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LEAVING CERTIFICATE EXAMINATION, 1994

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

MONDAY, 20 JUNE - MORNING, 9.30 to 12.30

200 Marks

INSTRUCTIONS

- Answer four questions.
- All questions carry equal marks.
- Drawings and sketches should be in pencil unless otherwise stated.
- Where dimensions are omitted they may be estimated.
- Credit will be given for neat orderly presentation of work.
- Candidates should work on one side of the paper only.
- The Examination Number should be written on each drawing sheet used.
- All dimensions are in millimetres.

1. Details of a Block (Part 1) and a Cap (Part 2) for a Shaft Support are given in Fig. 1.

- Draw a full size sectional elevation A-A showing the parts assembled. Insert item references and the title SHAFT SUPPORT. (Note: Threaded fasteners are not required.)
- Make a neat freehand isometric sketch of the Cap (Part 2). The sketch should be approximately full size.

2. The elevation and plan of a square to square transition piece are shown in Fig. 2.

- Draw in third angle projection the given views and project an end elevation when viewed in the direction of arrow E.
- Draw a half development of the piece with the seam at the edge AB.
- Determine graphically the dihedral angle between the surfaces C and D. Measure and state the value of the angle on the drawing.

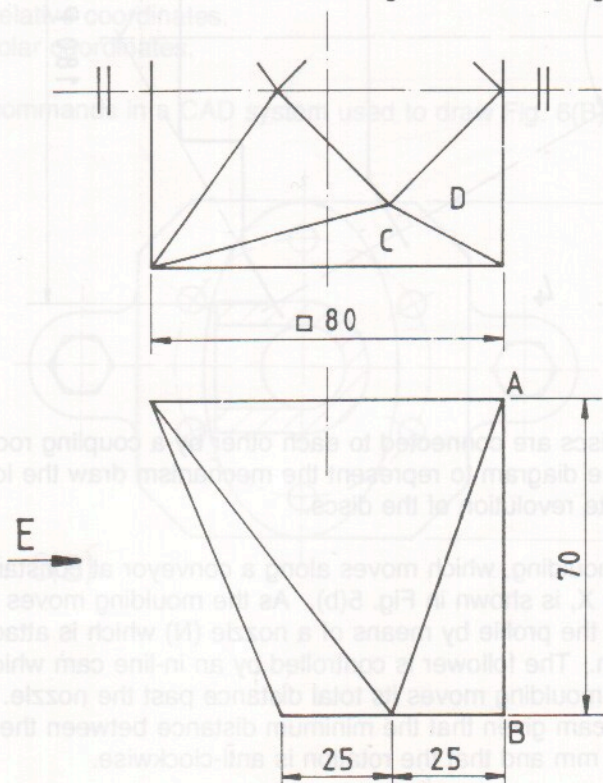


FIG 2

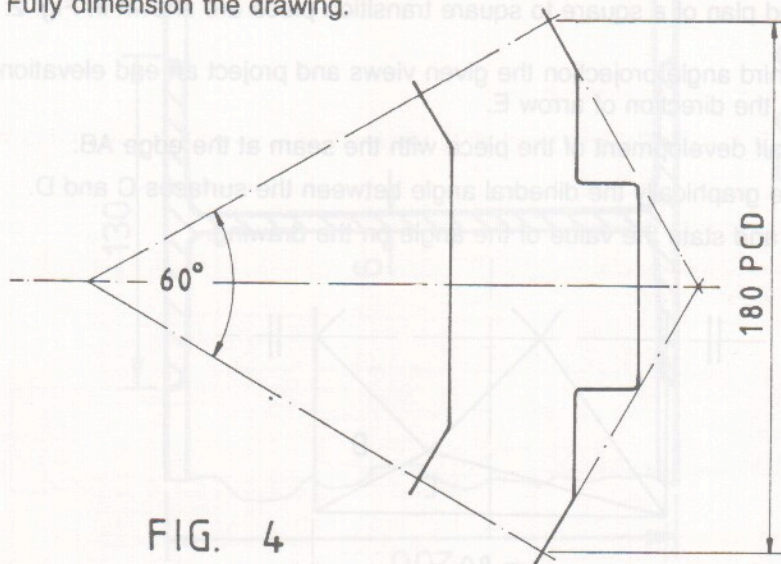
3. A pictorial drawing of a Fixture Body is shown in Fig. 3. Make a full size detailed working drawing of the Body. The detailed drawing should show a plan, elevation and end view and should be fully dimensioned. Include the following on the drawing:

