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INTERMEDIATE CERTIFICATE EXAMINATION, 1987

MECHANICAL DRAWING

WEDNESDAY, 24 JUNE - MORNING, 9.30 to 12.30

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.)

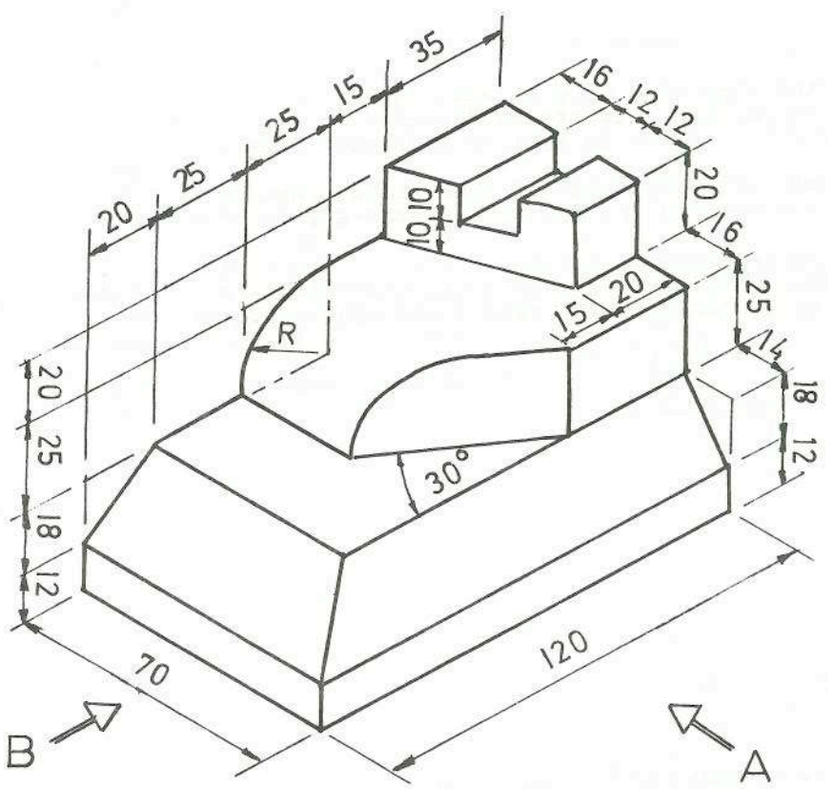

Fig. 1

1. A shaped solid is shown in Fig. 1. Make a full-size drawing of this solid in orthographic projection showing:-

(a) An elevation looking in the direction of arrow A.

(b) An end-view looking in the direction of arrow B.

(c) A plan projected from (a) above.

First or Third angle projection may be used.

OVER→

SECTION B

(Two questions to be attempted from this Section.)

2. The elevation and end-elevation of a cut triangular prism are given in Fig. 2.

   (a) Draw the given views.

   (b) Draw a plan of the cut prism in the position indicated on the drawing.

   (c) From the plan, project a new elevation of the cut prism onto the given X_1 Y_1 line.

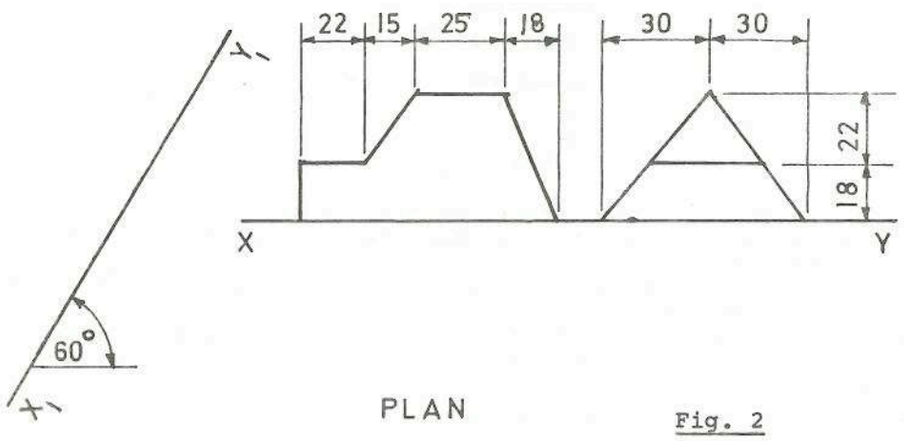

Fig. 2

3. Fig. 3 shows the plan of a cone A, altitude 75 mm and base diameter 80 mm, and a sphere B, diameter 50 mm, resting on the horizontal plane in contact with each other.

