Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION 2003

TECHNICAL DRAWING - ORDINARY LEVEL
PAPER II (A) – ENGINEERING APPLICATIONS

200 marks

FRIDAY, 13 JUNE - AFTERNOON 2.00 p.m. – 5.00 p.m.

INSTRUCTIONS

(a) Ensure that you have received examination paper M82(L) which accompanies this paper.
(b) Answer question 1 and two other questions.
(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.

NOTE: **The following drawings are shown on examination paper M82(L) which accompanies this paper: Fig. 1; Fig. 2; Fig. 5; Fig. 6; Fig. 7.1; Fig. 7.2; and Fig. 7.3**

1. Details of a Hinge Clamp are shown in Fig. 1 with a parts list tabulated below.

PART	NAME	REQUIRED
1	Body	1
2	Hinge	1
3	Jaw	1
4	Screw	1
5	Spindle	1
6	Circlip (not shown)	1

(a) Assemble the parts and draw full-size, in first or third angle projection, the following views:

(i) A sectional elevation on section plane AA;
(ii) A plan projected from view **(i)**.

(b) Insert the following on your drawing:

(i) Title:- Hinge Clamp;
(ii) ISO projection symbol;
(iii) Four leading dimensions. **(100 marks)**

2. The incomplete elevation and plan of the joint between a cylindrical and triangular pipe are shown in Fig. 2.

(a) Draw and complete the given views;

(b) Project an elevation in the direction of arrow R;

(c) Draw the surface development of the triangular pipe;

(d) Draw the true shape of the hole in the cylindrical pipe.

(50 marks)

3. **(a)** A radial plate cam rotates anti-clockwise at 60 revolutions per minute and operates an in-line knife edged follower. The nearest approach of the follower to the cam centre is 40mm. Draw the profile of the cam to give the following motion to the follower:

Rise 50mm with uniform velocity for 0.25 seconds.

Dwell for 0.25 seconds.

Return to initial position with simple harmonic motion for 0.5 seconds.

Include the displacement diagram as part of the solution.

(b) Fig. 3 below shows a link mechanism. Crank OA_1 rotates in an anti-clockwise direction. OA_1 is connected at A_1 by a pivot which allows link AB to slide through a fixed pivot at B_1.

(i) Using a line diagram to represent the linkage, plot the locus of the two ends of the link AB;

(ii) Draw the profile of a simple machine guard about the mechanism with a minimum clearance of 15mm.

(50 marks)

