- 10325

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LEAVING CERTIFICATE EXAMINATION, 1985

TECHNICAL DRAWING - HIGHER LEVEL

PAPER II(A) - ENGINEERING APPLICATIONS

THURSDAY, 27 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. The detailed parts of a Tool Post assembly are shown in Fig. 1.

   (a) Draw a sectional elevation of the assembled parts when viewed in the direction of the arrows B-B.

   (b) The outline of a packing strip is shown in Fig. 1/A. With the aid of brief notes, and a separate sketch, show how the strip is assembled, adjusted and locked in the toolpost slide.

   The sketch should include parts 7 to 10 from the parts list table.

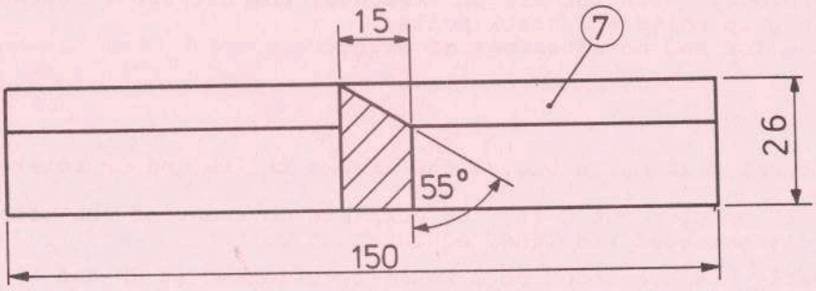

Fig. 1/A. Fíor 1/A.

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PARTS LIST	
INDEX	PART
1	TOOLPOST SLIDE
2	FEED NUT
3	SOCKET SCREW
4	TOOLHOLDER
5	WASHER
6	TOOLHOLDER SCREW
7	PACKING STRIP
8	M5 HEX HD SET SCREW 30LG
9	M5 HEX LOCK NUT
10	M6 CSK HD SET SCREW 25LG

OVER→

2. The elevation and incomplete plan of a symmetrical transition piece for a ventilation system are shown in Fig. 2.

   (i) Draw the given elevation and complete the plan view.

   (ii) Draw the semi-development of the piece.

   (iii) Measure and state the value of the fold angle between the surfaces A and B.

   (iv) Indicate on the solution a suitable position for the seam.

3. (a) Draw the cam profile and displacement diagram for a cam rotating at uniform velocity in an anti-clockwise direction. The cam is to impart the following motion to a flat follower:

   0° - 150° 45 mm with Uniform Acceleration and Retardation.
   150° - 210° Dwell.
   210° - 270° Fall 20 mm with Uniform Velocity.
   270° - 360° Fall 25 mm with Simple Harmonic Motion.

   The nearest approach of the follower to the cam axis is 40 mm.

   (b) A schematic layout of a single cylinder engine is shown in Fig. 3. Using a line diagram show how the motion of the crankshaft is used to operate the valves. Label the parts in the sequence.

4. An elevation of an angle cleat 75 x 75 x 10 is shown in Fig. 4. Two cleats are used for a beam to beam bolted connection.

   (i) Draw an isometric view of the assembled connection. Beam details: 200 x 250, 12 mm flange, 8 mm web. Show only the location of the bolts and add the title.

   (ii) Explain briefly, with the aid of sketches, the difference between high strength friction grip bolts and black bolts.
   Give a use for and an advantage of each.

5. In the link mechanism shown in Fig. 5 the cranks MA, NB and OD rotate about M, N and O.

   (i) Plot the locus of point C for the complete movement of the mechanism when CD and OD are disconnected from the mechanism at C.

   (ii) Show clearly how the locus of C would be affected if CD and OD were connected to the mechanism.

6. A rack is moved 125 mm laterally by a pinion wheel.
   Calculate the tooth pitch, addendum and dedendum of the rack.
   Draw the assembly showing all the teeth on the rack and three teeth on the pinion.

   Pinion data: 20 teeth, pitch circle diameter 100 mm, pressure angle 20°.

