TECHNICAL DRAWING - HIGHER LEVEL
PAPER II(A) - ENGINEERING APPLICATIONS

5348

MONDAY, 21 JUNE - MORNING, 9.30 to 12.30

200 Marks

INSTRUCTIONS

(a) Answer <u>four</u> questions.
(b) All questions carry equal marks.
(c) Drawings and sketches should be in pencil unless otherwise stated.
(d) Where dimensions are omitted they may be estimated.
(e) Credit will be given for neat orderly presentation of work.
(f) Candidates should work on one side of the paper only.
(g) The Examination Number should be written on each drawing sheet used.
(h) All dimensions are in millimetres.

---

1. A sectional elevation and side view of a Gate Valve are shown in Fig. 1. The drawing shows the valve in the closed position.

   (a) (i) Make a neat freehand sketch of the sectional elevation of the Gate Valve showing the valve in the open position.

   (ii) Identify and neatly label on the sketch the following parts:
   Body, Cap, Gland, Gland nut, Sleeve nut, Spindle, Spring, Stuffing box, Valve (2), Valve seat (2).

   (b) Make a separate neat freehand orthographic sketch of Part 1, Fig. 1. The sketch should contain a plan, sectional elevation and side view and should describe fully the shape of the part.

2. (a) Two equilateral triangular prisms are joined by a transition piece B as shown in Fig. 2.
      (i)   Draw three views of the assembly in third angle projection.
      (ii) Draw the surface development of the transition piece.

   (b) Sketch freehand a pictorial view of the following:
      (i)   A single lap sheetmetal joint.
      (ii) A simple sheetmetal safe edge.
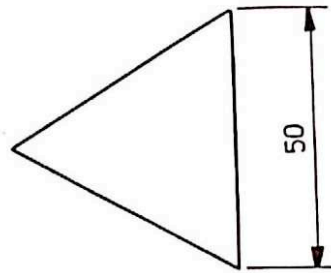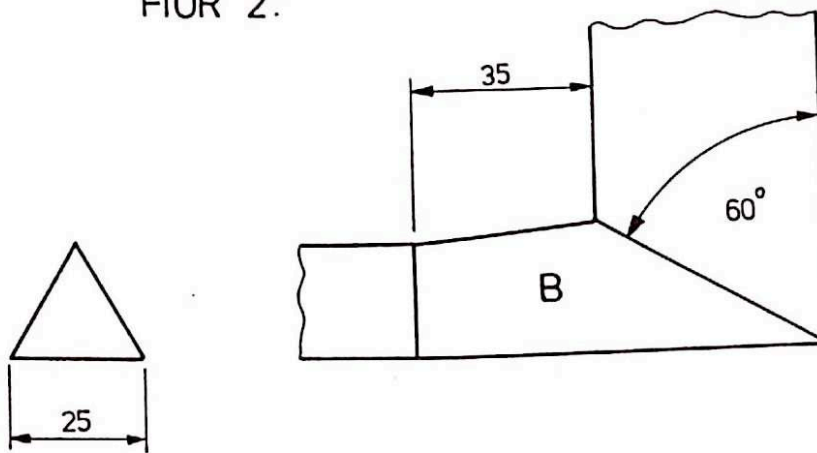   (iii) A method of stiffening sheetmetal.

   4.

FIG. 2.
FÍOR 2.

50

35

60°

B

25

3. The plan and elevation of a crank lever are shown in Fig. 3.

   (a) Draw the given view.
   (b) Draw an auxiliary sectional plan A-A.
   (c) Insert six leading dimensions on the sectional plan, the title CRANK LEVER and the ISO projection symbol.

4. Fig. 4 shows a pin jointed link mechanism. The links AD and BC oscillate about fixed points A and B respectively. CDE forms a rigid triangle pin jointed at C and D.

Draw separately each of the following:

(I) The mechanism when E is at its furthest from A. Dimension the angle BAD on the diagram.
(II) The mechanism when E is nearest to B. Dimension the angle ABC on the diagram.
(III) Draw the locus of the point E as the mechanism moves from (i) to (ii).

E

D

C

AB=100
AD=100
BC = 85
CD =CE=DE=50

FIG. 4.
FIOR 4.