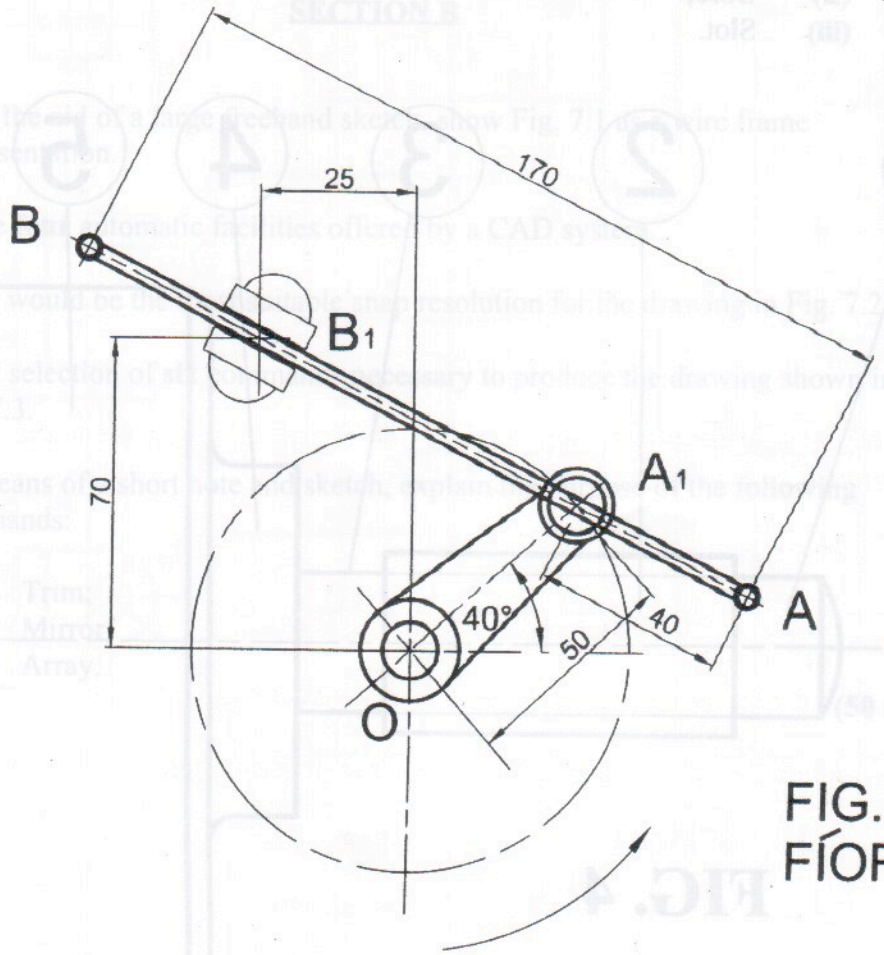


FIG. 3.
FÍOR. 3.

4. **(a)** Using the data table below, make a fully dimensioned drawing, showing all specifications, of the adjusting screw in Fig. 4 below.

1	Diameter 16, Length 10, Sphere radius 16
2	Screwthread: Metric 20, Pitch 2.5, Length 40
3	Diameter 16, Length 10
4	Diameter 40, Length 10, Radius 5
5	Diameter 80, Length 30, Chamfer 3 x 45°. Finish diamond knurl

(b) **(i)** Identify the mechanism shown in Fig. 5.

(ii) Name the parts 1, 2, 3 and 4.

(iii) Name the gearing arrangement between parts A and B.

(c) With the aid of large freehand sketches explain the following engineering terms:

(i) Blind Hole;
(ii) Bore;
(iii) Slot.

(50 marks)