- (i) Symbol to show that the top surface (Z) must be machined on a grinding machine; surface texture N5.
- (ii) Limits of size on diameter 30 H7 bore. Table of limits and fits is supplied (Table 1).
- (iii) Dimensions of the parallel keyway. Table of keyway dimensions is supplied (Table 2.)
- (iv) Appropriate projection symbol.
- (v) Title: FIXTURE BODY.

4. (a) Draw an elevation and end view of a beam to stanchion flange connection in third angle projection. Show clearly how the connection would be secured. Title the drawing.
- (b) The incomplete outline of a bevel gear is shown in Fig. 4. Draw a sectional elevation of the gear given the following specifications:

Pitch circle diameter	180 mm
Tooth face width	50 mm
Bore	30 mm
Tooth module	9 mm
Hub diameter	70 mm
Hub length	20 mm
Fillets	3 mm

Fully dimension the drawing.



5. (a) In Fig. 5(a) two discs are connected to each other by a coupling rod, pin jointed at both ends. Using a line diagram to represent the mechanism draw the locus of centre point P for one complete revolution of the discs.
- (b) The profile of a moulding, which moves along a conveyor at constant speed and in the direction of arrow X, is shown in Fig. 5(b). As the moulding moves along the conveyor, glue is applied to the profile by means of a nozzle (N) which is attached to the end of a follower as shown. The follower is controlled by an in-line cam which makes one revolution as the moulding moves its total distance past the nozzle. Construct and draw the profile of the cam given that the minimum distance between the cam edge and the central axis is 50 mm and that the rotation is anti-clockwise.

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

SECTION A

(a) Sketch a longitudinal section through a compression coupling and capillary coupling. Using a short note explain how the couplings seal the pipework.

Title the sketches and state where each coupling is used.

- (b) (i) Using freehand line diagrams explain the operation of the four stroke compression ignition engine.
- (ii) Sketch the mechanism used to operate the valves of an internal combustion engine. The sketch should include: camshaft, cam, push rod, rocker arm, compression spring, valve. Label the parts on the sketch.

OR

SECTION B

(a) List four edit functions available in CAD and, using a sketch and short note, explain how they are used.

(b) State four advantages of using layers in CAD.

(c) Using a sketch explain the use of the following solid modelling operations:

- (i) Union
- (ii) Subtraction
- (iii) Intersection

(d) Give an example of each of the following methods of specifying coordinates when drawing in CAD:

- (i) Absolute coordinates.
- (ii) Relative coordinates.
- (iii) Polar coordinates.

(e) List ten commands in a CAD system used to draw Fig. 6(B).

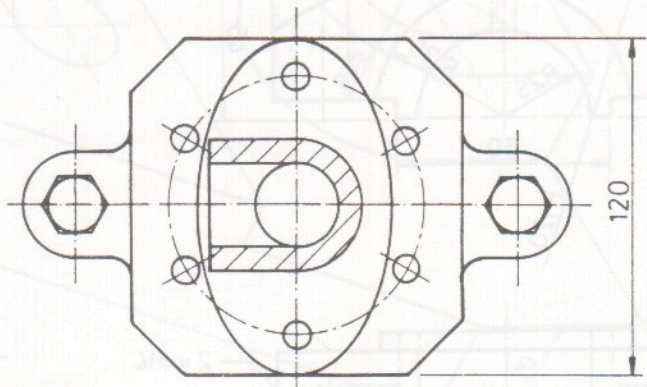


FIG. 6(B)

