

Technical Drawing Higher Level
LEAVING CERTIFICATE EXAMINATION, 1991

TECHNICAL DRAWING - HIGHER LEVEL

PAPER II(A) - ENGINEERING APPLICATIONS

THURSDAY, 20 JUNE - MORNING 9.30 to 12.30

200 Marks

INSTRUCTIONS

- (a) Answer four 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.

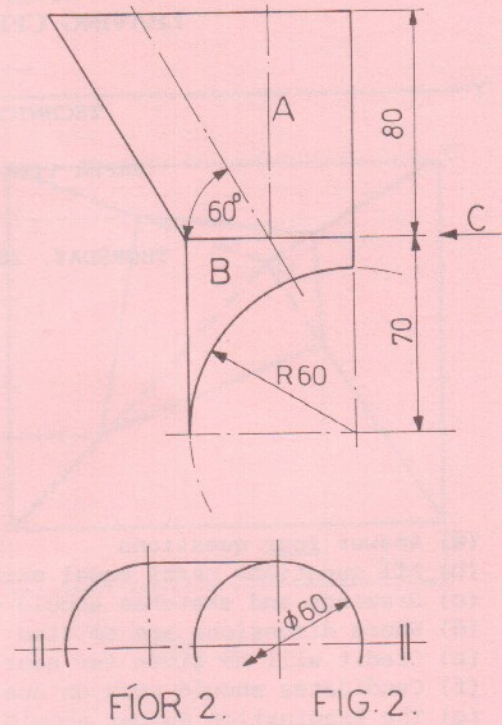
1. Details of a PIPE VICE are given in Fig. 1 with the parts list tabulated below.

- (a) Draw a full size sectional elevation A-A showing the parts completely assembled.
- (b) Insert item reference numbers to identify the parts and add the title PIPE VICE.
- (c) With the aid of a short note and/or sketch, explain the function of the 10 mm diameter hole in the body (Part number 1).

INDEX	PART	REQUIRED
1	Body	1
2	Clamping Screw	1
3	Sliding Vee	1
4	Securing Screw	1

2. The elevation and half plan of a chute assembly are shown in Fig. 2. The assembly consists of two separate parts A and B.

- (i) Draw the given views of the assembly and project an end elevation when viewed from C.
- (ii) Draw a half development of each of the parts.



3. (a) Draw the profile and displacement diagram for a cam rotating in an anti-clockwise direction and imparting the following motion to a 20 mm diameter roller follower:-

0° to 30° Dwell

30° to 210° Rise 36 mm with Simple Harmonic Motion

210° to 240° Dwell.

240° to 360° Fall 36 mm with Uniform Motion.

The minimum distance between the central axis and the cam edge is 40 mm.

(b) A toggle action mechanism is illustrated in Fig. 3. The crank OA rotates at uniform angular velocity about O. Links AB, CB and DB are pivoted at B. C is a fixed pivot point and D is constrained to move along the horizontal axis.

Draw a displacement diagram and plot the displacement of D for one revolution of OA.

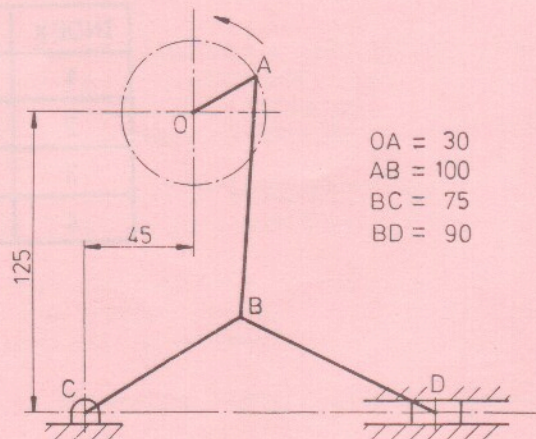


FIG. 3.
FÍOR 3.

