



Leaving Certificate Examination 2004

Technical Drawing
Paper II(A) – Ordinary Level
(Engineering Applications)

(200 Marks)

Friday 18 June
Afternoon, 2.00 to 5.00

- (a) Ensure that you have received examination paper M.82(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) Work on one side of the paper only.*
- (g) Your Examination Number should be written on each drawing sheet used.*

Note: The following drawings are shown on examination paper M.82(L) which accompanies this paper: Fig. 1, Fig 6, Fig 6.1, and Fig 6.2

1. Details of a Bar Vice Assembly are shown in Fig. 1 with a parts list tabulated below.

PART	NAME	REQUIRED
1	Vice Body	1
2	End Plate	1
3	Clamp Screw	1
4	Fixing Screw	2

- (a) Assemble the parts, with the screw tightened on a 90mm bar, and draw full size, in first or third angle projection, the following views:
- a sectional elevation on plane A-A;
 - a plan projected from (i).
- (b) Insert the following on your drawing:
- Title:- BAR VICE ASSEMBLY;
 - ISO projection symbol;
 - Four leading dimensions.

(100 marks)

2. Fig. 2 shows the elevation of three cylindrical pipes of 75mm diameter which form a bend. The axes of the pipes are in the same plane.

- Draw the given elevation and project a plan.
- Draw a surface development of pipe B with SS as the seam line.
- Make a neat freehand sketch of a suitable joint for the seam SS.

(50 marks)

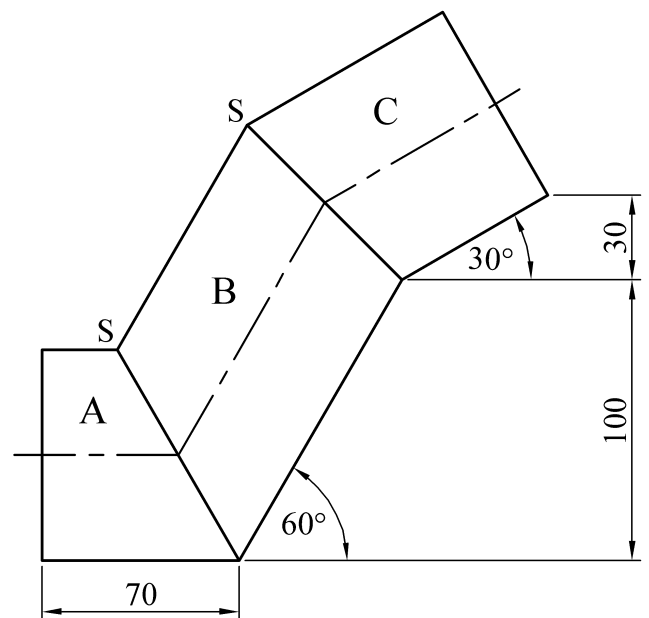


Fig. 2

3. (a) A radial plate cam rotates in an anti-clockwise direction and operates an in-line knife edged follower. The nearest approach of the follower to the cam center is 45mm.

Draw the profile of the cam to give the following motion to the follower:

0° to 180° Rise 55mm with uniform acceleration and retardation;

180° to 270° Dwell

270° to 360° Return to initial position with simple harmonic motion.

Include the displacement diagram as part of the solution.

- (b) Fig. 3 shows a pin-jointed mechanism. The cranks AB and CD revolve about A and C respectively. Both cranks rotate at the same speed and in the same direction.

- (i) Using a line diagram to represent the mechanism, plot the locus of F.
- (ii) Draw the profile of a simple machine guard about the mechanism with a minimum clearance of 15mm.

(50 marks)

$$\begin{aligned} AB &= CD = 40 \\ BE &= DE = 120 \\ AC &= 110 \\ EF &= 30 \end{aligned}$$

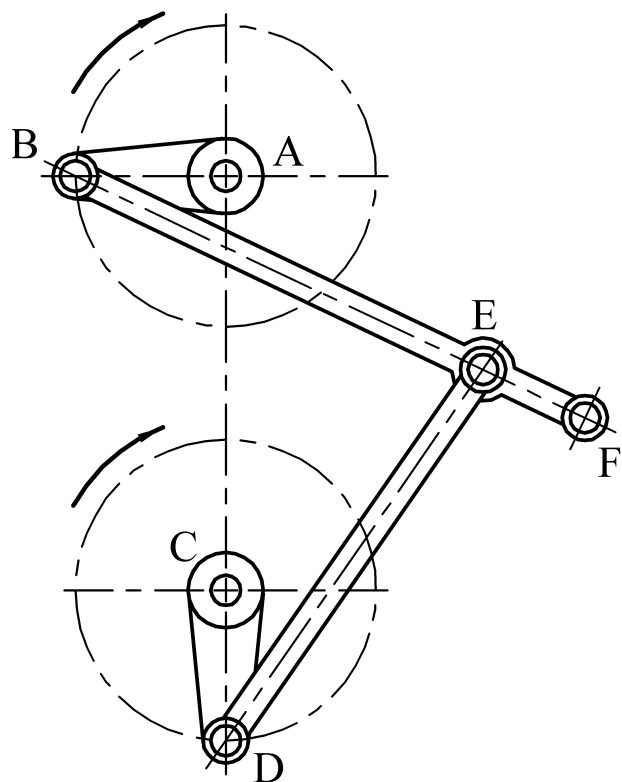


Fig. 3

4. (a) Using the data table below, make a fully dimensioned drawing of the machine part in Fig. 4(a), showing all specifications. Use SS as a datum.