   (a) Draw the elevation and plan of both solids showing clearly how to find the centre for sphere B in plan.

   (b) Draw the projections of another sphere C, diameter 32 mm, which will rest on the horizontal plane so that it is in contact with cone A and sphere B.

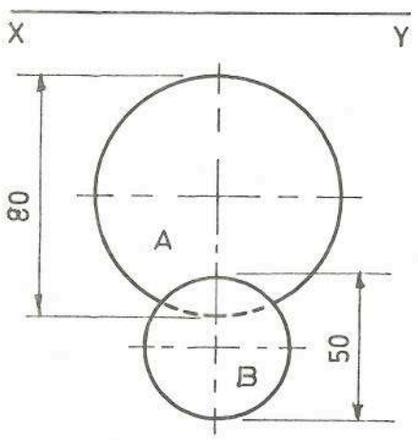

Fig. 3

4. (a) Draw the development of the surfaces of a cylinder, diameter 60 mm and height 45 mm.

   (b) The elevation and plan of a cut cylinder are given in Fig. 4.

   Draw the elevation and plan as given and draw the development of all the surfaces of the solid.

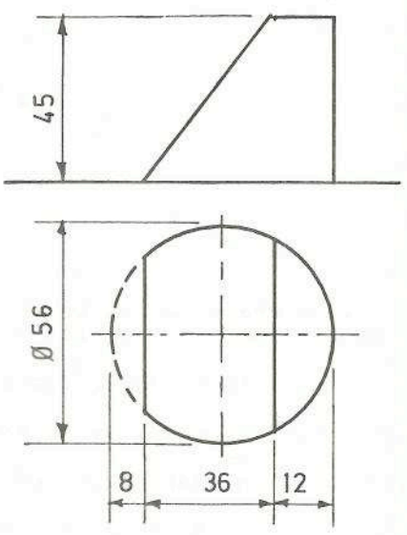

Fig. 4

5. The elevation and end-elevation of a shaped solid are given in Fig. 5.

A. Draw a full size isometric view of this solid.

or

B. Using the isometric grid paper provided make a neat well-proportioned FREEHAND sketch of the solid shown in Fig. 5.

Insert all measurements on the sketch.

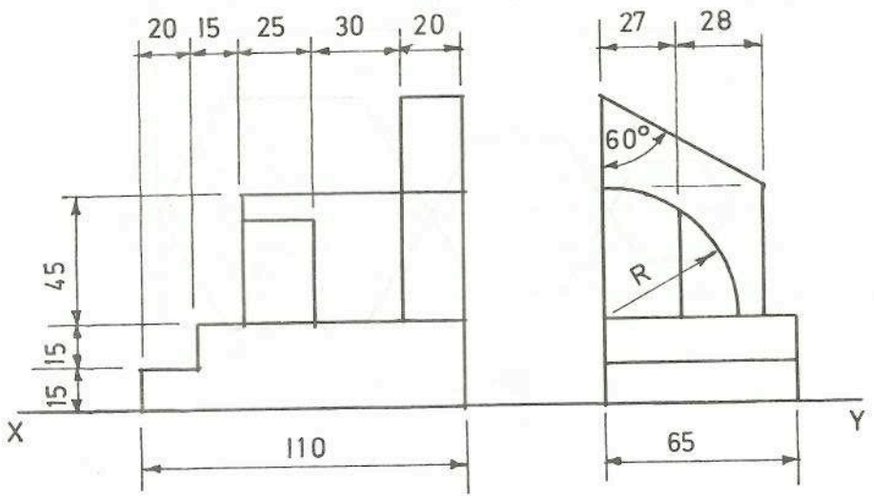

Fig. 5

SECTION C

(Two questions to be attempted from this Section.)

6. (a) Construct a diagonal scale of 1 : 4 which will show millimetres and read up to 400 mm.

(b) Using the above scale for all measurements construct the quadrilateral ABCD shown in Fig. 6. From the scale find the lengths of AD and DC.

(c) Draw a line from D which will divide the area of quadrilateral ABCD into two equal areas.