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

SECTION A

- (a) Fig. 4 shows a schematic layout of an air compressor. Sketch freehand the layout drawing with the compressor at the commencement of the delivery stroke. Identify and label on the sketch the following parts:- cooling fins, piston, piston seal rings, cylinder, cylinder head, connecting rod, crankcase, crankpin, crank, balance weights and non-return valve (One shown).
- (b) (i) There are two non-return valves fitted to the compressor. With the aid of a sketch and brief note, explain the operation of the valves during the delivery stroke.
- (ii) Sketch one of the following:
- (1) Radial bearing.
 - (2) Thrust bearing.
 - (3) Drawing convention for bearings.

OR

SECTION B

- (i) Explain briefly what is meant by a CAD/CAM system.
- (ii) With the aid of sketches and a short note, explain what is meant by (a) incremental programming and (b) absolute programming.
- (iii) Write a short program using absolute co-ordinates for finish turning the profile shown in Fig. 4A.

Answers to be given on drawing sheet.

5. Three views of a machine mounting are shown in Fig. 5 with the parts list tabulated below.
- (a) Using the scale provided, make a full size detailed working drawing of part 1 (Base). The detailed drawing should show fully the shape of the part and should be fully dimensioned.
- (b) Using the scale provided, make an isometric drawing of part 2 (Mount). The isometric view should be full size having X as the lowest point on the drawing.

INDEX	PART	REQUIRED
1	Base	1
2	Mount	1
3	Bush	2
4	Spindle	1
5	Collar	1
6	Pin	1

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

SECTION A

Details of a welded stanchion base and key to assembly are shown in Fig. 6.

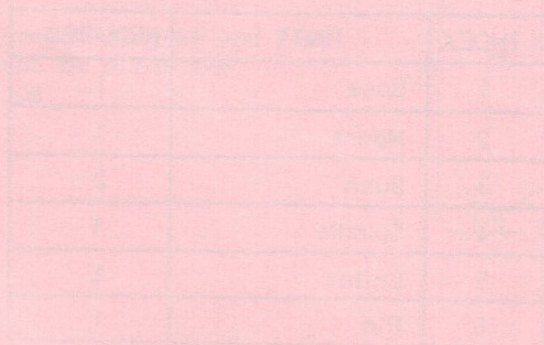
- (a) Assemble the parts and draw an isometric view of the base to a scale 1:5.
- (b) Dimension the base for a 6 mm fillet weld all round.
- (c) Title the drawing.

OR

SECTION B

- (i) Describe four functions used in CAD systems which are not possible by means of traditional manual draughting.
- (ii) Use sketches to explain the various types of 3-D models that can be used within computer aided design.
- (iii) With the help of neat sketches, describe the difference between Cartesian and Polar co-ordinate systems.

Answers to be given on drawing sheet.