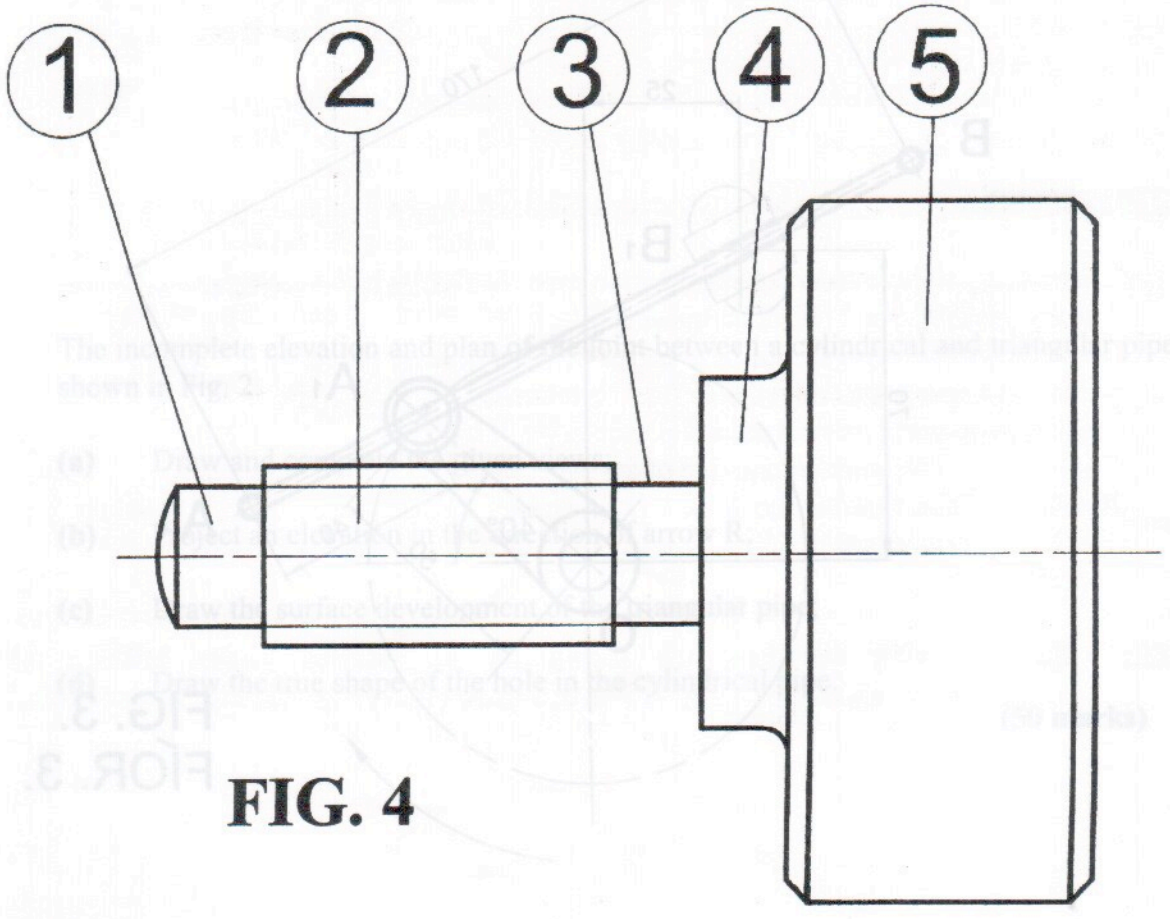


FIG. 4

5. Answer SECTION A **or** SECTION B but not both.

SECTION A

(a) Fig. 6 shows two elevations of a machine component. Draw an isometric view of the component viewed on the section plane XX with the front part of the component removed. Point P is to be the lowest point on the drawing.

(b) By means of large freehand sketches show the following structural steel sections:

(i) Tee section;

(ii) Channel section;

(iii) Unequal leg angle.

OR

SECTION B

(a) With the aid of a large freehand sketch, show Fig. 7.1 as a wire frame representation.

(b) Name **four** automatic facilities offered by a CAD system.

(c) What would be the most suitable snap resolution for the drawing in Fig. 7.2.

(d) List a selection of **six** commands necessary to produce the drawing shown in Fig. 7.3.

(e) By means of a short note and sketch, explain the purpose of the following commands:

(i) Trim;
(ii) Mirror;
(iii) Array.

(50 marks)

