

## TECHNICAL DRAWING - HIGHER LEVEL

## PAPER II(A) - ENGINEERING APPLICATIONS

Tuesday, 24 June, Afternoon 2.00 – 5.00 pm

200 MarksINSTRUCTIONS

- (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 Universal Joint are given in Fig. 1 with the parts list tabulated below.
- (a) Draw a full size sectional elevation A-A showing the parts fully assembled.
  - (b) Insert item reference numbers to identify the parts and add the title UNIVERSAL JOINT.
  - (c) Give one example for the use of a universal joint and state why joints of this type are used.

PART	NAME	REQUIRED
1	Fork	2
2	Centre	1
3	Pin	2
4	Bush	4
5	Washer	4
6	M12 Nut	4

2. A sheetmetal transition piece, used to connect a rectangular chute to a cylindrical pipe, is shown in Fig. 2.

- (a) Draw the given views and produce a one piece development of the transition piece. The development should have the shortest seam possible.
- (b) Sketch freehand and name a sheetmetal joint suitable for this transition piece. Using a separate sketch show the seam allowance necessary to make the joint.

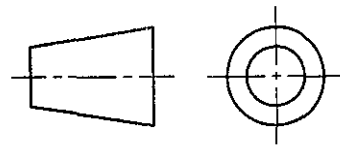
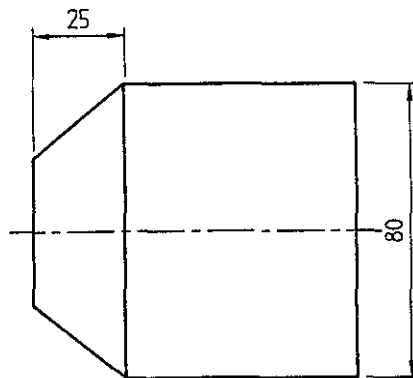
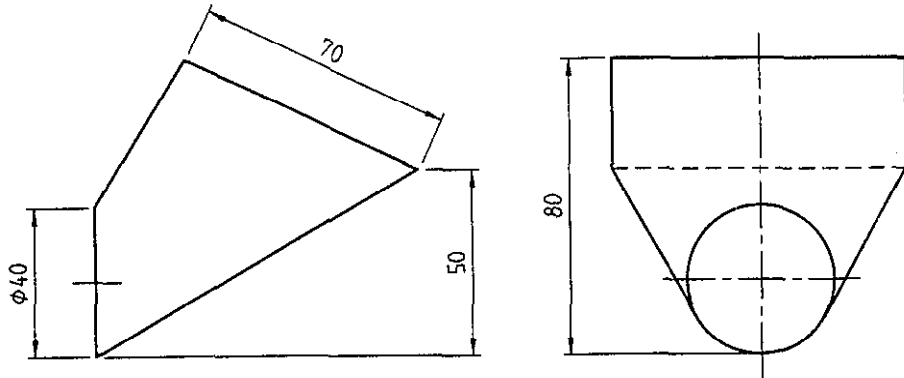


FIG. 2      FIG. 2

3. (a) The profile of two threads of a right hand, single start screwthread is shown in Fig. 3. Draw two full revolutions of a screw with these threads. The threads are cut on a shaft of 120 mm outside diameter. Hidden detail lines/curves are not required.

(b) An involute gear wheel with 24 teeth, 20° pressure angle and module 10 is in mesh with a rack. Draw the gear and rack in mesh, showing one tooth on the gear and two teeth on the rack. Tabulate on the sheet the following values for the gear wheel:-

Pitch circle diameter; Addendum circle diameter; Dedendum circle diameter; Base circle diameter; Circular pitch; Tooth thickness.