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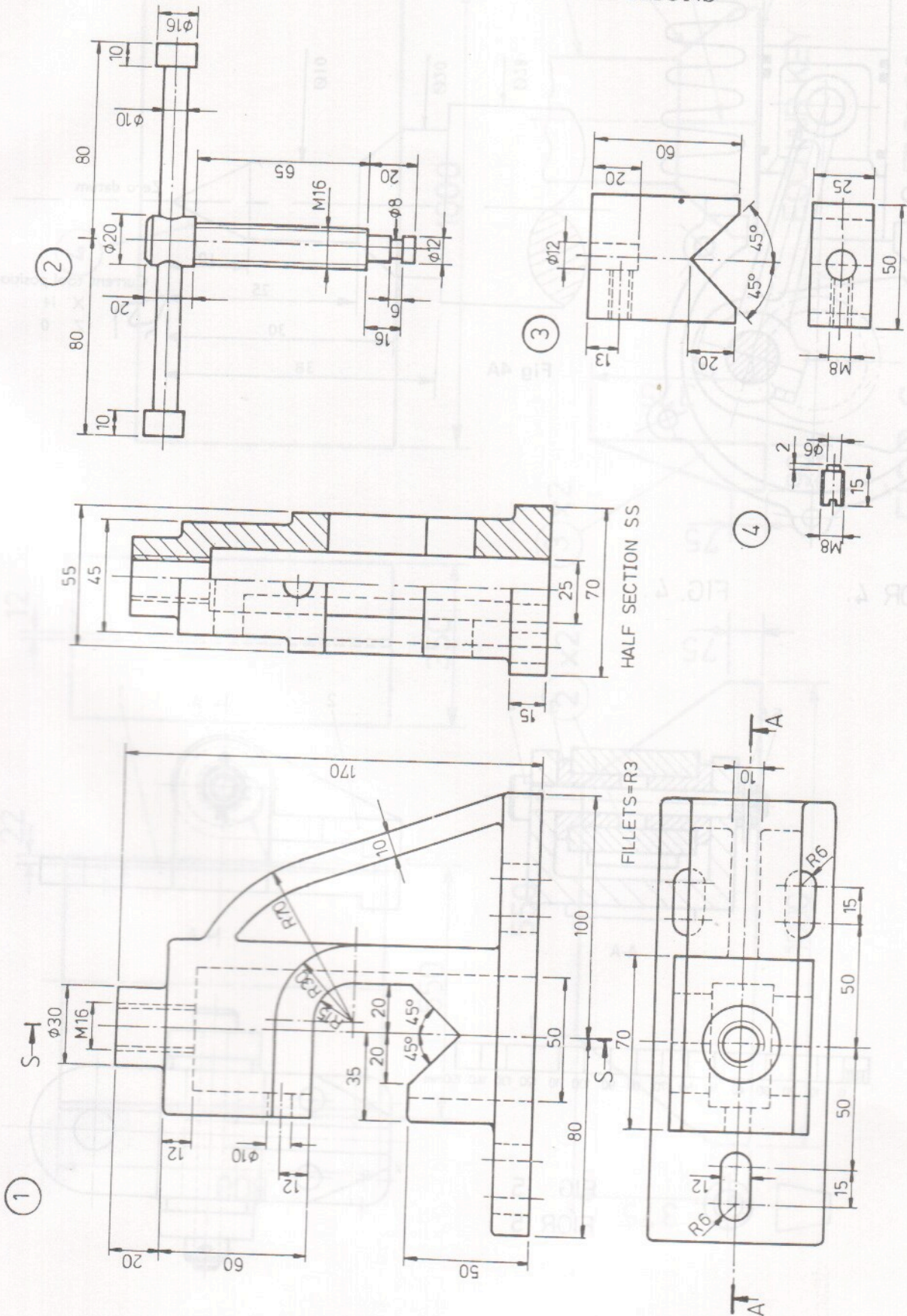
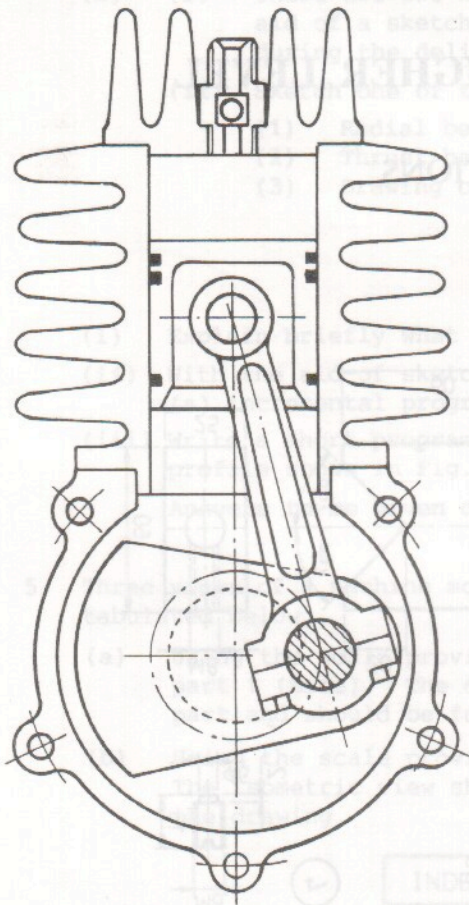


FIG. 1.
 FIGOR 1.





FÍOR 4.