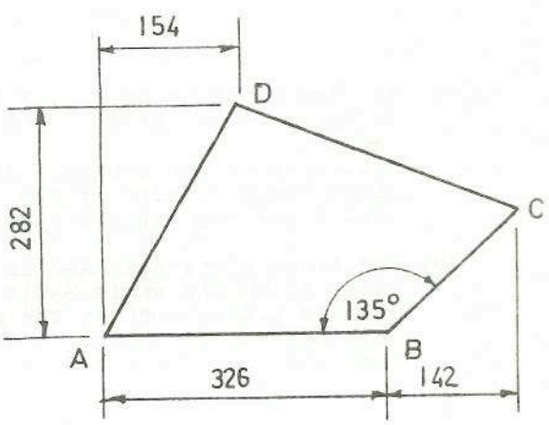

Fig. 6

7. (a) Draw the design shown in Fig. 7 to the given dimensions. Show clearly how to obtain all points of contact for the tangential arcs.

(b) The diagonal of a certain square is 25 mm longer than the length of its side. Draw this square.

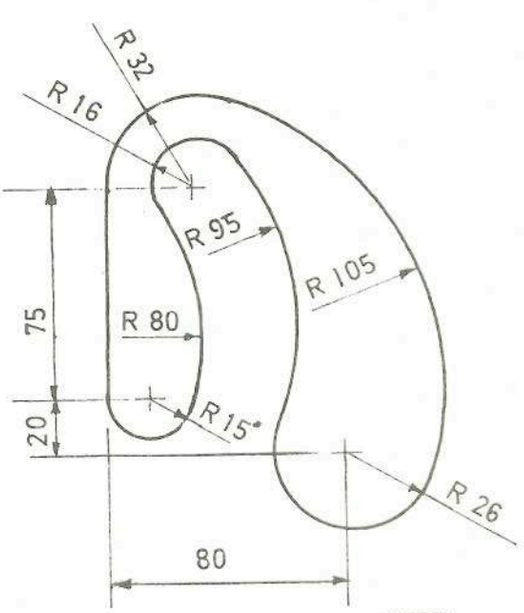

Fig. 7

OVER→

8. (a) Draw a regular hexagon of 50 mm side. Construct a square which will have an area equal to that of the hexagon.

(b) Fig. 8 shows a series of three regular hexagons in which the sides of successive hexagons increase in the ratio of 3 : 2.
Draw the three hexagons, showing clearly how the lengths of the sides are obtained.

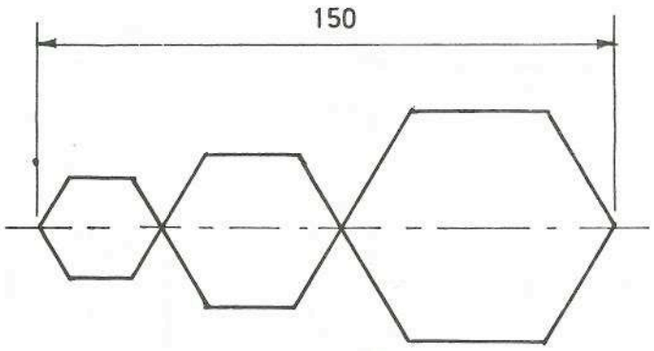

Fig. 8

9. (a) The design shown in Fig. 9 contains an ellipse, major axis 130 mm and minor axis 90 mm.
Draw this design showing clearly how to find the direction of the tangents at P and Q and the centres for the circles.

(b) Construct a triangle ABC in which AB = 85 mm, AC = 45 mm and angle BAC = 105°.
In this triangle BC is the major axis of an ellipse and A a point on the curve.
Find the minor axis and draw half the curve.

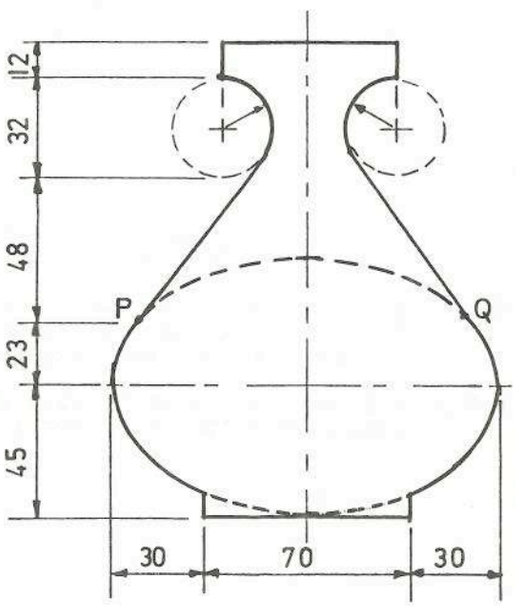

Fig. 9