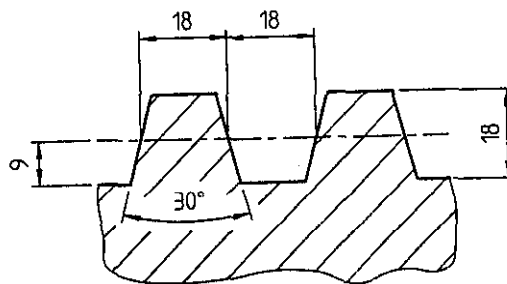


FIG. 3      FIG. 3

4. (a) A sectional view of a hydraulic cylinder, showing the piston rod in the fully retracted position, is shown in Fig. 4.
- (i) Make a neat freehand sketch of the sectional view of the cylinder showing the piston rod in the fully extended position.
  - (ii) Show, with the aid of arrows, the direction of flow of oil in the cylinder.
  - (iii) Identify and neatly label on the sketch the following parts; Piston, Piston rod, Guide bush, Tube, Oil port (2), Guide ring (2), Wiper, Rod seal, Piston seal, Tube seal (2).
- (b) Sketch, freehand, a simple non-return ball valve and use arrows to indicate the direction of flow through the valve.
- (c) Sketch freehand the following pipe fittings:-
- (i) Elbow
  - (ii) Tee junction
  - (iii) Cross.

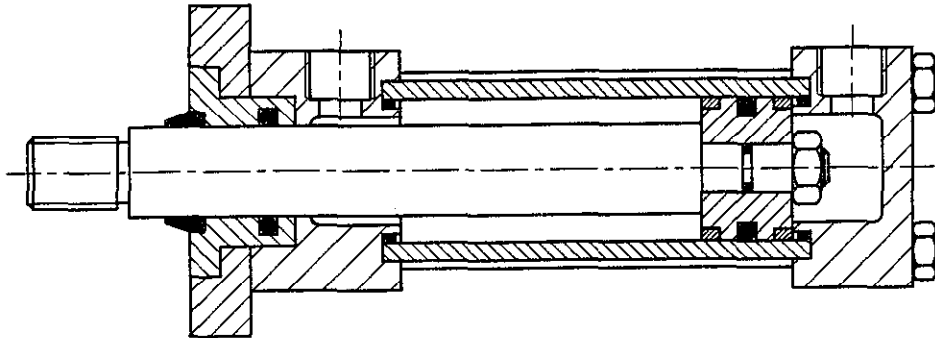


FIG. 4

5. The plan and elevation of a machine casting are shown in Fig. 5.
- (a) Draw the sectional elevation A-B<sub>1</sub> of the casting. (The inclined portion of the cutting plane may be revolved into the plane of projection)
  - (b) Draw an isometric view of half of the casting, cut on the section plane B-B<sub>1</sub>. Hatch the cut faces. (Note: Draw the half that is shown above the cutting plane in the plan view.)

### SECTION A

A pictorial view and a scaled elevation and plan of a roof truss connection is shown in Fig. 6 (A).

- (i) Produce a parts list for this connection with the following information contained in the columns of the parts list.
- |       |   |
|-------|---|
| ITEM: | Part numbers.   |
| NAME: | Steel section name, type of description for each part.  |
| QTY:  | The number required of each part of this connection.  |
| SIZE: | Sizes to describe each section. Supply flange and web sizes where appropriate. Only approximate sizes for thicknesses are required.<br>(Note: you are not required to specify the length of the sections) |
- (ii) Produce, to a suitable scale, a detailed drawing for Part 5. The drawing should fully describe the part and should be fully dimensioned. State the scale used.
- (iii) Part 2 is welded to Part 1 on three sides using a fillet weld. Produce a neat freehand sketch of this arrangement and supply a welding symbol to show a fillet weld on one joint.
- (iv) Draw the symbol for a site fitted HSFG bolt and state what the letters *HSFG* stand for.

### SECTION B

- (a) List four computer system considerations or specifications that would concern you if you were purchasing a computer for CAD use. Explain the effect of each consideration on the computer systems performance.
- (b) List the prompts you would have to respond to when creating Text on a CAD system and produce a simple sketch to show what is meant by each prompt. List three dimension variables or system settings that control the display of dimensions and produce a simple sketch to explain what is meant by each.
- (c) Draw the profile that would be created on CAD as follows:-
- Five circles, of radius 10 are drawn with their centres positioned at the following points. Point 1 X 40 YO; Point 2 X40 Y60; Point 3 X0 Y90; Point 4 X-40 Y60; Point 5 X-40 YO.
  - Five lines are drawn connecting each circle centre (Point) to form a pentagon.
  - The portion of the circles within the pentagon are trimmed out.
  - The portions of each line within the circles are trimmed out.
- (d) Use simple sketches to show the meaning of the following 3D surfaces.
- (i) Revolved surface.
- (ii) Extruded or Tabulated surface.
- (iii) Ruled surface.
- (e) List the commands you would use, in the sequence that you would use them, to convert the drawing shown in Fig. 6(B)1 into the drawing shown in Fig. 6(B)2.