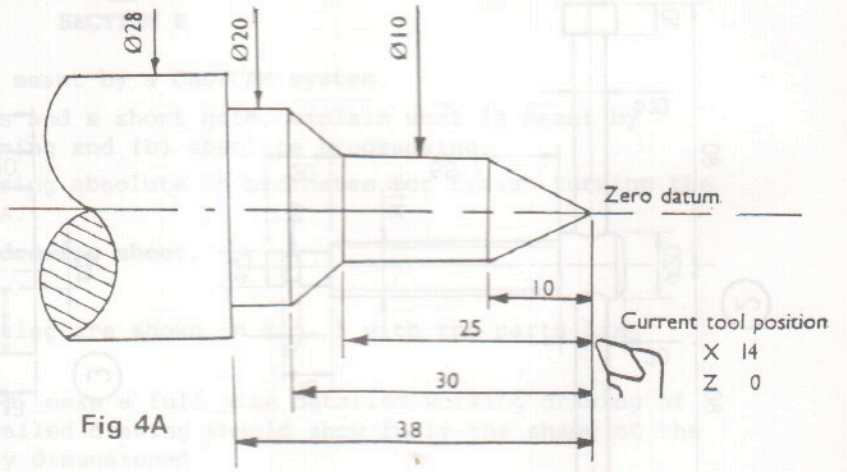


FIG. 4.

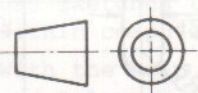
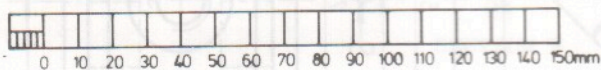
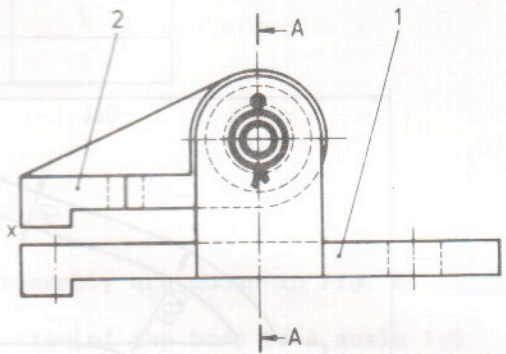
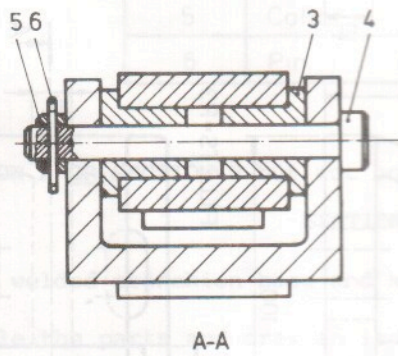
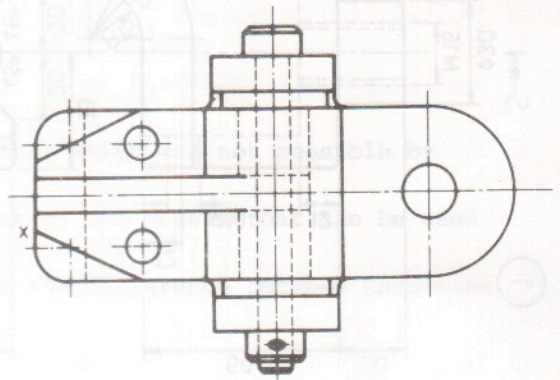