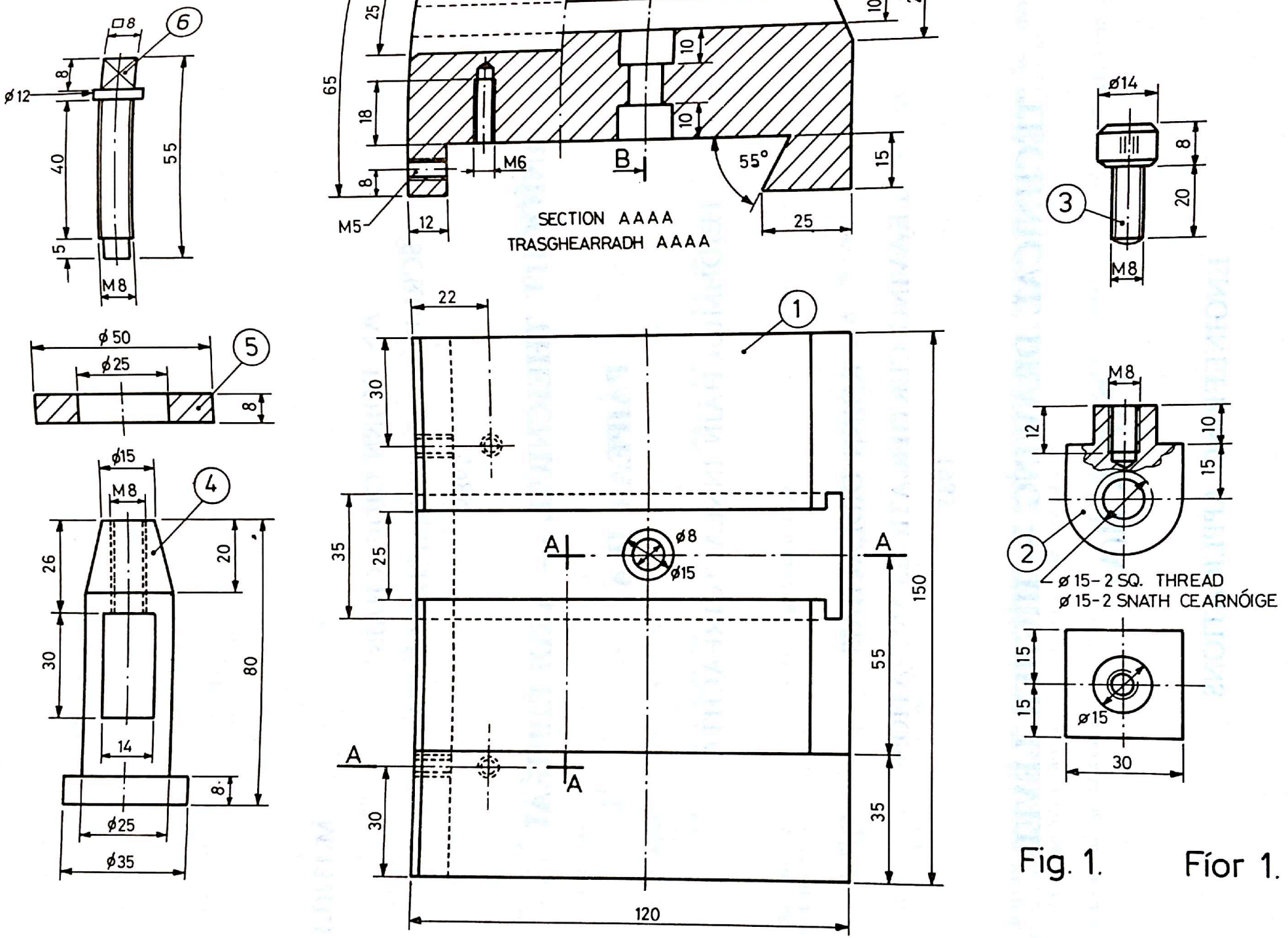

Fig. 1. Fíor 1.

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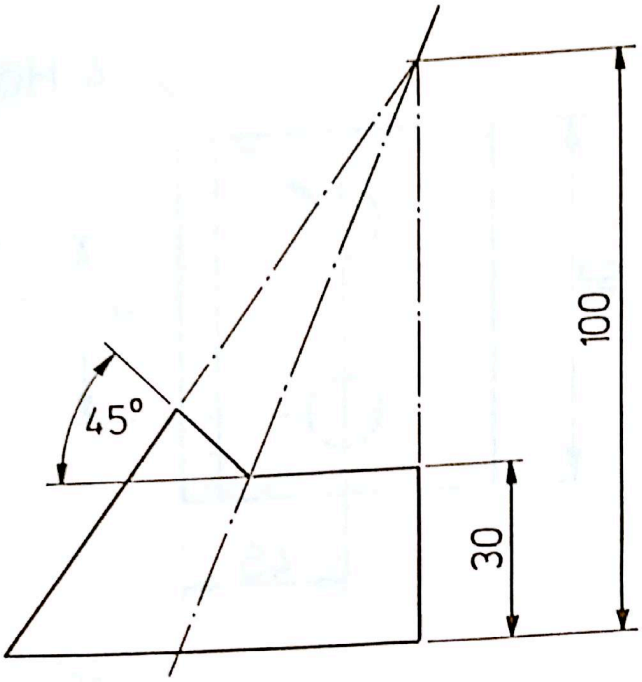

