

**LEAVING CERTIFICATE EXAMINATION, 1991**

**TECHNICAL DRAWING - ORDINARY LEVEL**

**PAPER II (A) - ENGINEERING APPLICATIONS**

**200 Marks**

**THURSDAY, 20 JUNE - MORNING 9.30 to 12.30**

**INSTRUCTIONS**

- (a) Answer question 1 and two other questions.
- (b) Drawings and sketches should be in pencil unless otherwise stated.
- (c) Where dimensions are omitted they may be estimated.
- (d) Credit will be given for neat orderly presentation of work.
- (e) Candidates should work on one side of the paper only.
- (f) The Examination Number should be written on each drawing sheet used.
- (g) All dimensions are in millimetres.

1. Details of a **CLAPPER BOX ASSEMBLY** for a shaping machine are given in Fig. 1 with a parts list tabulated below.

INDEX	PART	REQUIRED
1	SLIDE	1
2	BODY	1
3	CLAPPER	1
4	TOOL POST	1
5	PIN	1
6	NUT/STUD	1
7	NUT	1
8	STUD	1

- (a) Make the following drawings of the assembly in first or third angle projection.

- (i) A sectional side elevation on section plane AA.
- (ii) An end elevation viewed in the direction of arrow C.

- (b) Insert the following on the drawing;

- (i) Title: **CLAPPER BOX ASSEMBLY**.
- (ii) ISO projection symbol.
- (iii) Four leading dimensions.

(100 marks)

2. Two incomplete elevations of the joint between a vee trough of 60mm side and a cylindrical pipe are shown in Fig. 2.

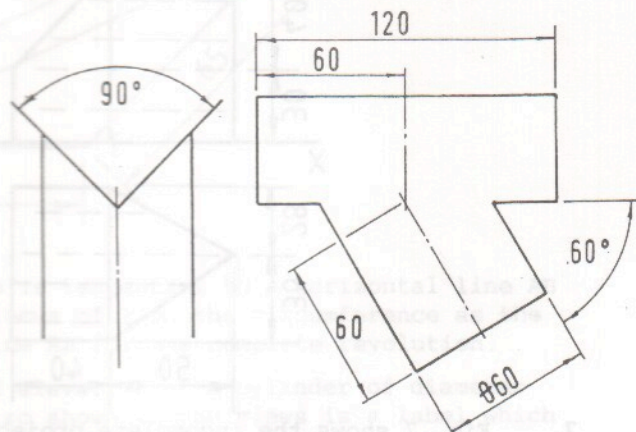
- (a) Draw and complete both elevations.

- (b) Draw the surface development of

- (i) the vee trough
- (ii) the cylindrical pipe.

- (c) Make a large freehand sketch of a suitable safe edge for the vee trough.

FIG. 2 FÍOR 2



(50 marks)

3. (a) Draw a radial cam with a minimum radius of 20mm and anti-clockwise rotation to impart the following motion to an in-line knife edge follower:

- 0° - 90° Rise 40mm with simple harmonic motion.  
 90° - 150° Rise a further 30mm with uniform velocity.  
 150° - 180° Dwell.  
 180° - 360° Fall 70mm with uniform acceleration and retardation.

Include the displacement diagram as part of the solution.

- (b) Fig. 3 shows a pin jointed mechanism. The cranks AB and CD revolve about A and C at the same speed and in the same direction.

- (i) Using a line diagram to represent the linkage, plot the locus of F.  
 (ii) Draw the profile of a simple machine guard about the mechanism with a minimum clearance of 12mm.

(50 marks)

4. (a) Using the data table below, make a fully dimensioned drawing, showing all specifications, of the machine part in Fig. 4. Use edge XX as a datum.

1	Square 30, Length 40
2	Diameter 40, Length 10
3	Screwthread Metric 60, Pitch 5, Length 15
4	Diameter 60, Length 15
5	Diameter 80, Length 18, Hole Diameter 10
6	Maximum Diameter 80, Minimum Diameter 60 Woodruff Keyway $\phi$ 30 and depth 6 Mid-Length
7	Undercut Depth 5, Length 5
8	Screwthread Metric 40, Pitch 3.5, Length 20

- (b) (i) Identify the mechanism shown in Fig. 5.  
 (ii) Name the parts 1, 2, 3, 4.  
 (iii) Make a neat freehand sketch showing a method of operating shaft D.
- (c) With the aid of freehand sketches explain any two of the following engineering terms:
- (i) Keyway.  
 (ii) Collar.  
 (iii) Dowel.

(50 marks)

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

**SECTION A**

(a) Fig. 6 shows two elevations of the vehicle rear hub. Draw an isometric view of the hub, viewed in the direction of arrow B, with the quadrant removed on section plane XXX.

