4

Inter. Mechanical Drawing

## INTERMEDIATE CERTIFICATE EXAMINATION, 1991

MECHANICAL DRAWING

THURSDAY, 13 JUNE - AFTERNOON, 2.00 to 5.00

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400 marks

INSTRUCTIONS

(a) Five questions to be answered; one of these must be question No. 1, Section A. Two must be selected from Section B and two 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)
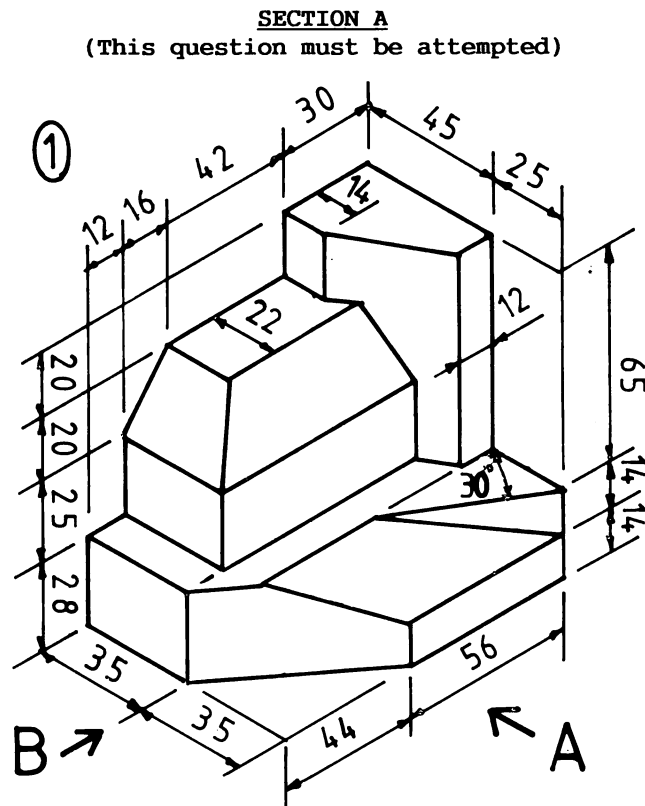
1. A shaped solid is shown in Fig. 1. Make a full-size drawing of this solid in orthographic projection showing:-
    (i)   An elevation looking in the direction of arrow A.
    (ii) An end-view looking in the direction of arrow B.
    (iii) A plan projected from (i) above.
   First or third angle projection may be used.

2. Fig. 2. shows the plan of a regular pentagonal pyramid standing on the horizontal plane and which is cut by the plane A-A. The altitude of the pyramid is 55mm.

(i) Draw the plan of the cut pyramid.

(ii) Project the elevation of the cut pyramid.

(iii) Project a <u>sectional elevation</u> of the cut pyramid when viewed in the direction of the arrows.
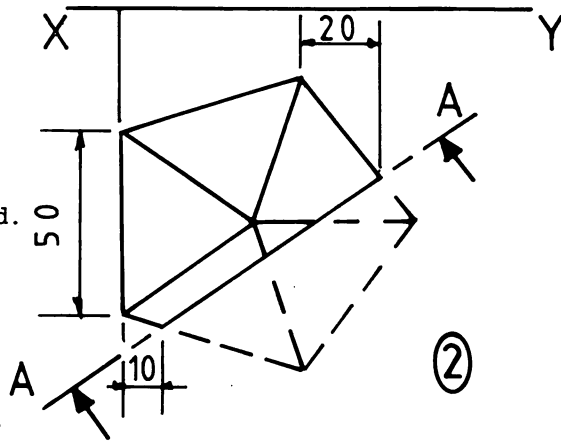
3. A shaped solid is shown in elevation, plan and end-view in Fig. 3. The solid has a square hole as indicated.

