



Leaving Certificate Examination 2005

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

(200 Marks)

Friday 17 June
Afternoon, 2.00 - 5.00

Instructions

- (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. 5(a) and Fig. 5(b)

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

PART	NAME	REQUIRED
1	Clamp Body	1
2	Adjustable Jaw	1
3	Clamping Screw	1
4	Grub Screw	1

(a) Assemble the parts with a bar of diameter 30mm held in the vice and draw full size, in first or third angle projection, the following views:

- (i) a sectional elevation on plane A-A;
- (ii) a plan projected from (i).

(b) Insert the following on your drawing:

- (i) Title:- PIPE VICE;
- (ii) ISO projection symbol;
- (iii) Four leading dimensions.

(100 marks)

2. The incomplete elevation and end elevation of two intersecting pipes of unequal diameter are shown in Fig.2.

(a) Draw the given views and complete the elevation.

(b) Draw a surface development of pipe S with CC as the seam line.

(c) Draw the true shape of the intersection hole in pipe R.

(50 marks)

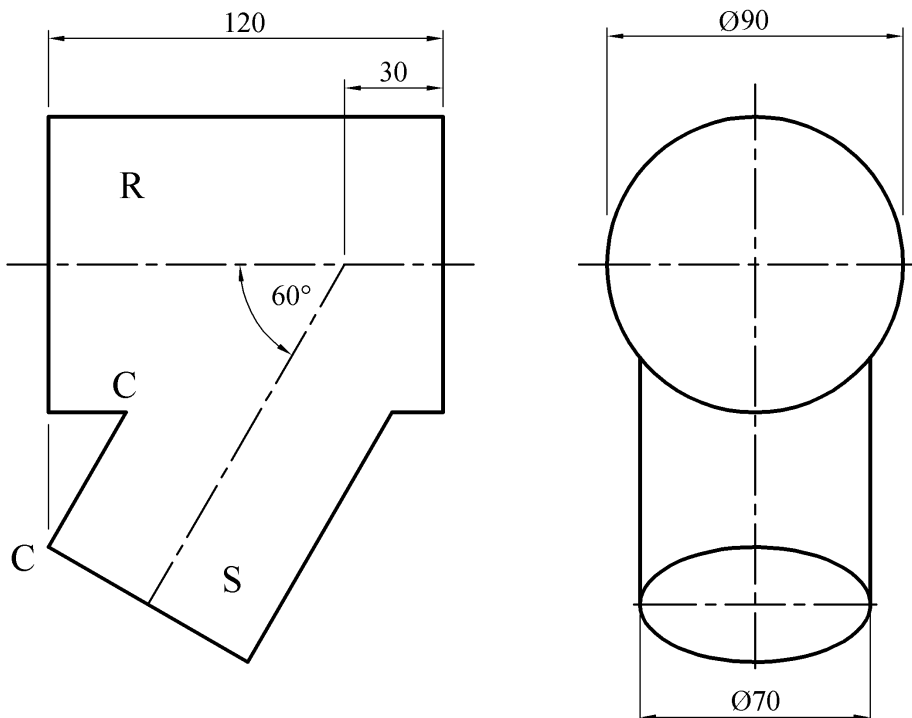


Fig. 2

3. (a) A radial plate cam has a minimum radius of 35mm and a camshaft diameter of 24mm. The cam rotates in an anticlockwise direction and imparts the following motion to an inline knife-edge follower:

0° to 180° Rise 50mm with uniform acceleration and retardation;

180° to 210° Dwell;

210° to 270° Fall 20mm with uniform velocity;

270° to 360° Fall 30mm with simple harmonic motion.

Draw the profile of the cam.

Include the displacement diagram as part of the solution.

- (b) Fig. 3 shows a link mechanism. Crank AB rotates about A in a clockwise direction. Link BD is pin jointed at B, and D is constrained to slide vertically along the line LM. CE is perpendicular to BD as shown.

- (i) Using a line diagram to represent the mechanism, plot the locus of point E for one revolution of the crank AB.
- (ii) Draw the profile of a simple machine guard about the mechanism with a minimum clearance of 15mm.

(50 marks)

AB = 40
BD = 120
BC = 50
CE = 20

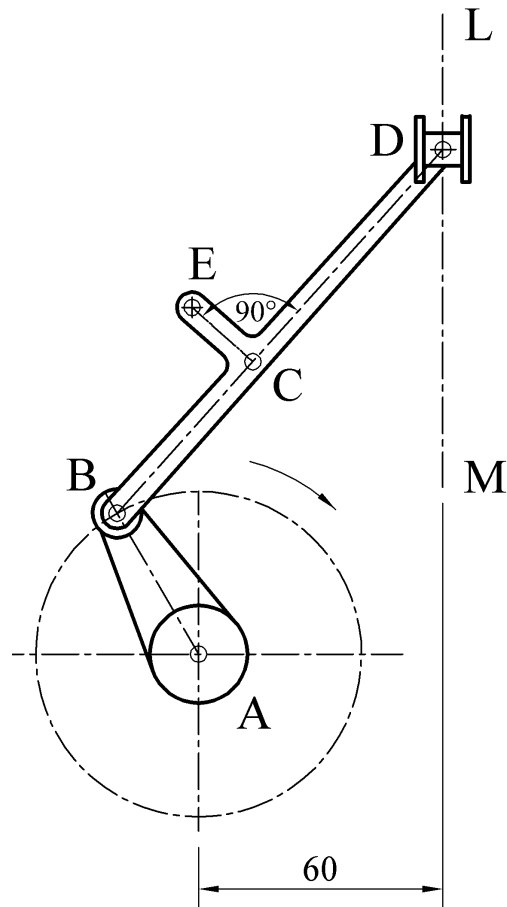


Fig. 3

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.