(b) With the aid of large freehand sketches, explain the following abbreviations:

(i) INT

(ii) RD HD

(iii) CYL

**OR**

**SECTION B**

(i) List five advantages of Computer Aided Design (CAD) systems.

(ii) In what form does the computer store the detail of a drawing ?

(iii) With the aid of a large freehand sketch, show Fig. 6A as a Wire Frame representation.

(iv) Explain briefly what is meant by a CAD/CAM system.

(v) With the aid of a sketch and short note, explain what is meant by absolute programming.

Answers to be given on drawing sheet.

(50 marks)

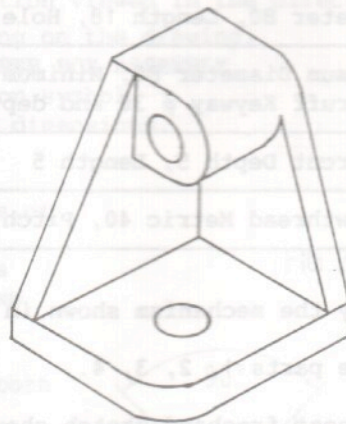
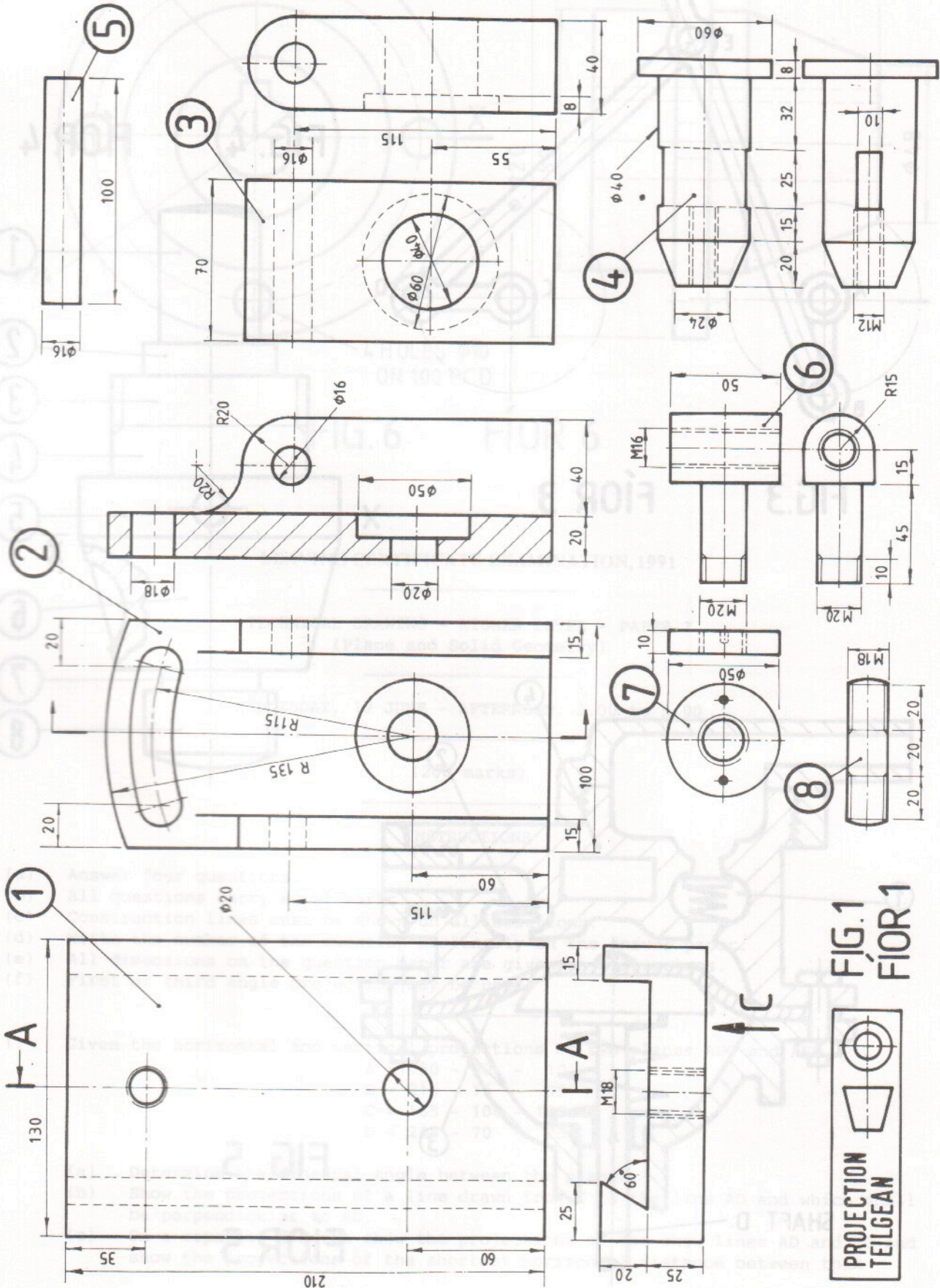