FIG. 5
FÍOR 5



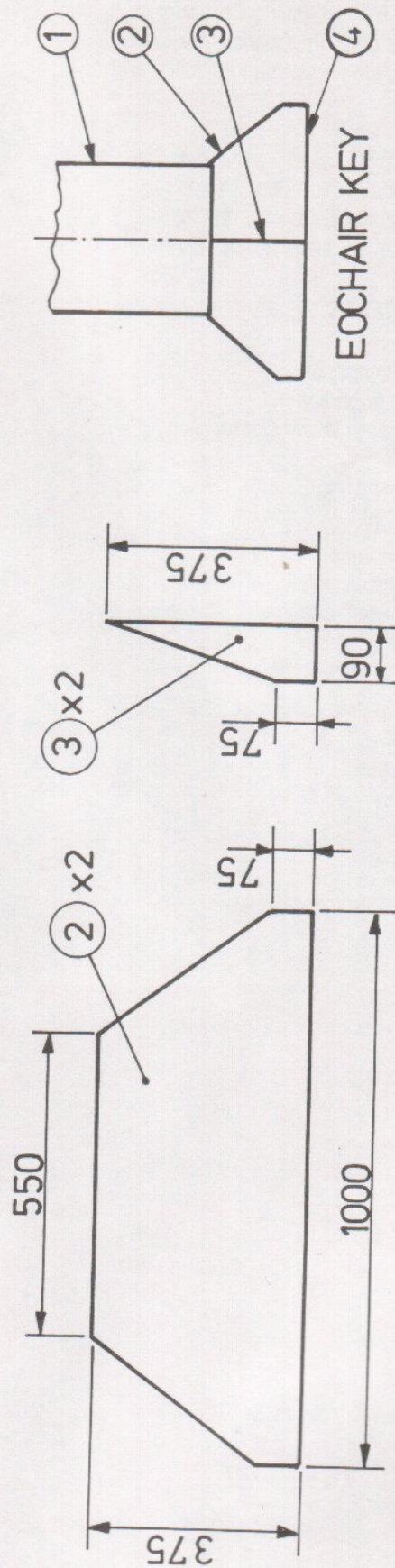
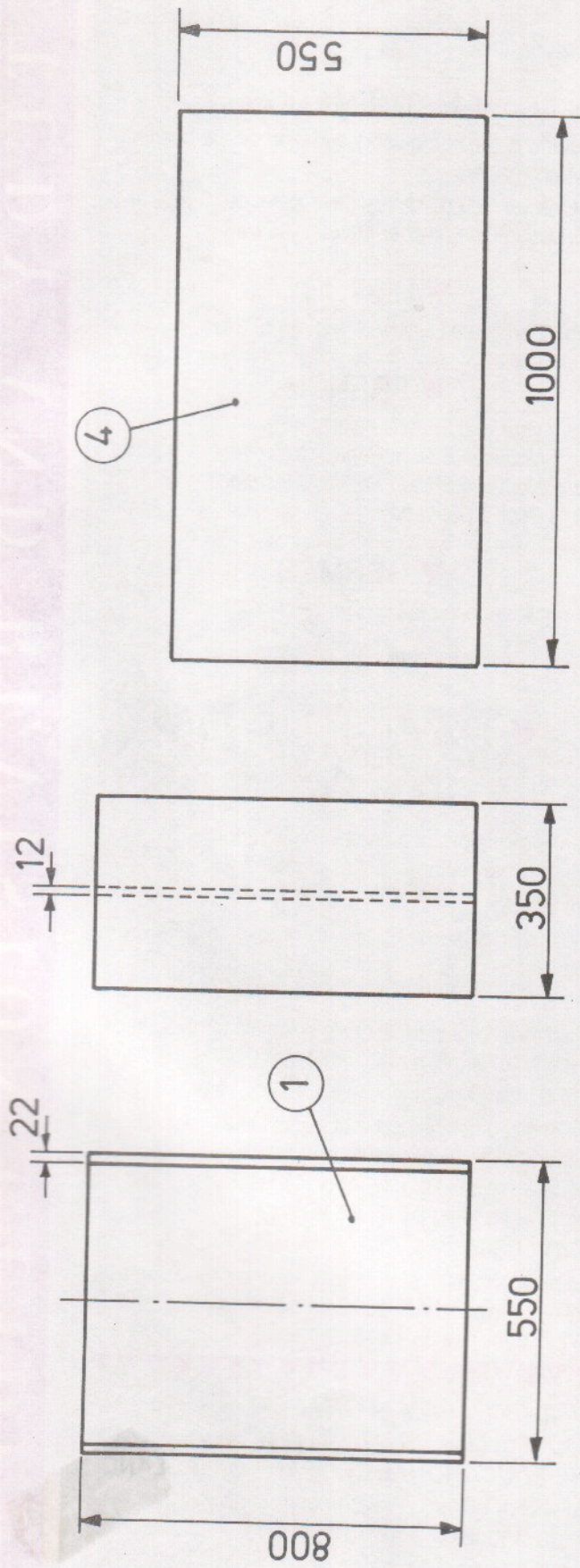


FIG. 6

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