



Leaving Certificate Examination 2006

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

(200 Marks)

Friday 16 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), Fig. 5(b), and Fig. 5(c)

1. Details of a Flat Belt Pulley Bracket are shown in Fig.1 with a parts list tabulated below.

PART	NAME	REQUIRED
1	Body	1
2	Spindle	1
3	Pulley	1
4	Bush	2
5	Collar	1
6	Grub Screw	1
7	Washer	1
8	Hexagonal Nut	1

(a) Assemble the parts and draw, full size, 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:- PULLEY BRACKET;
- (ii) ISO projection symbol;
- (iii) Four principal dimensions.

(100 marks)

2. Fig.2 shows the elevation and plan of a pipe and base plate from an air duct cover. A pictorial view is also shown.

The pictorial view shows material thickness which may be ignored for the purposes of your drawing.

- (a) Draw the given plan and elevation.
- (b) Draw a surface development of the pipe with C-C as the seam line.
- (c) Make a neat freehand sketch of a suitable joint for the seam C-C.

(50 marks)

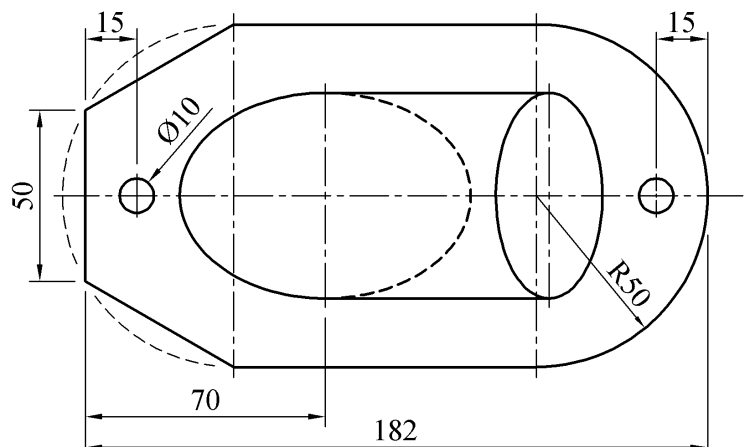
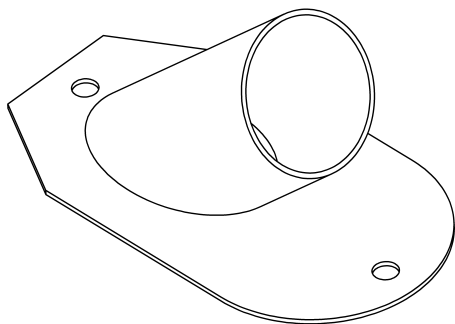
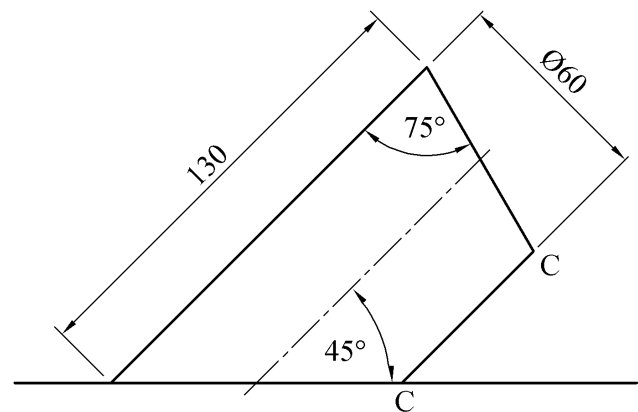


Fig. 2

3. (a) A radial plate cam has a minimum radius of 40mm and a camshaft diameter of 22mm. The cam rotates in a clockwise direction and imparts the following motion to an inline knife-edge follower:

0° to 180° Rise 60mm with uniform acceleration and retardation;

180° to 210° Dwell;

210° to 300° Fall 40mm with simple harmonic motion;

300° to 360° Fall 20mm with uniform velocity.

Draw the profile of the cam.

Include the displacement diagram as part of the solution.

- (b) Fig. 3 shows a link mechanism. A and C are fixed points. Crank AB rotates in an anti-clockwise direction. Link BDEF is pin jointed at B and D. Link CD oscillates about point C.