Fig. 6A

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$AB = CD = 30$   
 $BE = DE = 120$   
 $AC = 110$   
 $EF = 30$

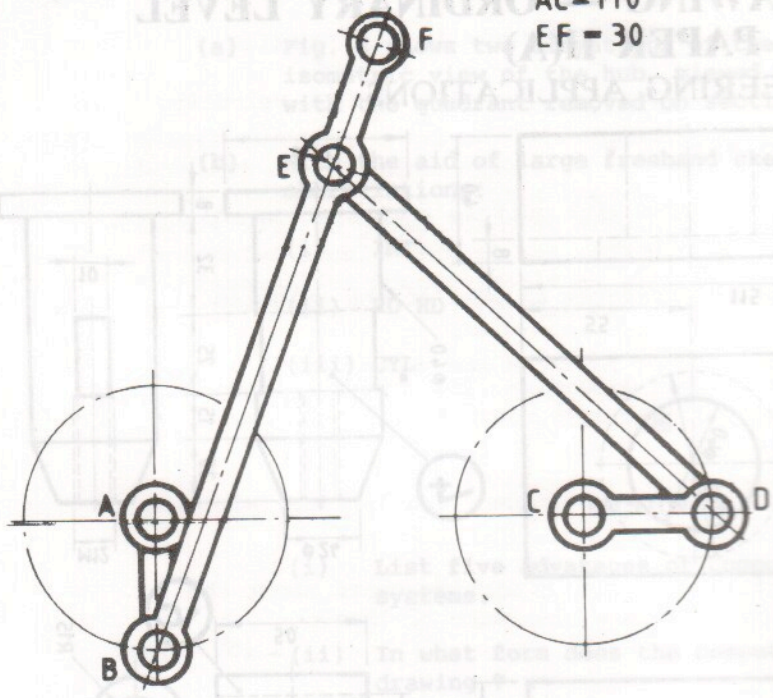


FIG. 3 FÍOR 3

FIG. 4 FÍOR 4

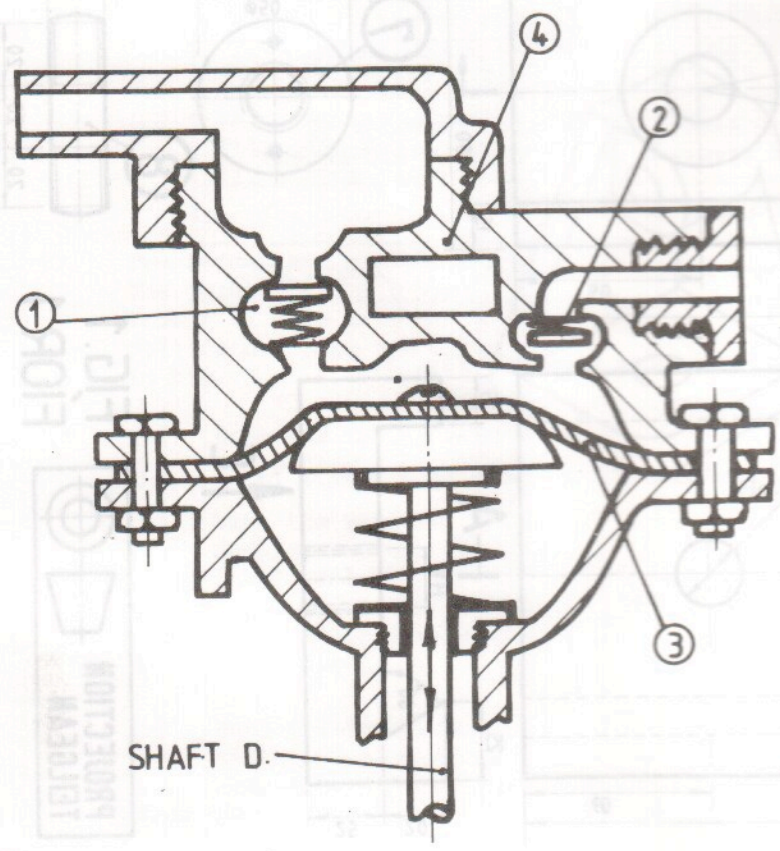
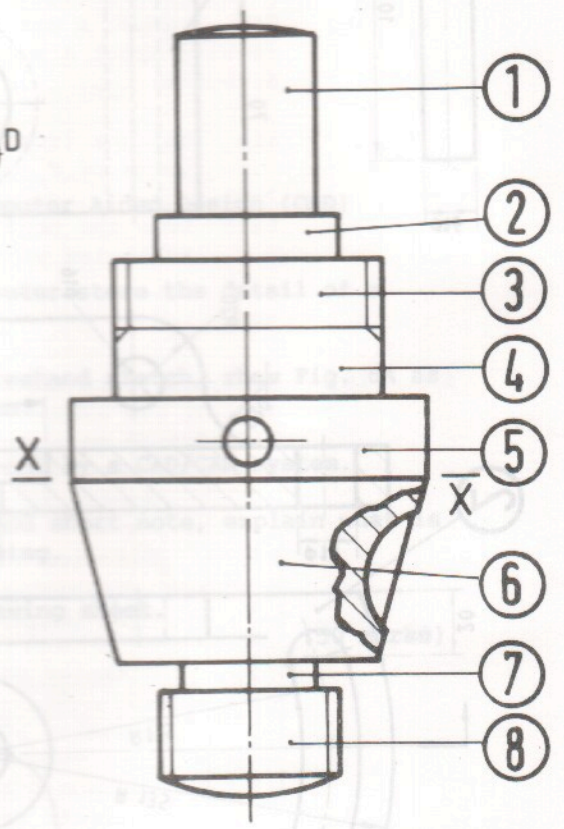