8014

AN ROINN OIDEACHAIS

M.84(L)

SCRÚDÚ ARDTEISTIMÉIREACHTA

1997

**LÍNÍOCHT THEICNIÚIL - ARDLEIBHÉAL**

**PÁIPÉAR II(A)**

FEIDHMIÚCHÁIN INNEALTÓIREACHTA

AN ROINN OIDEACHAIS

LEAVING CERTIFICATE EXAMINATION

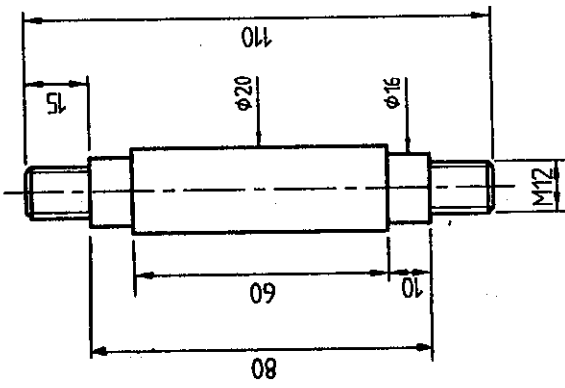
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**TECHNICAL DRAWING - HIGHER LEVEL**

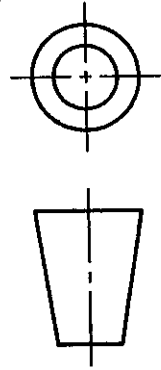
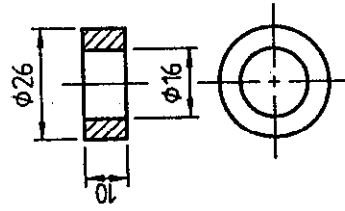
**PAPER II(A)**