- (i) Using a line diagram to represent the mechanism, plot the locus of point F 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)

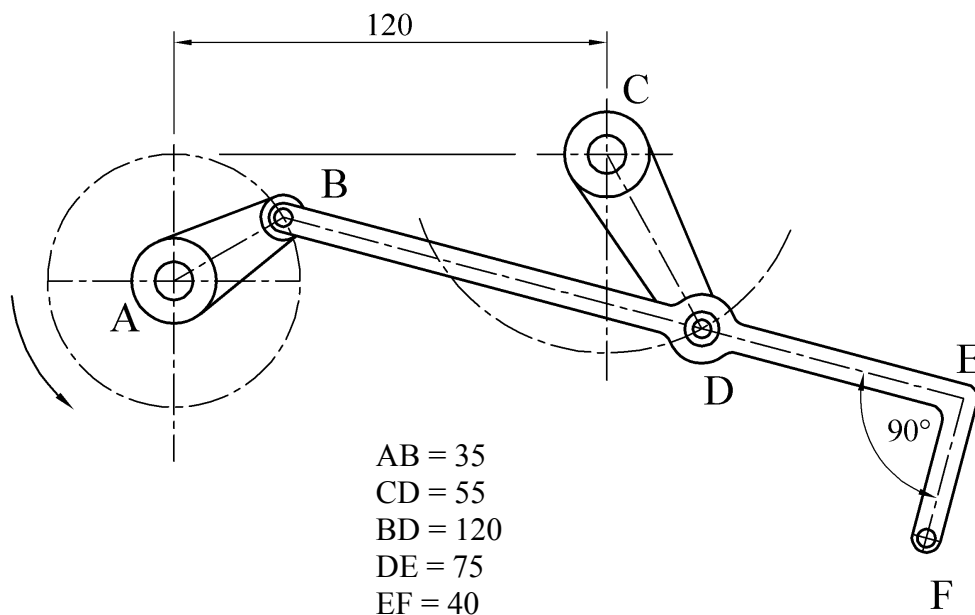


Fig. 3

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

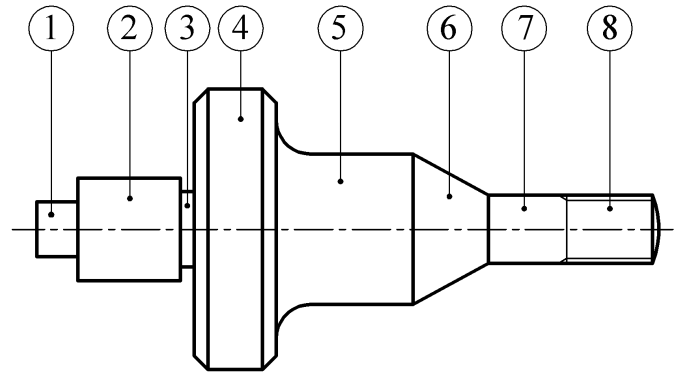


Fig. 4(a)

1	Square 16, Length 12
2	Diameter 30, Length 30
3	Undercut 4 x 4
4	Diameter 82, Length 24, Chamfer 4 x 4
5	Diameter 44, Fillet radius 10, Length 40
6	Maximum diameter 44, Minimum diameter 20, Length 22
7	Diameter 20, Length 23
8	Screwthread Metric 20, Pitch 2.5, Length 25

- (b) Fig. 4(b) shows a lever type relief valve.

- (i) Draw a parts list, in table format, which includes the item number and name for each of the parts 1, 2, 3, 4 and 5.
- (ii) Explain, with the aid of freehand sketches and with reference to the letters A, B, C, D and E, the operation of the air relief valve.
- (iii) Explain, with the aid of sketches, how the valve could be regulated to operate at different air pressures.