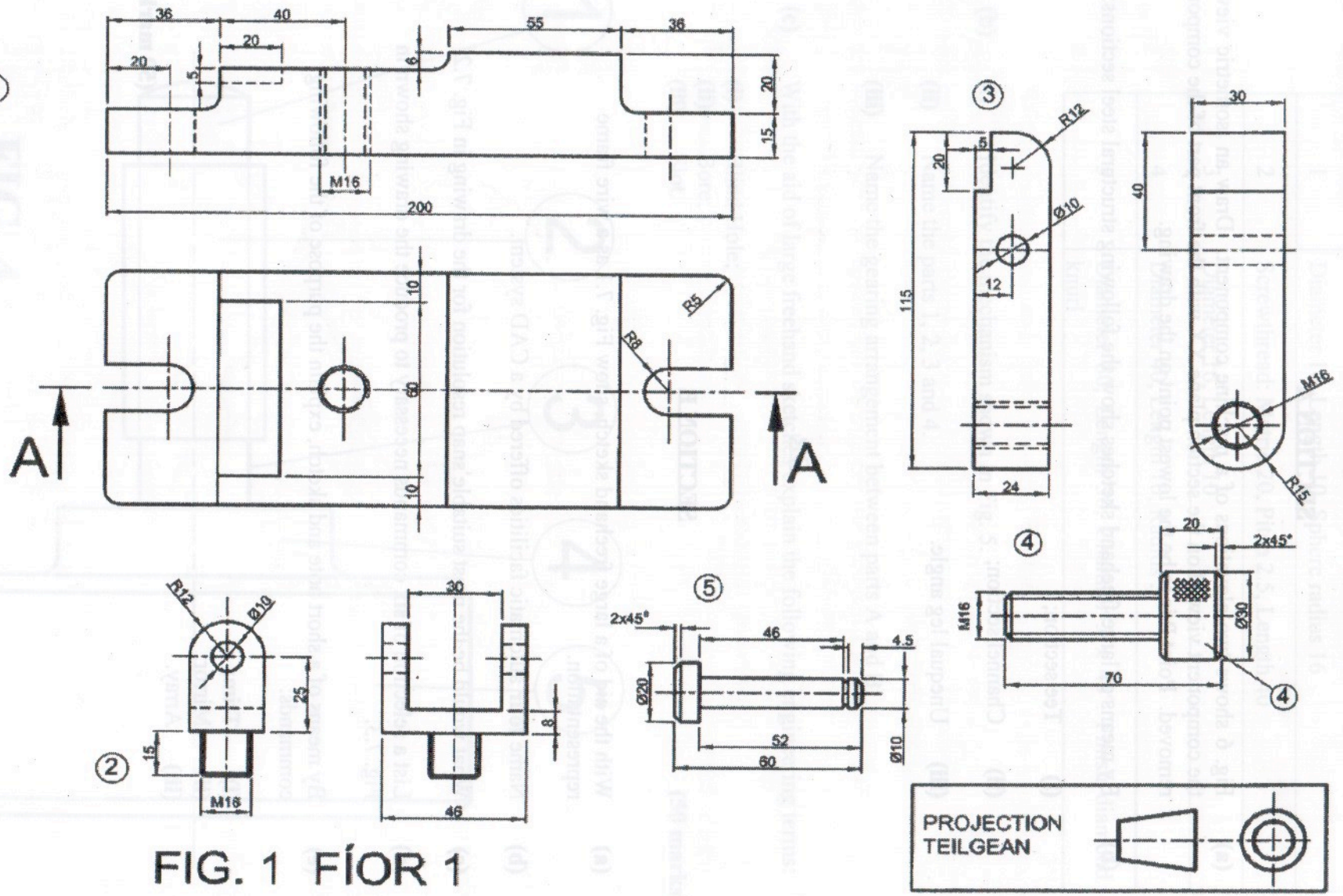

①
36
40
20
20
5
55
36
6
20
15
M16
200
10
60
10
R5
R8
A
A
②
R12
Ø10
25
15
M16
30
8
46
③
R12
20
5
Ø10
12
115
24
30
40
M16
R15
④
20
2x45°
M16
Ø30
70
⑤
2x45°
46
4.5
Ø20
52
60
Ø10
PROJECTION
TEILGEAN