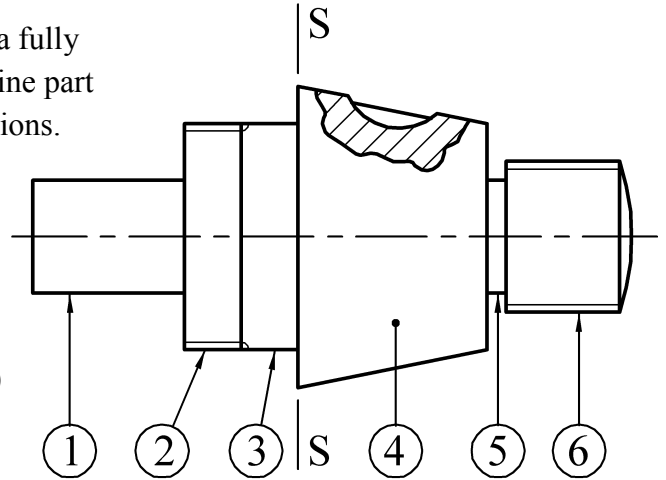


Fig. 4(a)

1	Square 30, Length 40
2	Screwthread Metric 60, Pitch 5, Length 15
3	Length 15, Diameter 60
4	Maximum diameter 80, Minimum diameter 60, Length 50, Woodruff keyway diameter 30, Depth 6 Mid length
5	Undercut depth 5, Length 5
6	Screwthread Metric 50, Pitch 3.5, Length 30

- (b) (i) Identify the valve type in Fig. 4(b).
(ii) Name the parts 1, 2, 3, 4 and 5.
(iii) Make a freehand sketch showing another method of fixing part 1 to part 5.

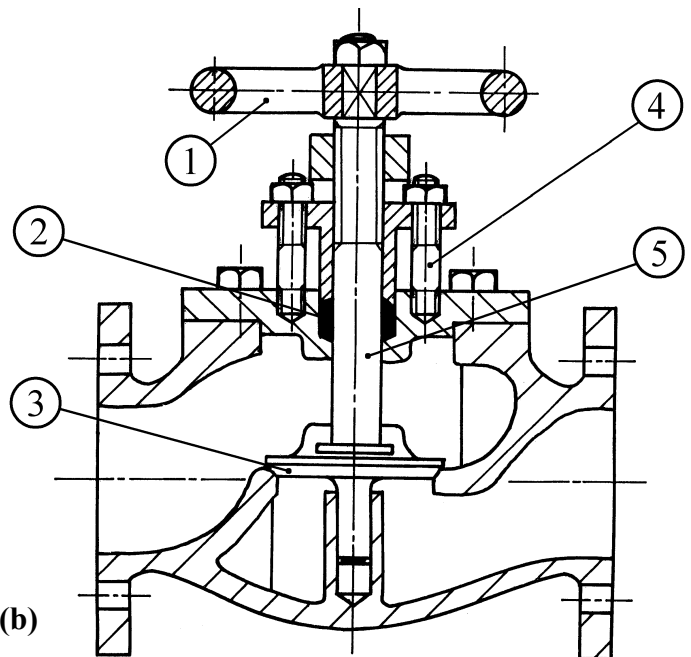


Fig. 4(b)

- (c) Using large freehand sketches, explain the following engineering terms:
(i) Keyway;
(ii) Collar;
(iii) Dowel.

(50 marks)

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

SECTION A

- (a) Fig. 6(a) shows the plan and elevation of a machine casting. Draw an isometric view of the casting with the portion in front of section plane AA removed. Point P is to be the lowest point on the drawing.
- (b) Using large freehand sketches illustrate the following:
- (i) Ball bearing;
 - (ii) Roller bearing;
 - (iii) Thrust bearing.

(50 marks)

OR

SECTION B

- (a) List **six** Computer Aided Drawing commands necessary to produce the drawing in Fig.6(b).
- (b) Using notes and freehand sketches briefly explain **each** of the **six** commands listed at (a).
- (c) With the aid of a large freehand sketch show the component in Fig. 6(c) as a wireframe representation.
- (d) Explain the difference between the following pairs of CAD terms:
- (i) ***grid resolution*** and ***snap resolution***;
 - (ii) ***polar array*** and ***rectangular array***;
 - (iii) ***zoom*** and ***scale***;
 - (iv) ***vector graphics*** and ***raster graphics***.

(50 marks)

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