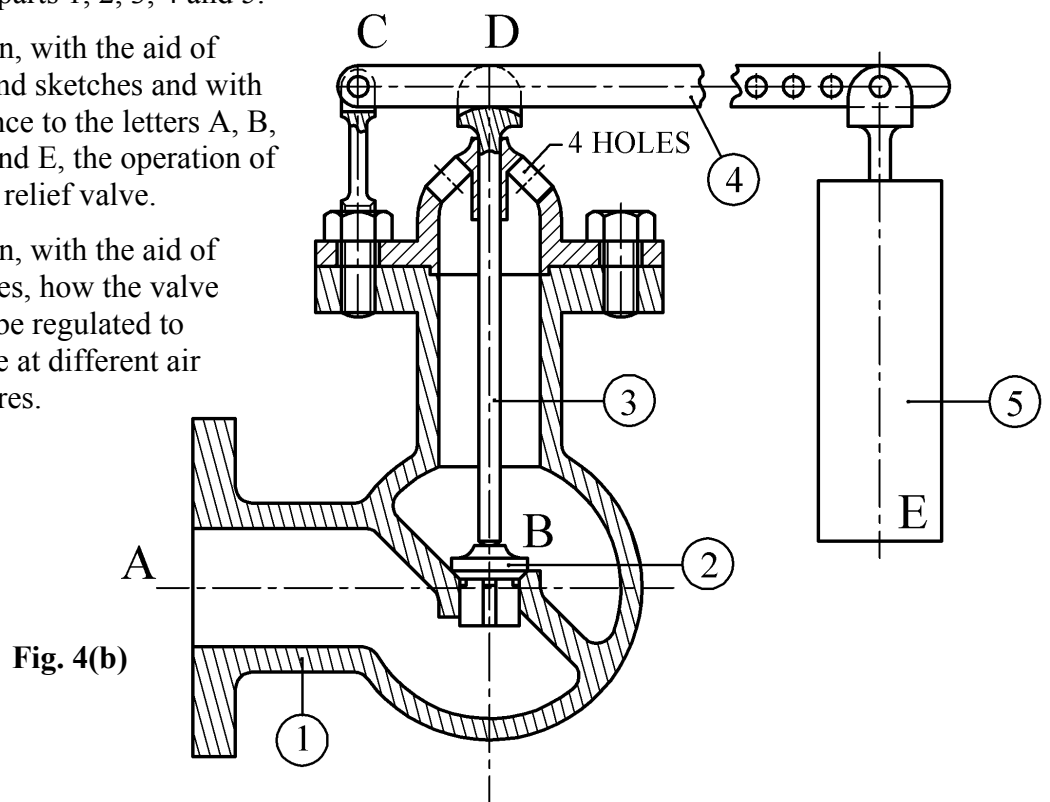


Fig. 4(b)

- (c) Using large freehand sketches, explain the following engineering terms:
- (i) Flanged elbow; (ii) Rolled steel channel; (iii) Butterfly valve.

(50 marks)

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

SECTION A

- (a) Fig.5(a) shows the elevation and plan of a machine casting. Draw an isometric view of the casting with the portion in front of the section plane A-A removed.
Point P is to be the lowest point on the drawing.

(50 marks)

OR

SECTION B

- (a) List, in the order in which they would be used, **six** Computer Aided Drawing commands necessary to produce the drawing in Fig. 5(b).
- (b) By means of sketches and a short note, explain the purpose of the following commands:
- (i) Lengthen;
 - (ii) Pan;
 - (iii) Zoom.
- (c) Using a large freehand sketch, draw the object shown in Fig. 5(c) as a wireframe representation.
- (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)

- Five lines AB, AE, EF, FG and GH are drawn using the following co-ordinates:
A (50,50) B (90,50) E (50,184) F (60,184) G (60,100) H (140,100)
- From B, a line is drawn to C, which is defined by the relative polar coordinates @40<60
- From C, a line is drawn to D, which is defined by the relative polar coordinates @30<0
- The lines FG and GH are filleted at G with a radius of 15mm
- A polyline KL, with a width of 5mm, is drawn using the following co-ordinates:
K (60,174) L (70,174)
- The shape drawn, is then mirrored about the line DH
- A circle, of 140mm diameter, is drawn with its centre point at (140, 174)
- A rectangle is drawn with its lower left corner at (101,130) and its upper right corner at (113,138)
- This rectangle is duplicated 16 times in a rectangular array consisting of four rows and four columns. There is an 18mm array distance between the rows and a 22mm array distance the between the columns
- A rectangle is drawn with its lower left corner at (101,204) and its upper right corner at (179,219)

(50 marks)

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