FIG. 1 FÍOR 1

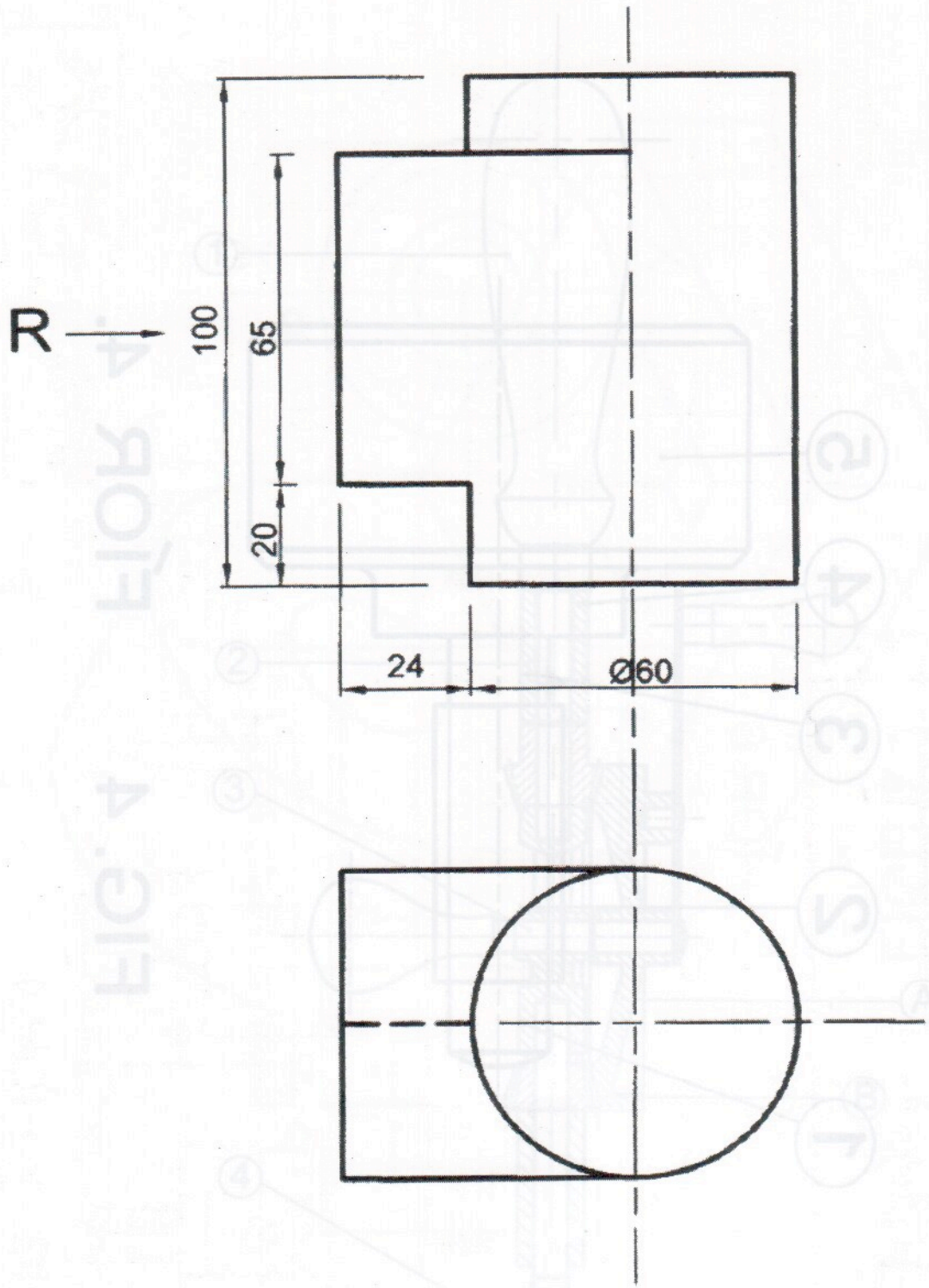


FIG. 2 FÍOR 2

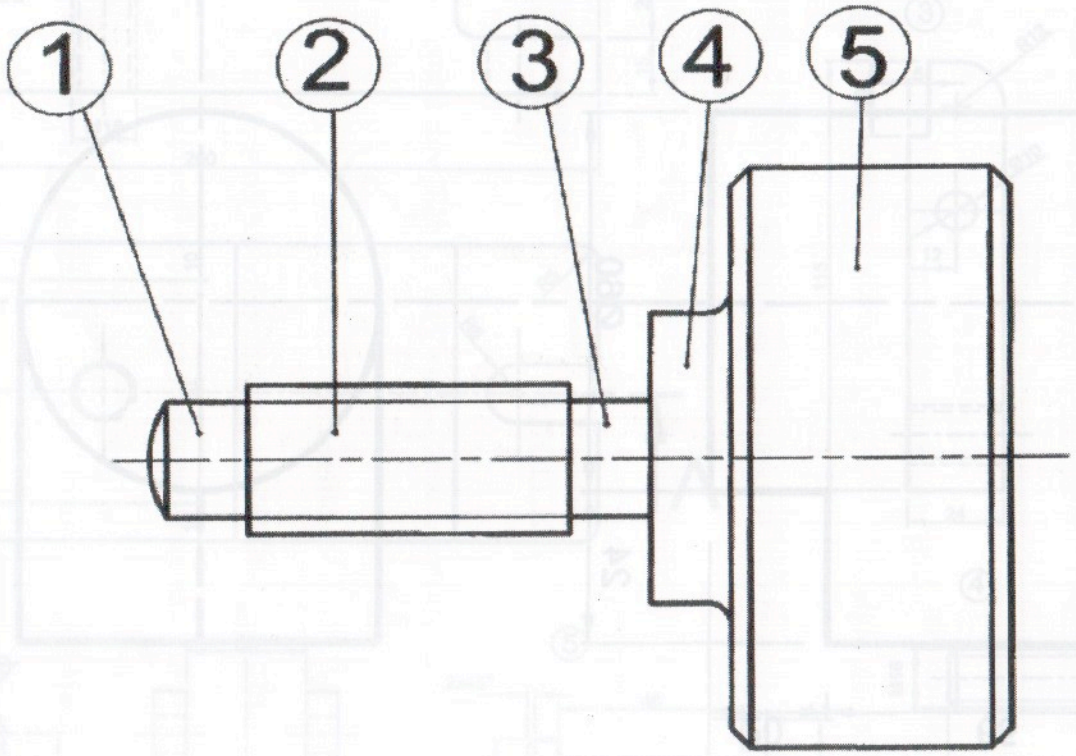


FIG. 4 FÍOR 4.