A

B
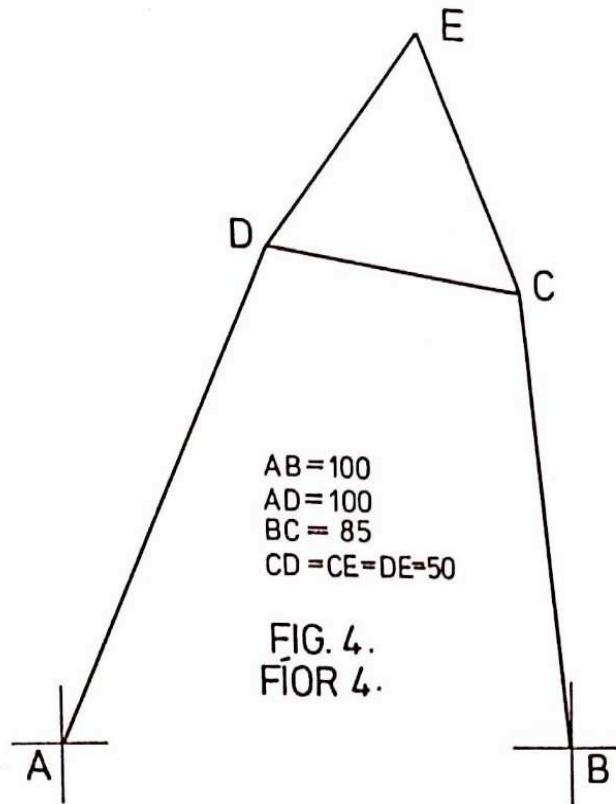
5. (a) Draw the profile and displacement diagram for a cam rotating in an anti-clockwise direction and imparting the following motion to a 24 mm in-line knife edge follower:

0° to 90°	Rise 54 mm with Simple Harmonic Motion.
90° to 135°	Dwell.
135° to 315°	Fall 54 mm with Uniform Acceleration and Retardation.
315° to 360°	Dwell.

The minimum distance between the central axis and the cam edge is 36 mm.

(b) Draw two full threads of a right hand, V-form single start screw thread to the following specifications:

Outside (crest) diameter = 120 mm
Root diameter = 80 mm
Pitch = 24 mm

Hidden detail not required.

OVER->

6.   Answer SECTION A OR SECTION B but not both.

SECTION A

Draw, half full size, an isometric view of the beam to beam connection. The secondary beam to have a welded end plate bolted to the web of the main beam.

Main beam 250 x 150. Flange thickness 10. Web thickness 8. Details of secondary beam and plate are shown in Fig. 6.

The solution should include the following:

(i)   Symbol for site fitted HSFG bolts.
(ii)   Dimension for 8mm all round fillet weld.
(iii)   Title: BEAM TO BEAM CONNECTION.

OR

SECTION B

(a)   With the aid of a sketch and short note explain the following functions used in CAD systems.

(i)   Translating
(ii)   Rotating
(iii)   Duplicating
(iv)   Zooming.

(b)   List four additional automatic facilities offered by CAD systems.