ENGINEERING APPLICATIONS

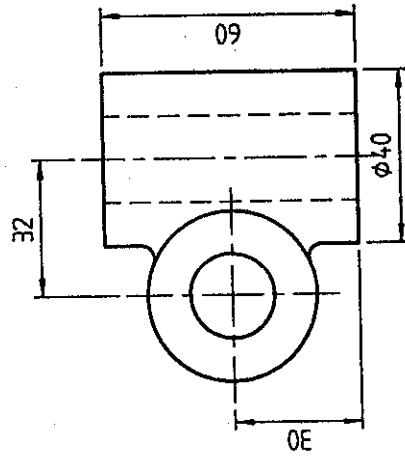
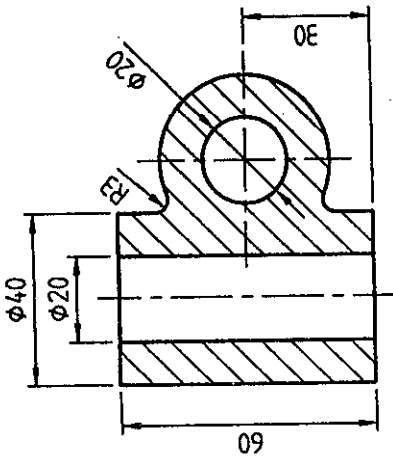
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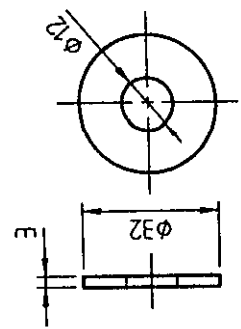
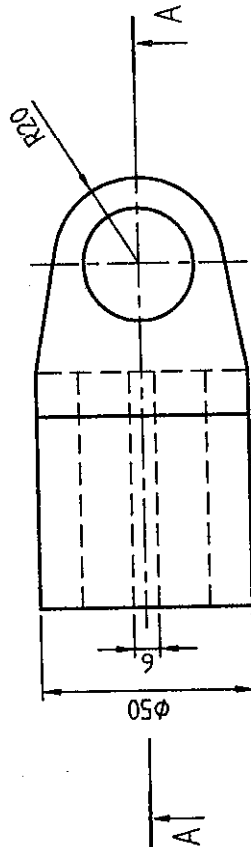
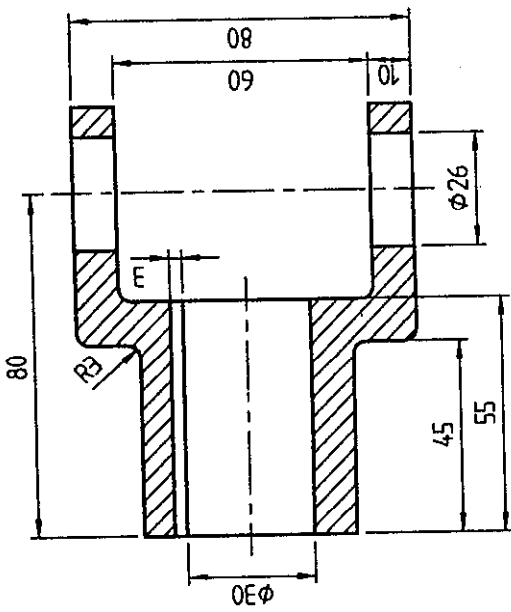
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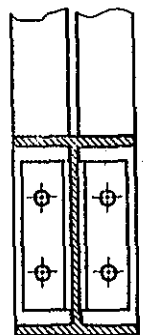
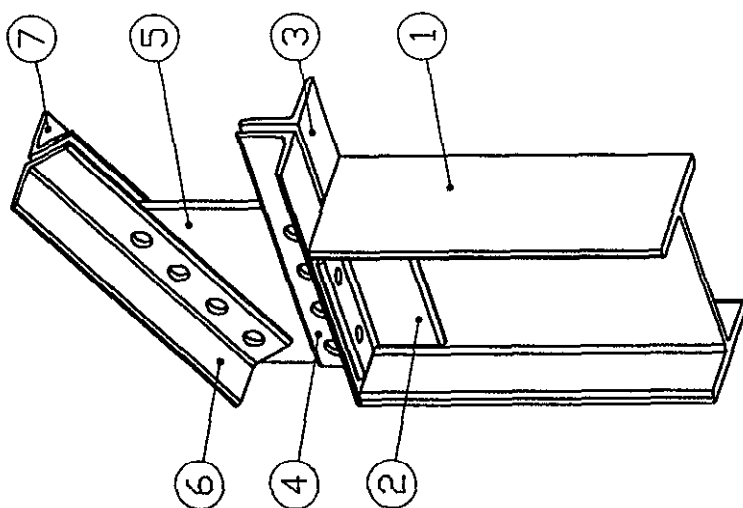
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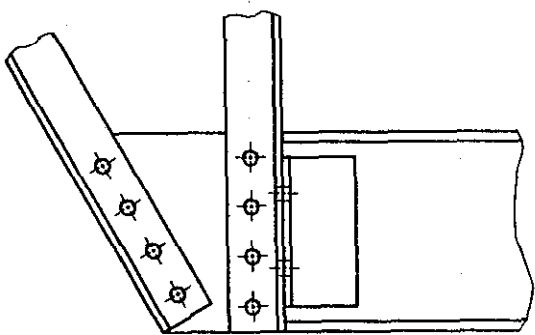
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FIG. 1

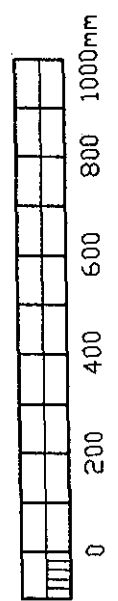




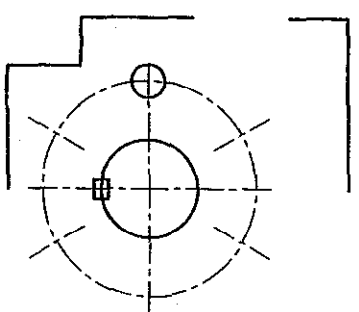
VIEW Z



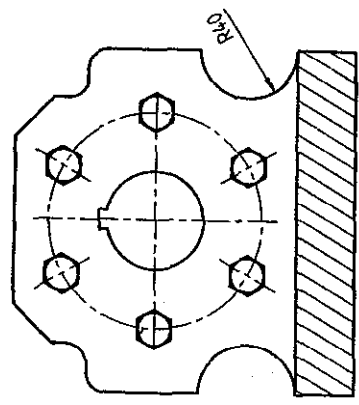
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FÍOR 6(A) FIG. 6(A)



FÍOR 6(B)1 FIG. 6(B)1



FÍOR 6(B)2 FIG. 6(B)2