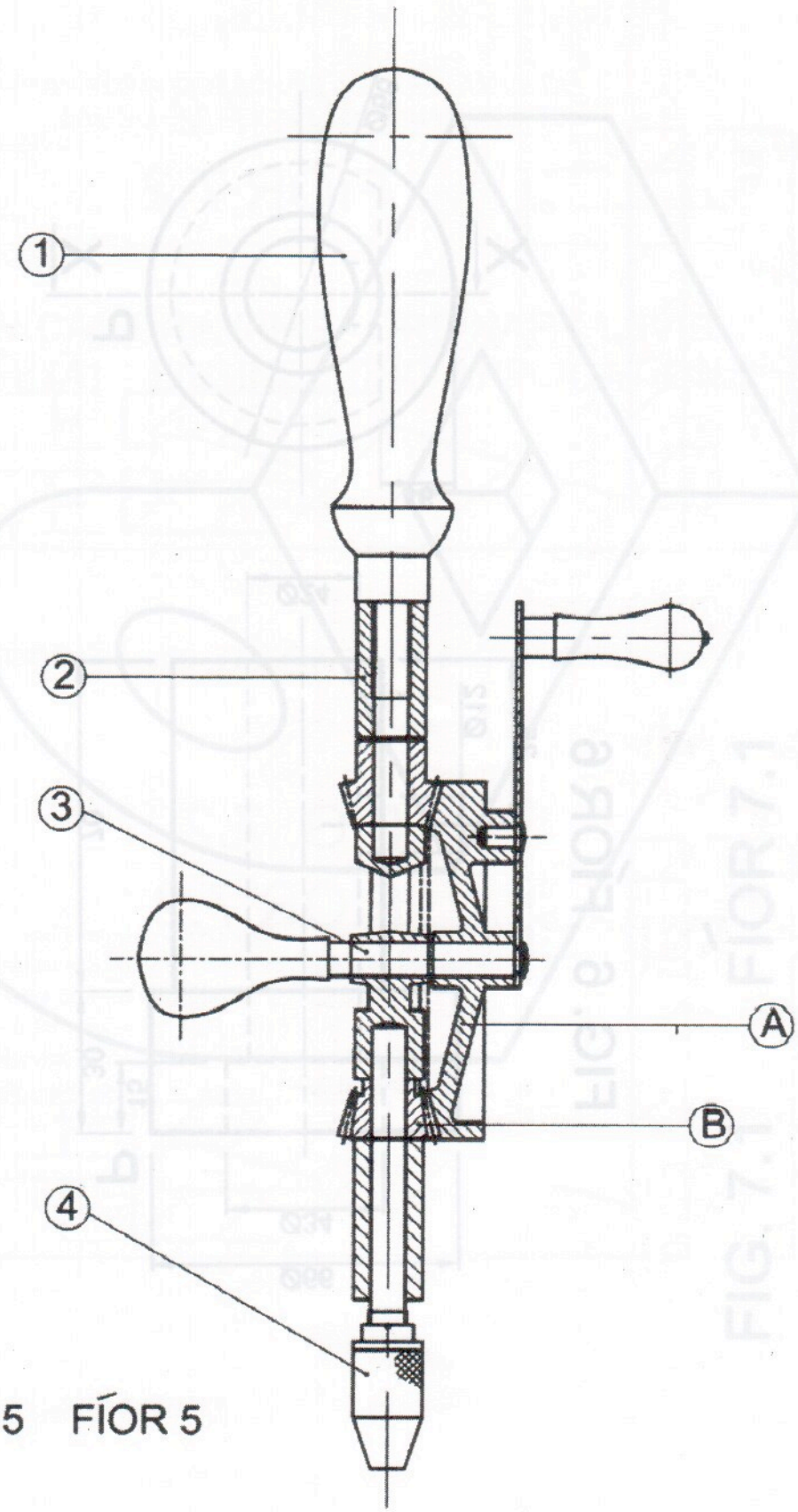
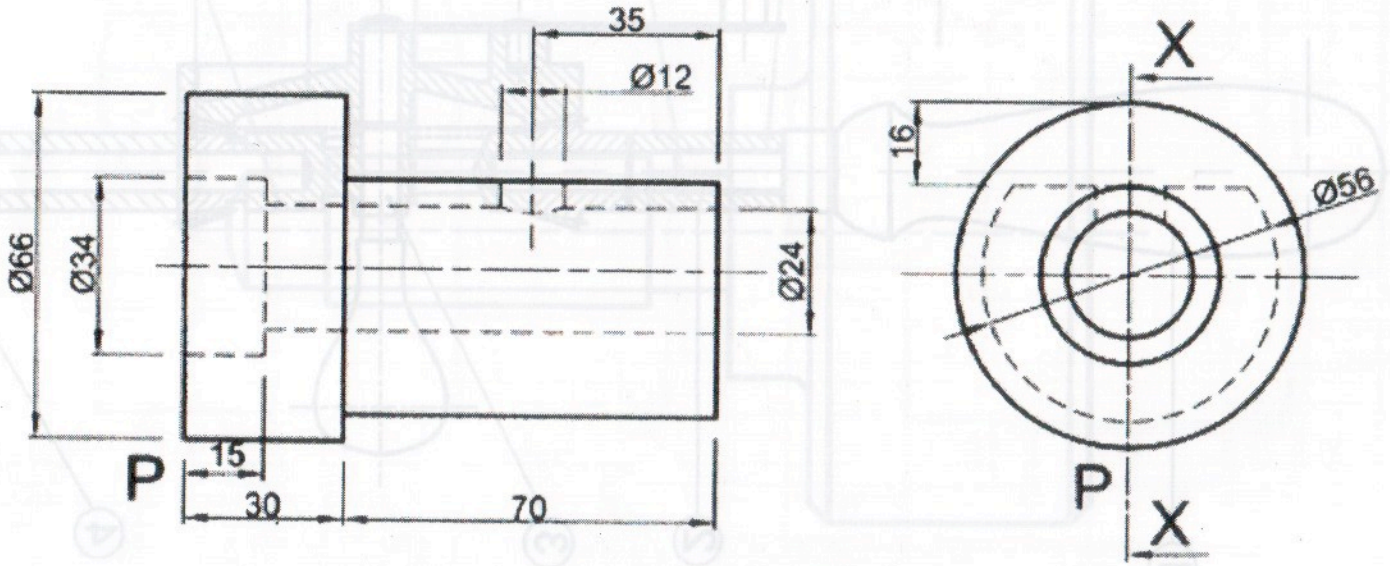