LEAVING CERTIFICATE EXAMINATION

1994

TECHNICAL DRAWING - HIGHER LEVEL

PAPER II(A)

ENGINEERING APPLICATIONS

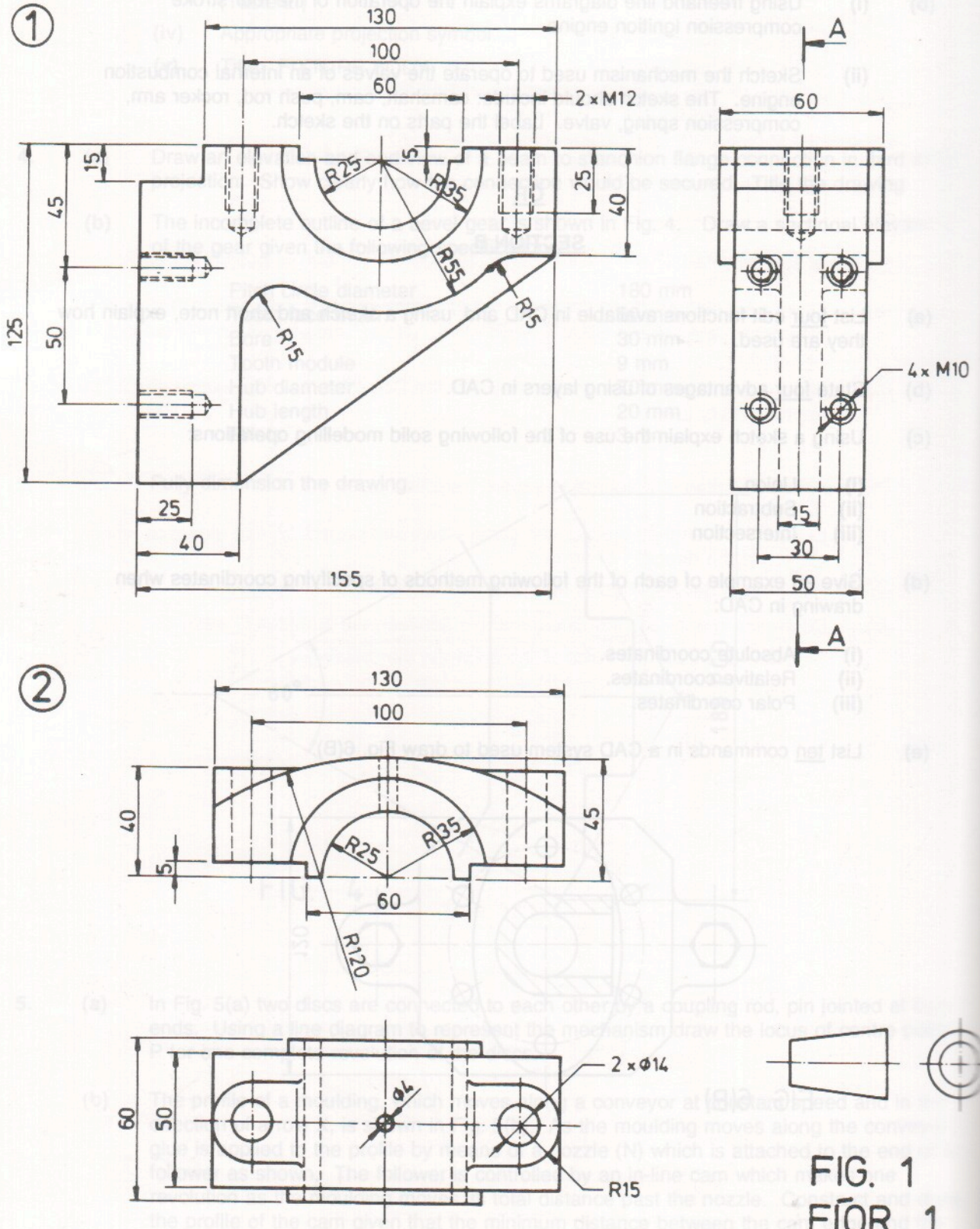


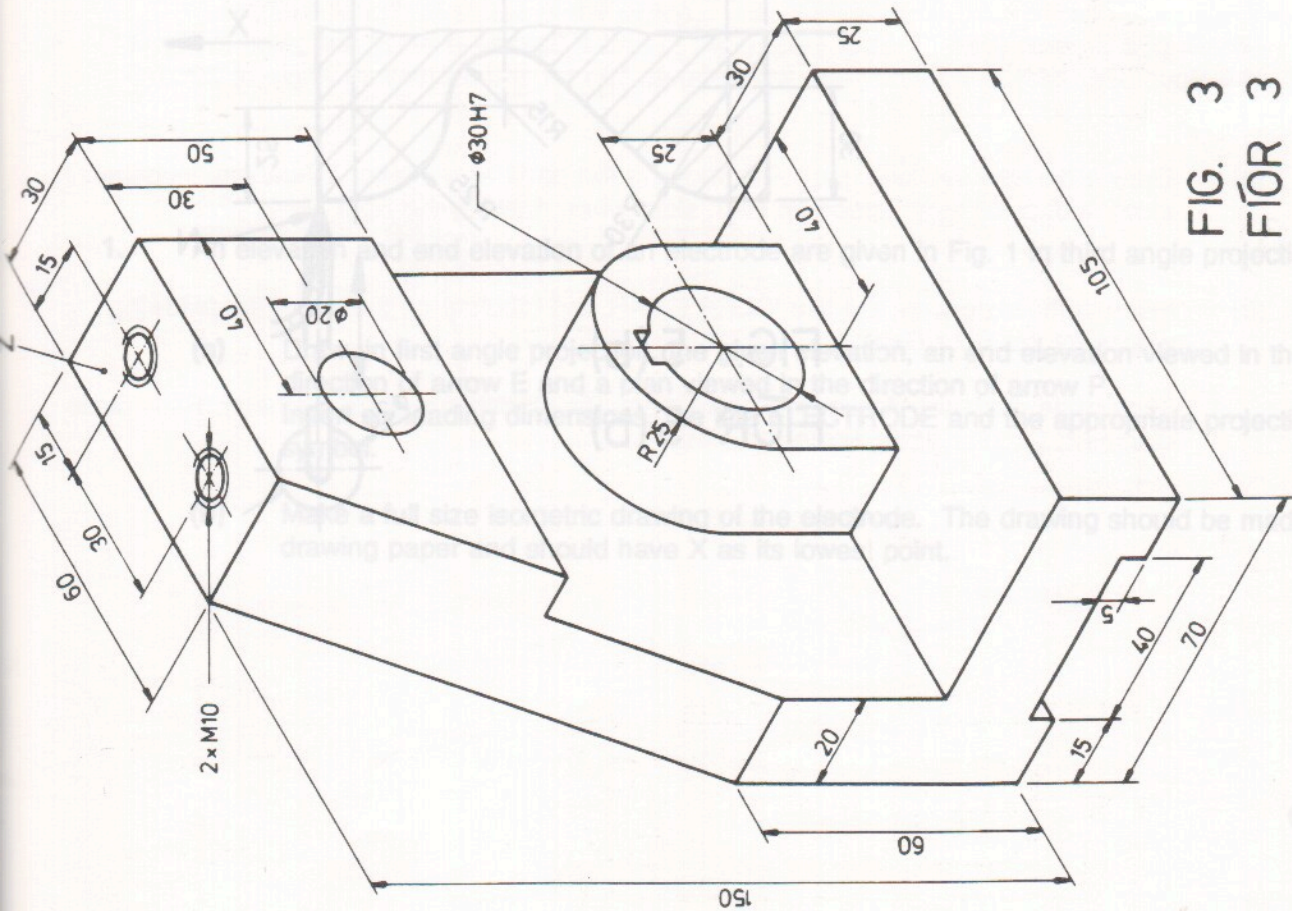
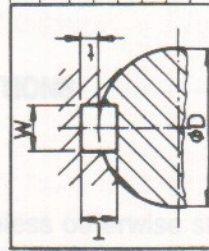
FIG. 1
FÍOR 1