(c)   Complete the following table on your drawing sheet. The first answer has been entered for guidance.
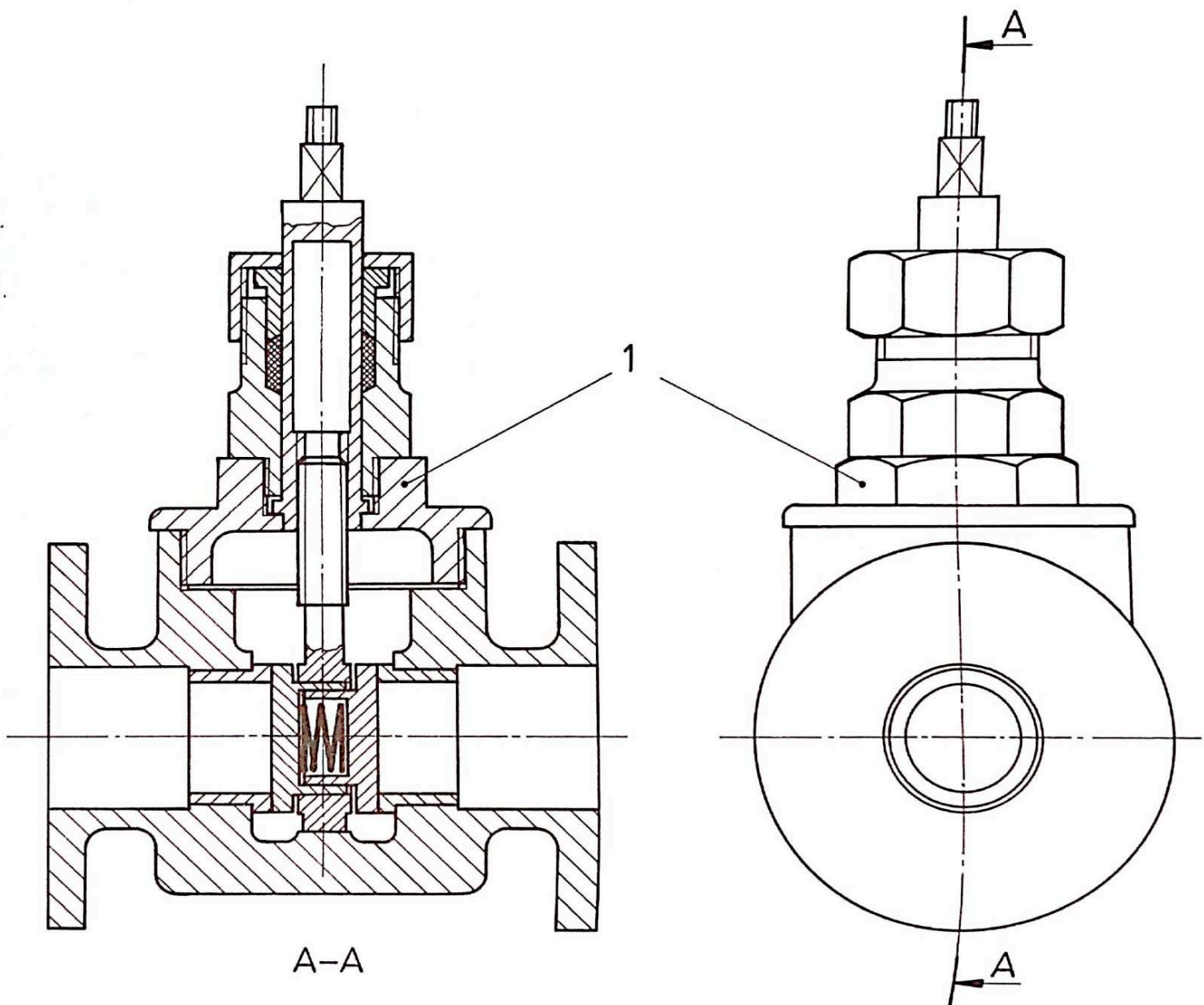
3D Extrusion
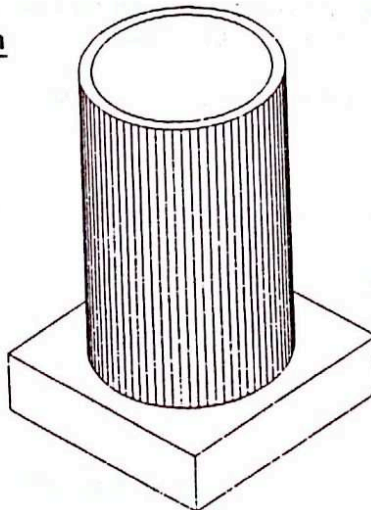
Drawing commands used:

1 Line _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

(d)   What are the terms in which SURFACE MODELLING is defined ?

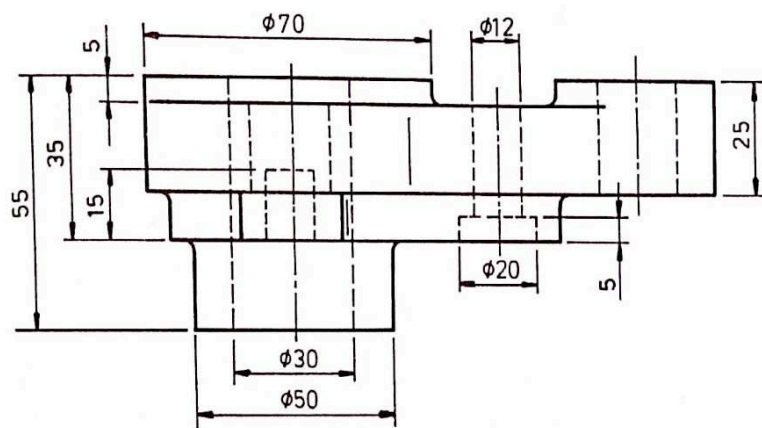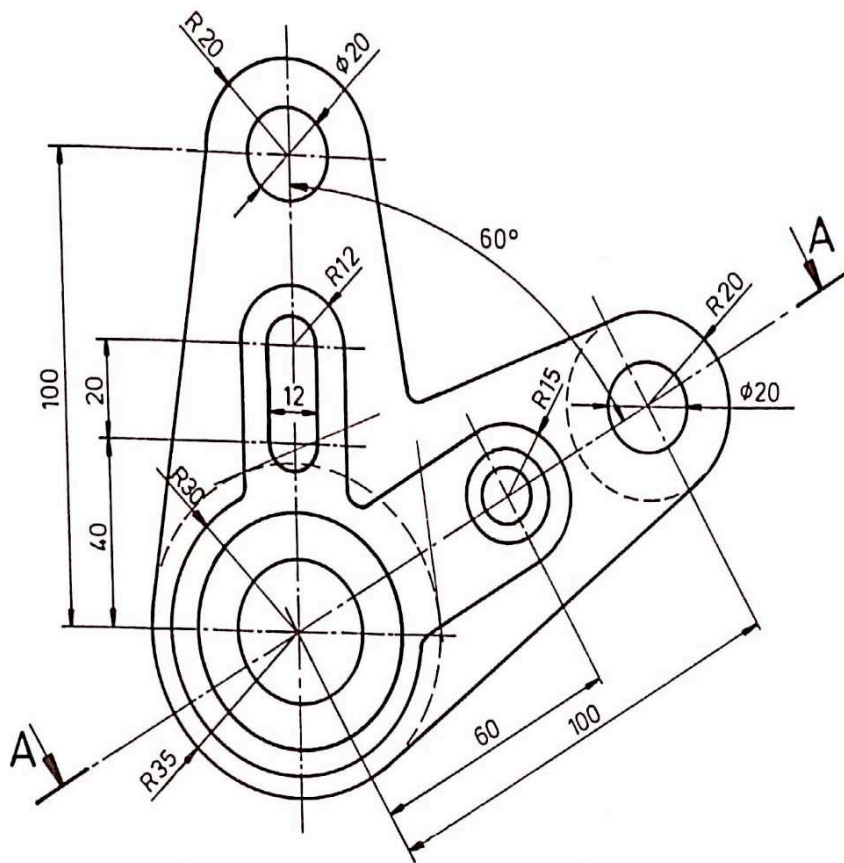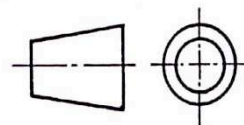**ANSWERS TO BE GIVEN ON DRAWING SHEET.**