FIG. 5 FÍOR 5

FIG. 6 FÍOR 6



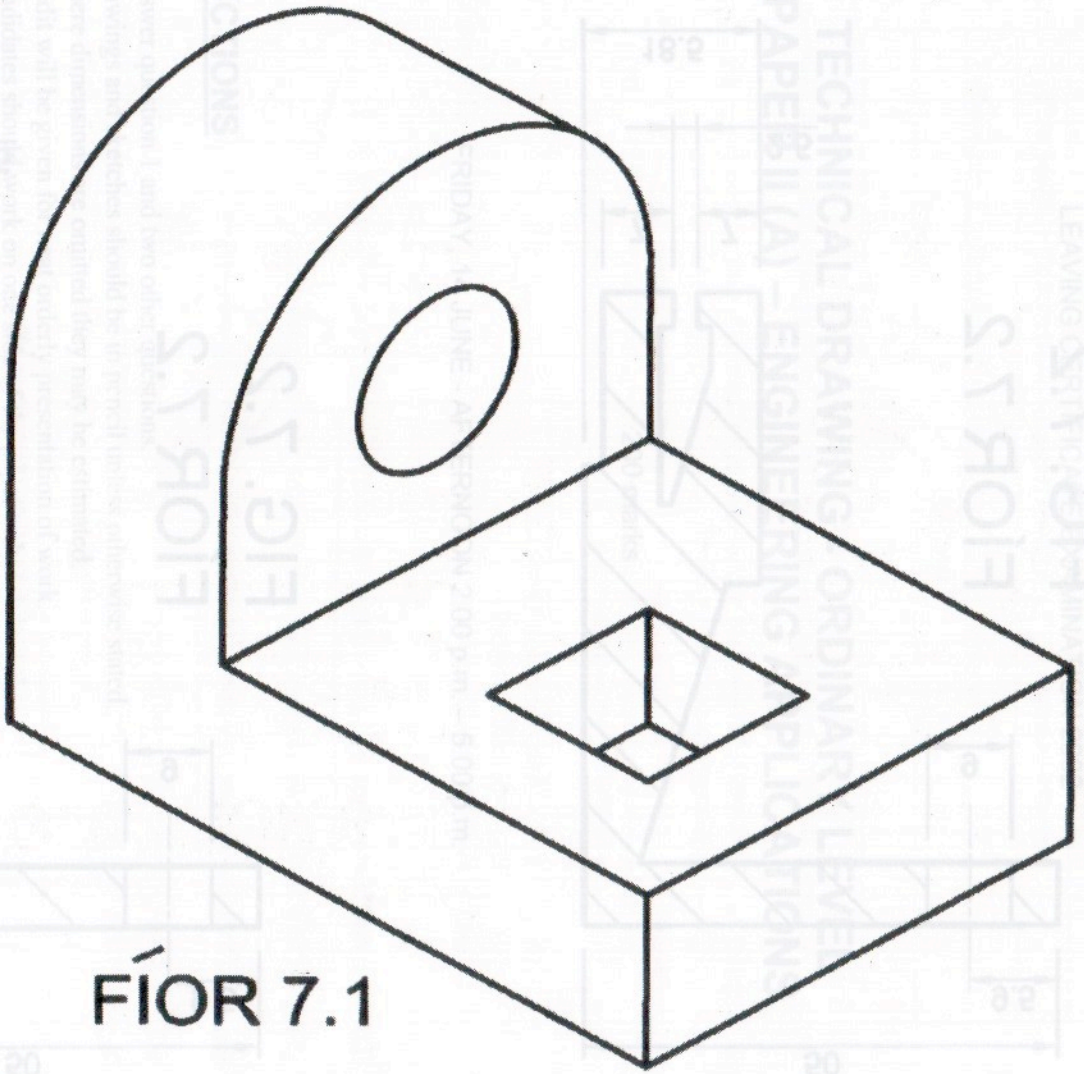


FIG. 7.1 FÍOR 7.1

FIG. 7.2