TABLE 1: SELECTED LIMITS AND FITS

OVER	TO	H9	e9	H8	f7	H7	g6
mm	mm	0.001mm	0.001mm	0.001mm	0.001mm	0.001mm	0.001mm
-	3	+25 0	-14 -39	+14 0	-6 -16	+10 0	-2 -8
3	6	+30 0	-20 -50	+18 0	-10 -22	+12 0	-4 -12
6	10	+36 0	-25 -61	+22 0	-13 -28	+15 0	-5 -14
10	18	+43 0	-32 -75	+27 0	-16 -34	+18 0	-6 -17
18	30	+52 0	-40 -92	+33 0	-20 -41	+21 0	-7 -20
30	50	+62 0	-50 -112	+39 0	-25 -50	+25 0	-9 -25
50	80	+74 0	-60 -134	+46 0	-30 -60	+30 0	-10 -29

TABLE 2: PARALLEL KEYWAY DIMENSIONS

ØD(mm)		W(mm)	T(mm)	t(mm)
OVER	TO			
10	12	4	3.2	1.2
12	18	5	4	1.5
18	24	6	5	1.8
24	30	8	6	2.5
30	40	10	8	3
40	50	12	9.5	4



**FIG. 3
FIOR 3**

FIG. 5 (a)
FIÖR 5(a)

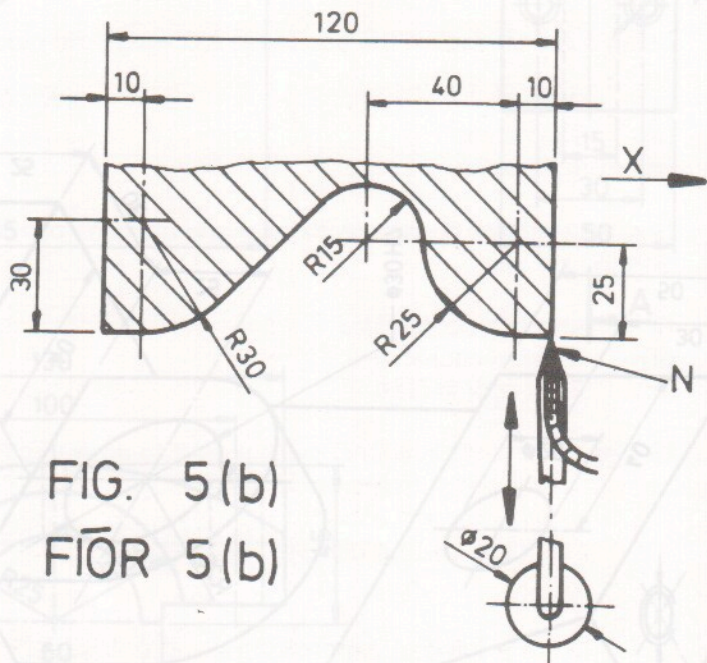
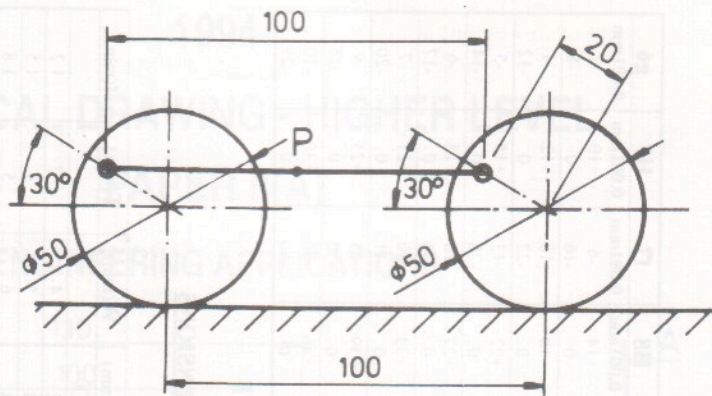


FIG. 5 (b)
FIÖR 5 (b)