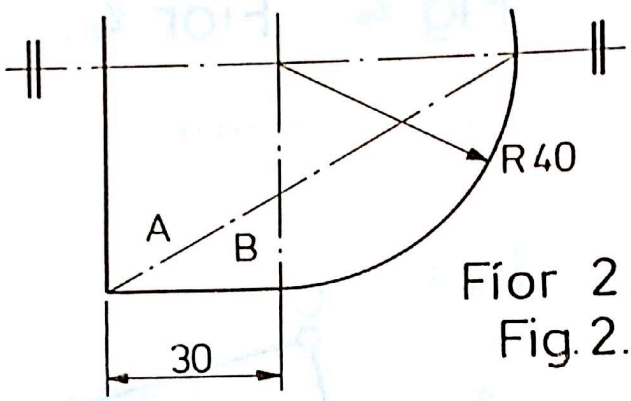

Fíor 2.
Fig. 2.

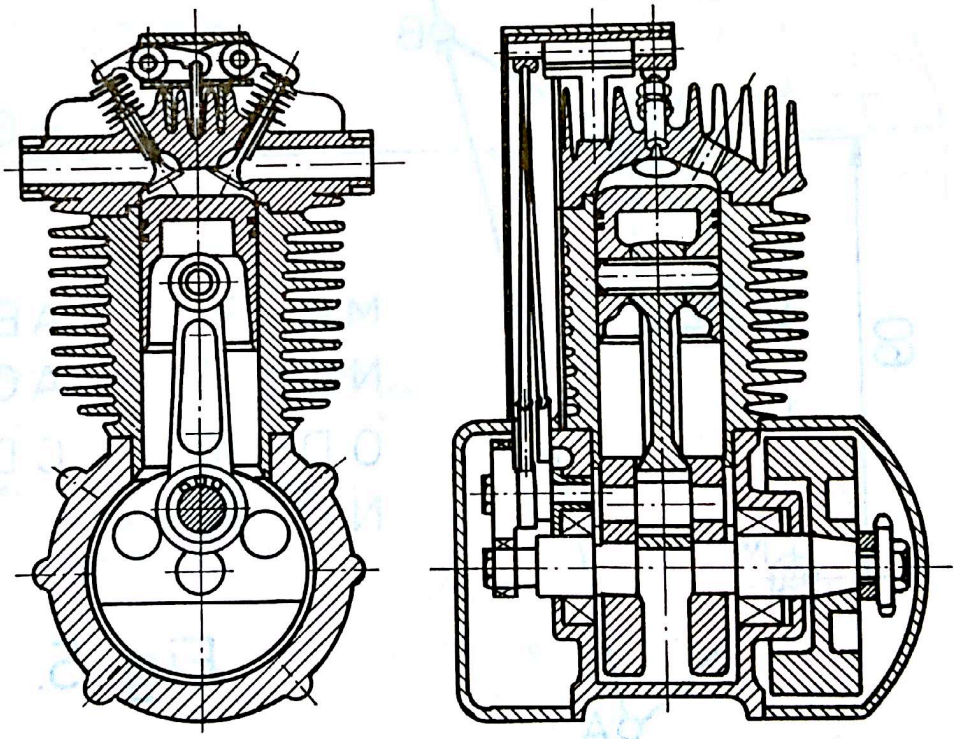

Fig. 3. Fíor 3.