FÍOR 7.2

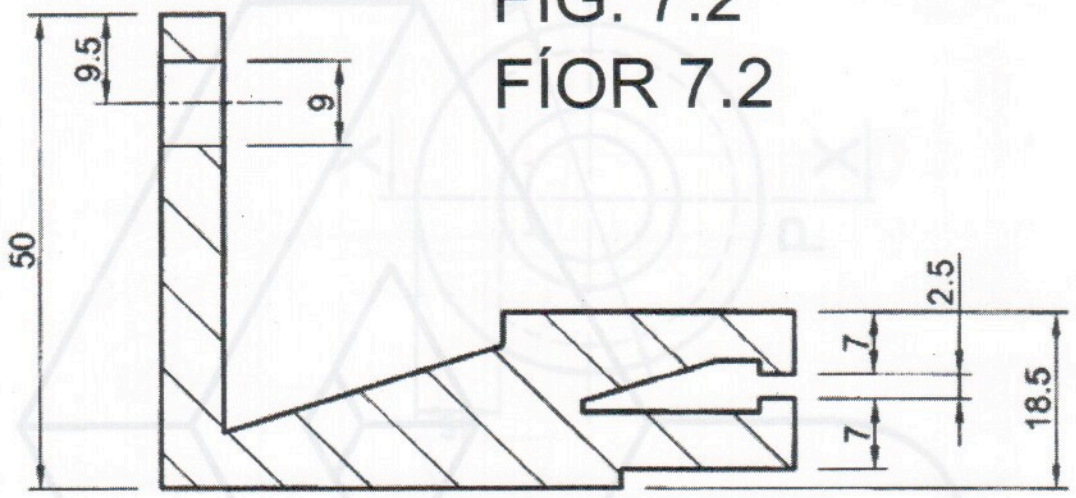
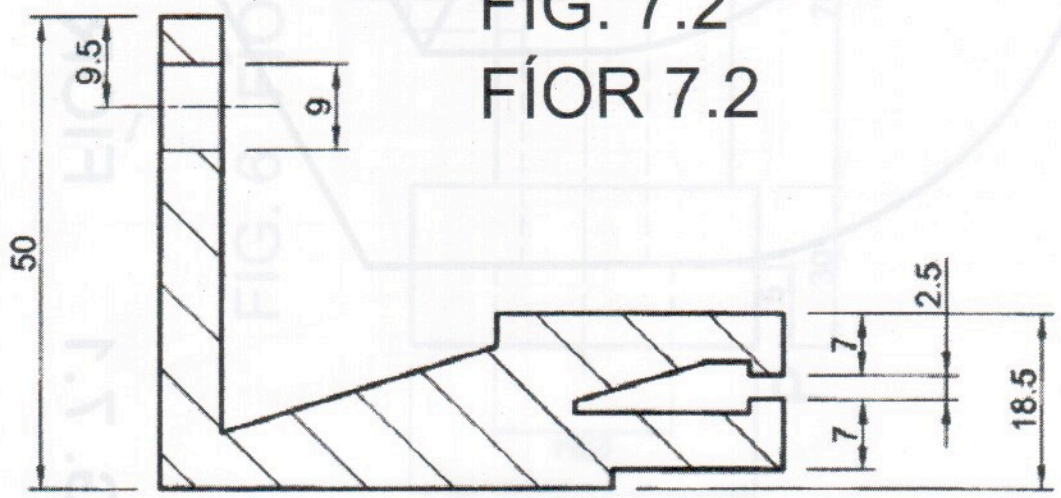



FIG. 7.2
FÍOR 7.2