FIG. 5 FÍOR 5

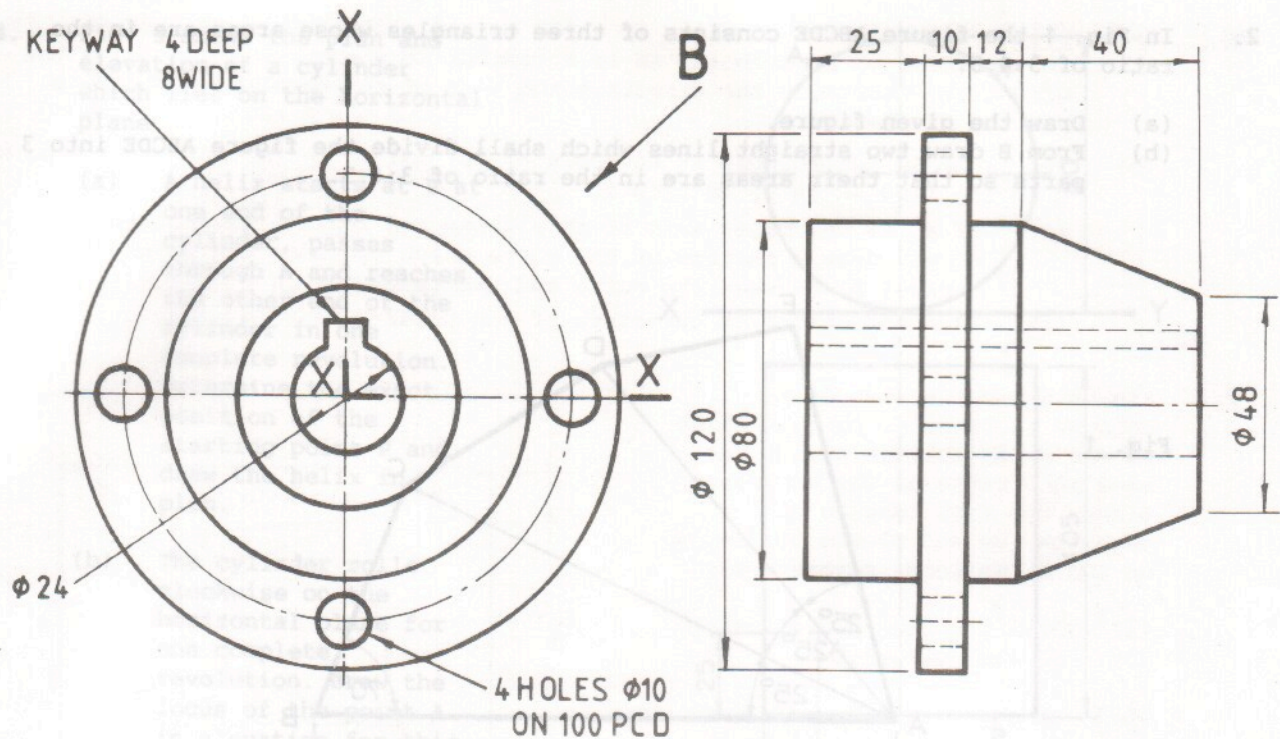


FIG. 6 FIOR 6