(a) Make a full-size drawing in <u>isometric</u> projection of the solid shown in Fig. 3.
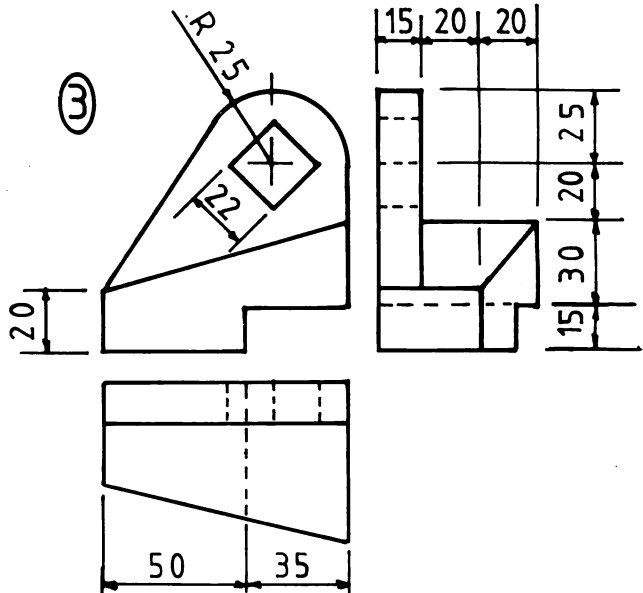
<u>OR</u>

(b) Using the isometric grid-paper provided make a neat well-proportioned <u>FREEHAND</u> sketch of the solid shown in Fig. 3. Insert six dimensions on the sketch.

4. A pictorial sketch of a solid is given in Fig. 4.

(i) Draw the elevation, plan and end-view of the solid.

(ii) Draw the development of all the surfaces of this solid.
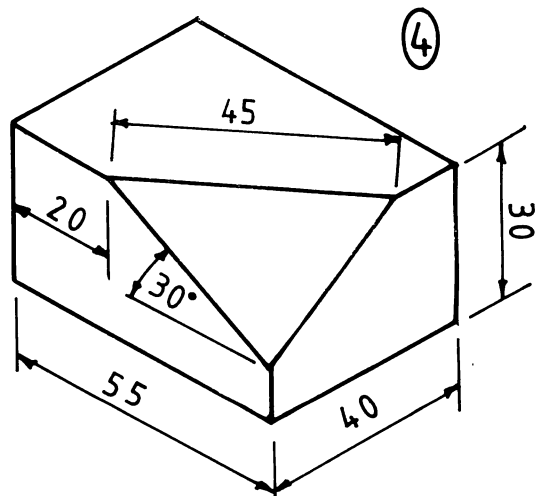
5. Fig. 5. shows the plan of a cone A in contact with a sphere B. The altitude of the cone is 60mm. Both solids rest on the horizontal plane.

    (i)   Draw the plan and project the elevation of the solids showing clearly how to obtain the position for sphere B.
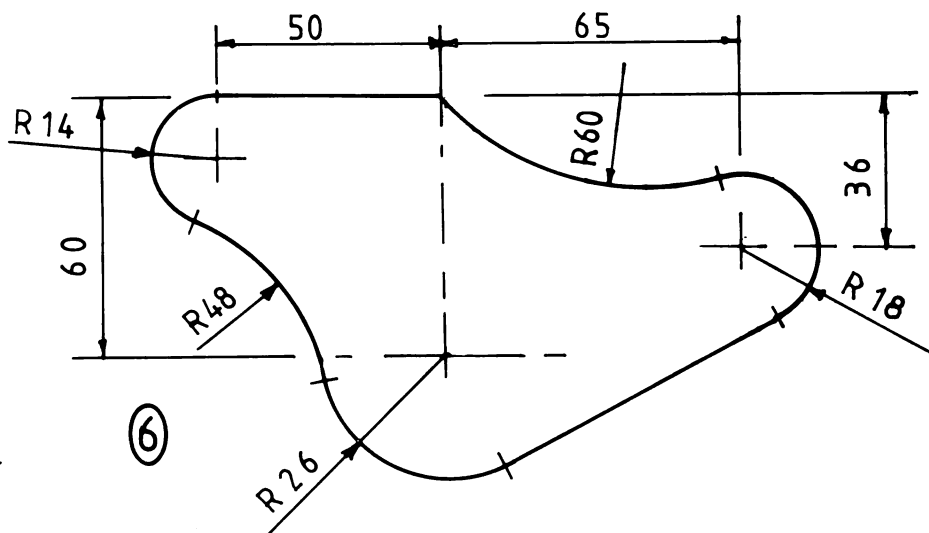
    (ii) Another sphere, diameter 30mm is placed on the horizontal plane in position C so that it is in contact with cone A and sphere B. Draw this sphere in plan and elevation.
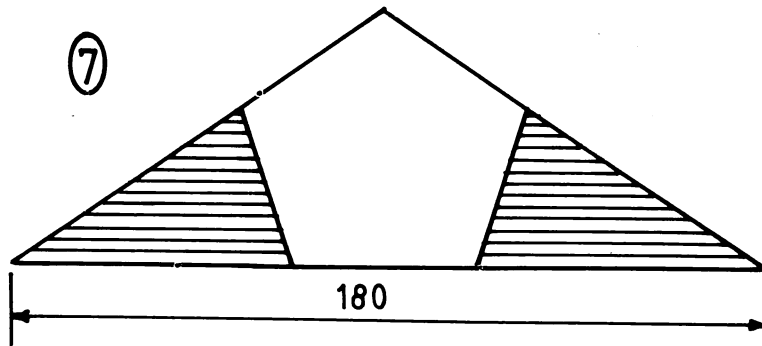
    (iii) Show all contact points in both views.
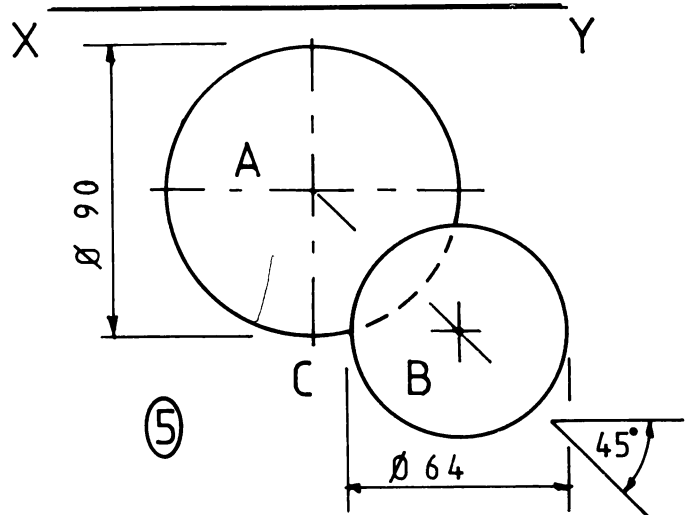
SECTION C