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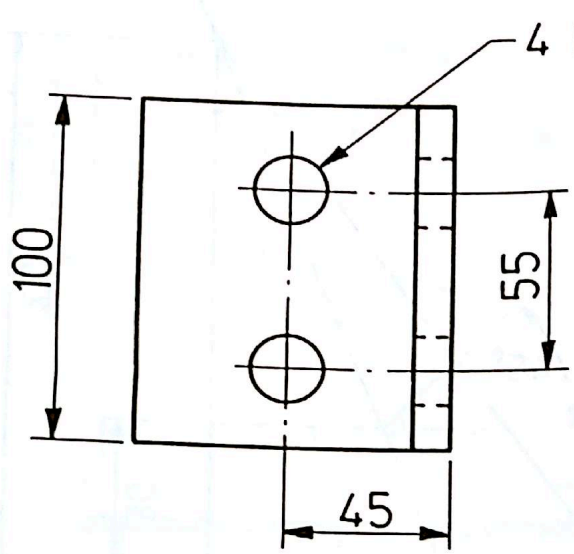
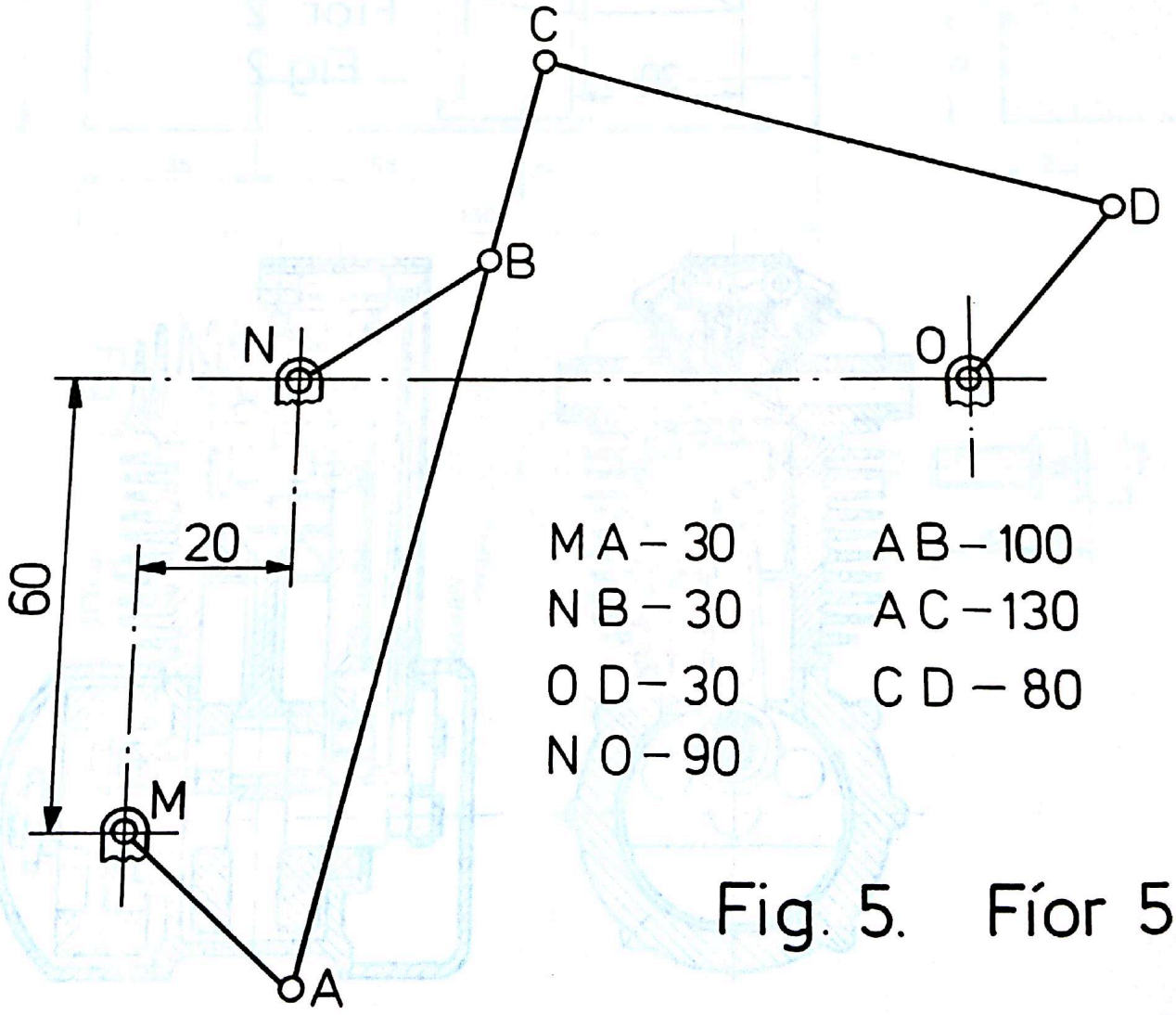


Fig. 4. Fíor 4.



M A – 30 A B – 100
N B – 30 A C – 130
O D – 30 C D – 80
N O – 90

Fig. 5. Fíor 5.

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