FIG. 1.

FÍOR 1.

1

A—A

R20 Φ20 60° A
R12 R20
100 20 Φ20
12 R15
R30 A
40
R35 60 100

Φ70 Φ12
5
35 25
55
15
Φ20
5
Φ30
Φ50

FIG. 3.   FÍOR 3.

130

55

20

200

6

8

FIG. 6.
FÍOR 6.

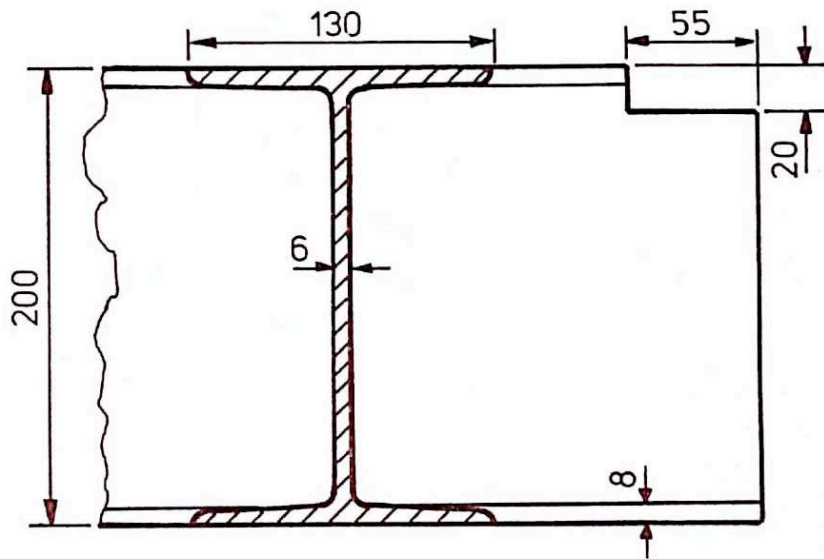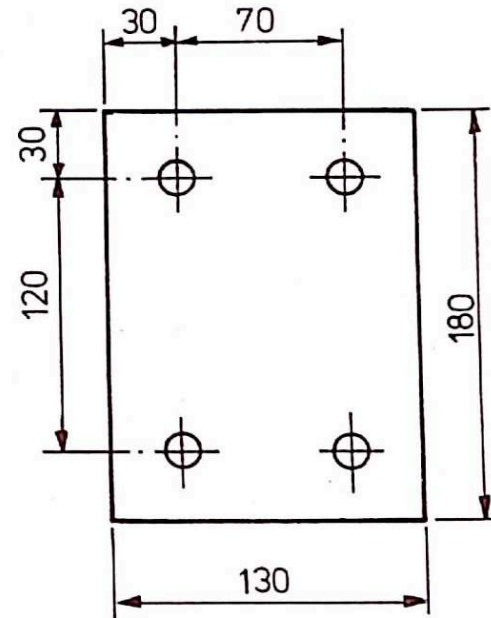4 HOLES 15 DIA.
4 POLL TRSTOMHAS 15

30   70

30

120

180

130

PLATE THICKNESS   20
TIÚS PLÁTA 20