheres in contact with a cone is shown in fig.3. The cone
   is cut by a plane tangential to the two spheres as indicated.
   Draw the elevation of the solids as given and project the plan. Show the
   contact points between the solids.
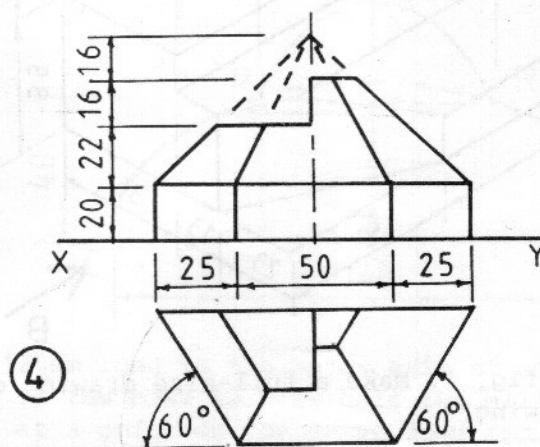
4. The elevation and plan of a solid are shown in fig.4.
   (i) Draw the elevation and plan of the solid to the given dimensions.
   (ii) Draw the development of all the surfaces of this solid.

⑤
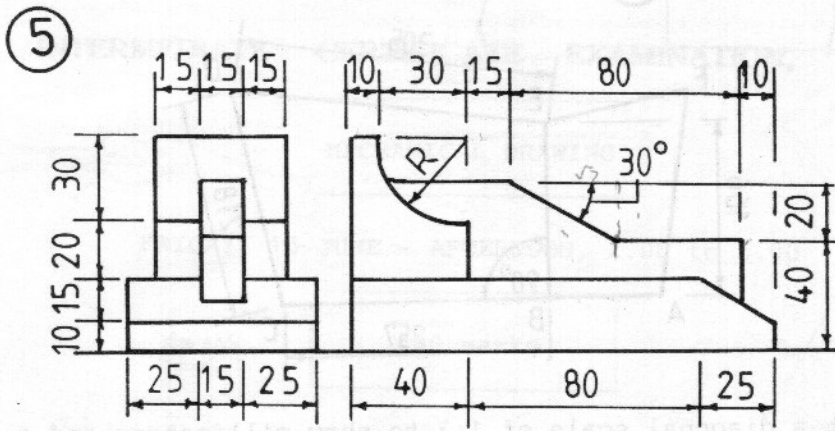
5. Fig.5 shows the elevation and end-view of a shaped solid.

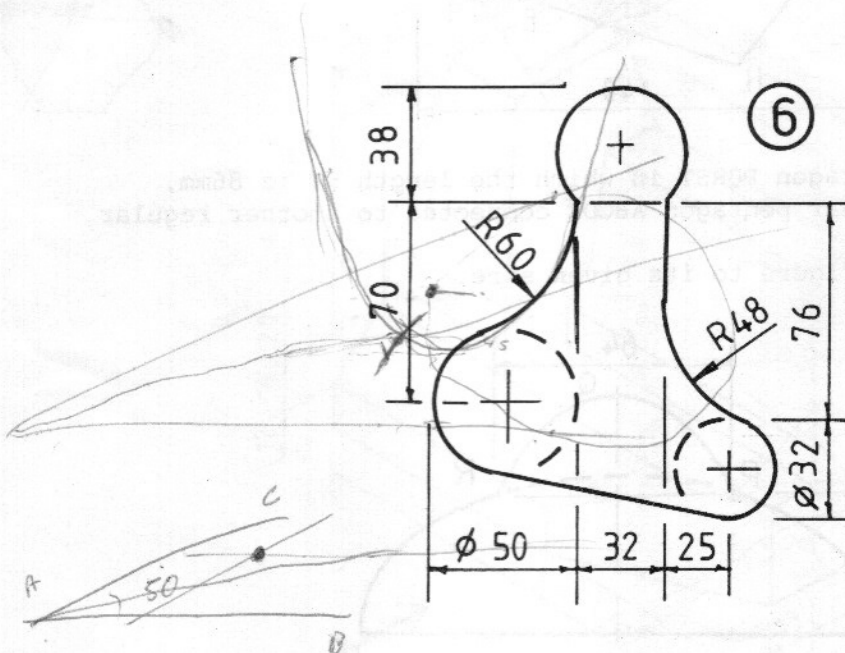   (a) Make a full-size drawing in <u>ISOMETRIC</u> projection of this solid.

                              <u>or</u>

   (b) Using the isometric grid-paper provided make a neat well-proportioned
        <u>FREEHAND</u> sketch of the solid shown in fig.5. Insert six dimensions on the
   sketch.

SECTION C

(<u>Two</u> questions to be attempted from this section)

6. (a) Draw the outline shown in fig.6 showing clearly how the centres for the
        arcs and the tangency points are obtained.

   (b) Two lines AB and AC intersect at A and form an angle of 50°. Draw this
        angle and locate a point P which will be 45mm from line AB and 15mm from
        line AC.
   Draw a circle which will pass through P and be tangential to lines AB and
        AC.