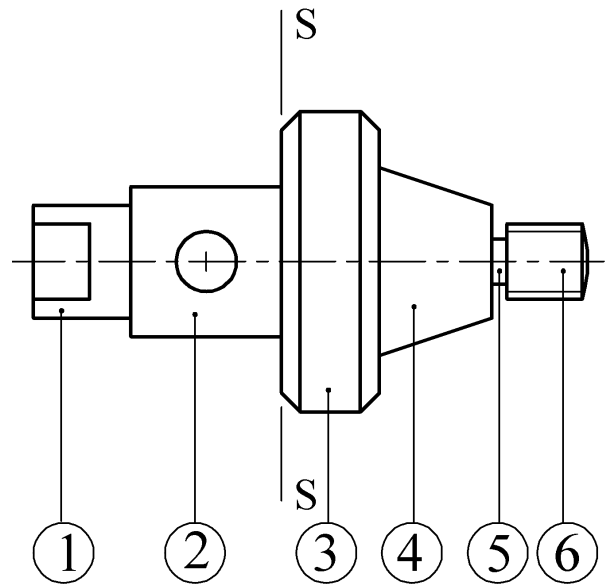


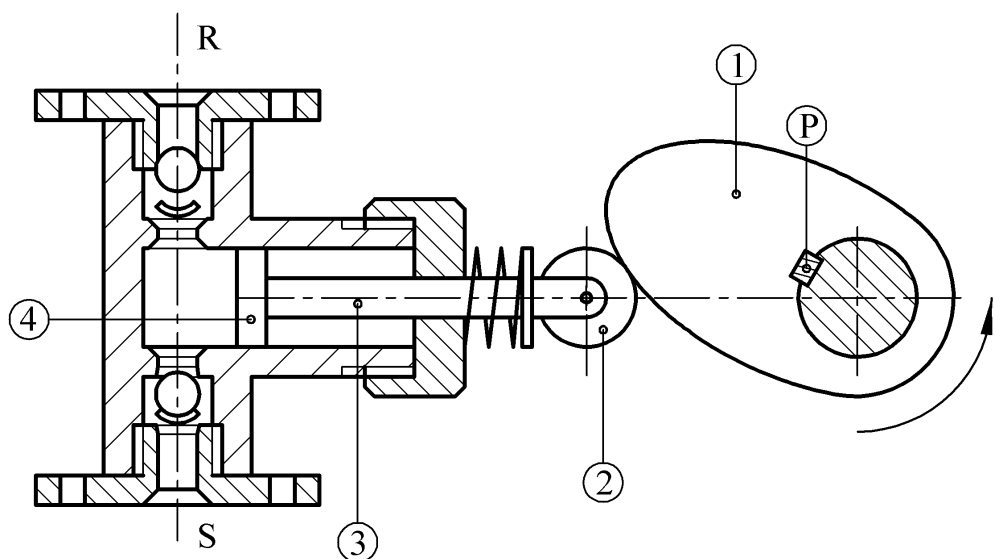
Fig. 4(a)

1	Diameter 30, Length 26, Flat 20 x 15 long
2	Diameter 40, Length 40, Diameter 16 hole thru. centre
3	Diameter 80, Length 26, Chamfer 5 x 45°
4	Maximum diameter 50, Minimum diameter 30, Length 30
5	Undercut 4 x 4
6	Screwthread Metric 20, Pitch 2.5, Length 20

- (b) Fig 4(b) shows a pump.
- Draw a parts list, in a table format, which includes the item number and name for each of the parts 1, 2, 3 and 4.
 - Explain, with the aid of freehand sketches, the function of the part labelled P.
 - With reference to the letters R and S, identify the inlet and outlet and, with the aid of sketches, explain briefly how the pump operates.

(50 marks)

Fig. 4(b)



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

SECTION A

- (a) Fig. 5(a) shows the elevation and end elevation of a machine casting. Draw a sectional isometric view of the casting with the portion in front of section plane AA removed. The section plane passes through the centre of the rectangular slot. Point P is to be the lowest point on the drawing.
- (b) Using large freehand sketches illustrate the following:
- Split pin;
 - Tee slot;
 - Curved slot.

(50 marks)

OR

SECTION B

- (a) List **six** Computer Aided Drawing commands necessary to produce the drawing in Fig. 5(b).
- (b) Using notes and freehand sketches, explain briefly **each** of the **six** commands listed at (a).
- (c) Explain the difference between the following pairs of CAD terms:
- trim* and *extend*;
 - stretch* and *scale*;
 - line* and *polyline*;
- (d) Draw, full size, the object that would be displayed on a CAD system when the following commands are executed:

(All points (X,Y) are specified using absolute co-ordinates. The origin (0,0) is located at the lower left corner of the display)

- A rectangle is drawn with its lower left corner at (30,30) and its upper right corner at (150,45)
- Two lines AB and CD are drawn using the following co-ordinates:
A (45,45) B (45,125) C (135,45) D (135,125)
- An arc is drawn with its start point at B, its mid point at (90,145) and its end point at D
- A 12mm diameter circle is drawn with its centre at point (60,95)
- The circle is duplicated 12 times in a circular (polar) array pattern with the centre of the array at the point (90,95)
- Two polylines EF and FG are drawn with a width of 3mm and using the following co-ordinates:

E (90, 117) F (90,95) G (100,78)

(50 marks)

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