(Two 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) In a circle of 100mm diameter inscribe a triangle in which the sides are in the ratio of 2:3:4.

7. (a) Fig. 7 shows a regular pentagon inscribed in an isosceles triangle. Draw this figure showing clearly how to obtain the length of the side of the pentagon.
   (b) Construct a square which will have an area equal to the sum of the shaded triangles.

8. Fig. 8 contains two similar designs.

   Draw the figure to the given dimensions.
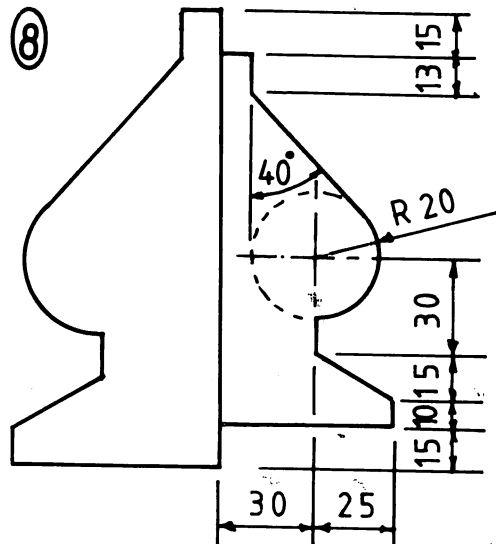
9. (a) The design shown in the circle in Fig. 9 contains a complete ellipse, major axis 120mm, and two similar portions of the same elliptical curve. The minor axis of the ellipse is $\frac{4}{7}$ of the length of the major axis. Draw the design as given.
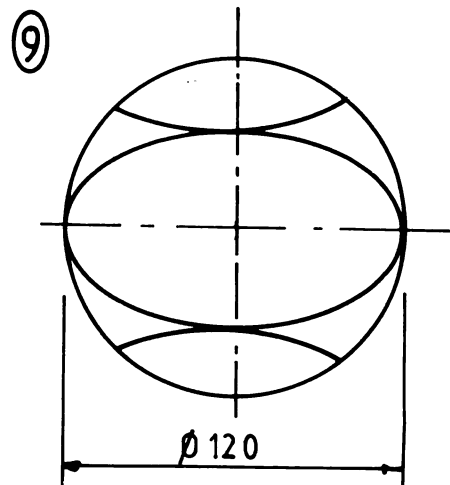
   (b) The minor axis AB of an ellipse is 80mm long. A point P on the curve is 50mm from A and 85mm from B. Draw the minor axis, locate P and determine the length of the major axis. Draw the curve.