                                                              Over→

Fig. 7

Dimensions: 305, 166, 218, 257, 90°
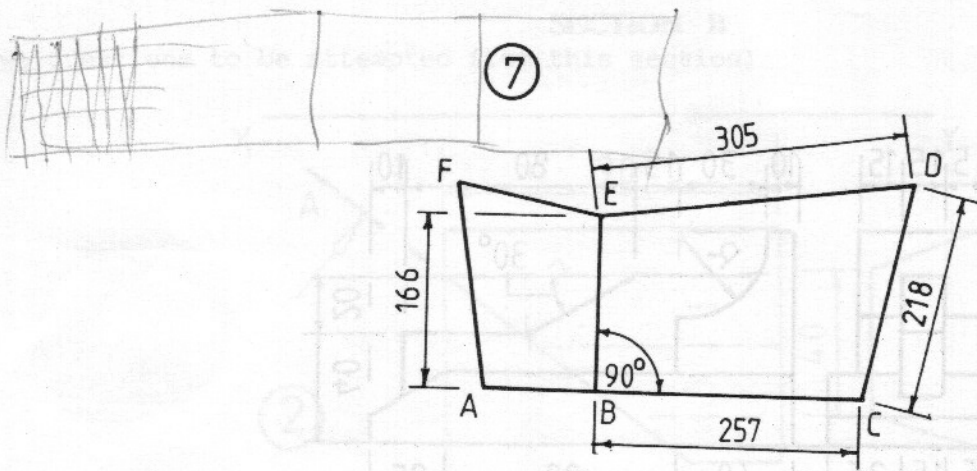
7. **(a)** Construct a diagonal scale of 1:3 to show millimetres and to read up to 400mm.

(b) Using the diagonal scale of 1:3 for measurements draw the quadrilateral BCDE shown in fig.7.

(c) The quadrilateral ABEF in fig.7 is similar to quadrilateral BCDE. Draw the quadrilateral ABEF in its given position showing clearly how to determine the lengths of the sides AB, EF and AF.

Fig. 8

Dimension: 140
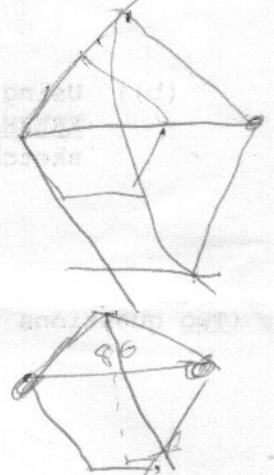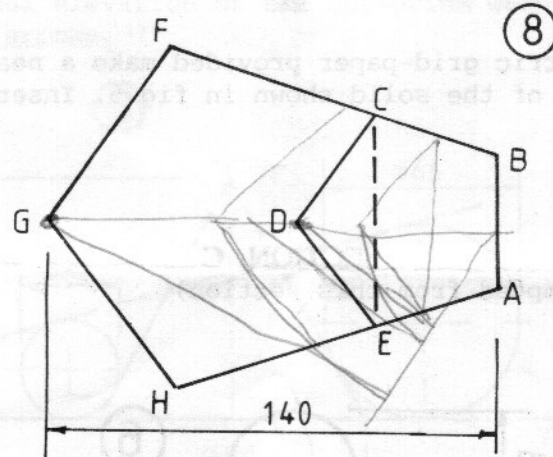
8. **(a)** Draw a regular pentagon PQRST in which the length RT is 86mm.

(b) Fig.8 shows a regular pentagon ABCDE connected to another regular pentagon ECFGH.

Draw the complete figure to its given size.

Fig. 9

Dimensions: 64, 40, 140
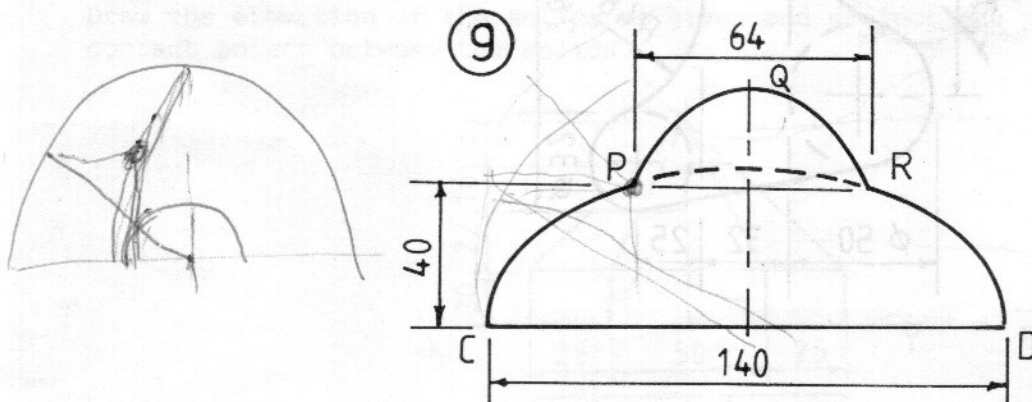
9. **(a)** A line AB 120mm long is the major axis of an ellipse. The minor axis is 90mm long. On the base AB draw half the ellipse and construct the tangent and normal at a point on the curve 35mm from A.

(b) The design shown in fig.9 is based on a semi-ellipse with major axis CD. The curve PQR is also portion of the same elliptical curve. Draw this design showing clearly how the minor axis is found and how the points on the curve PQR are obtained.