



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

GEOMETRICAL AND MECHANICAL DRAWING

7040/01

Paper 1

October/November 2007

2 hours 40 minutes

Additional Materials: A2 Drawing Paper (1 sheet)
 Standard Drawing Equipment



READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name at the bottom right-hand corner of your Drawing Paper.

Use both sides of the paper for your answers.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **five** questions.

Answer not more than **three** questions from any one section.

Unless otherwise stated, strictly geometrical methods must be used, solutions are to be drawn full size and no dimensions are required. All construction lines must be shown clearly, but lines which are parallel to, perpendicular to, or inclined at angles of 30° , 45° or 60° to other lines may be drawn without showing construction lines.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

All dimensions are in millimetres unless otherwise stated.

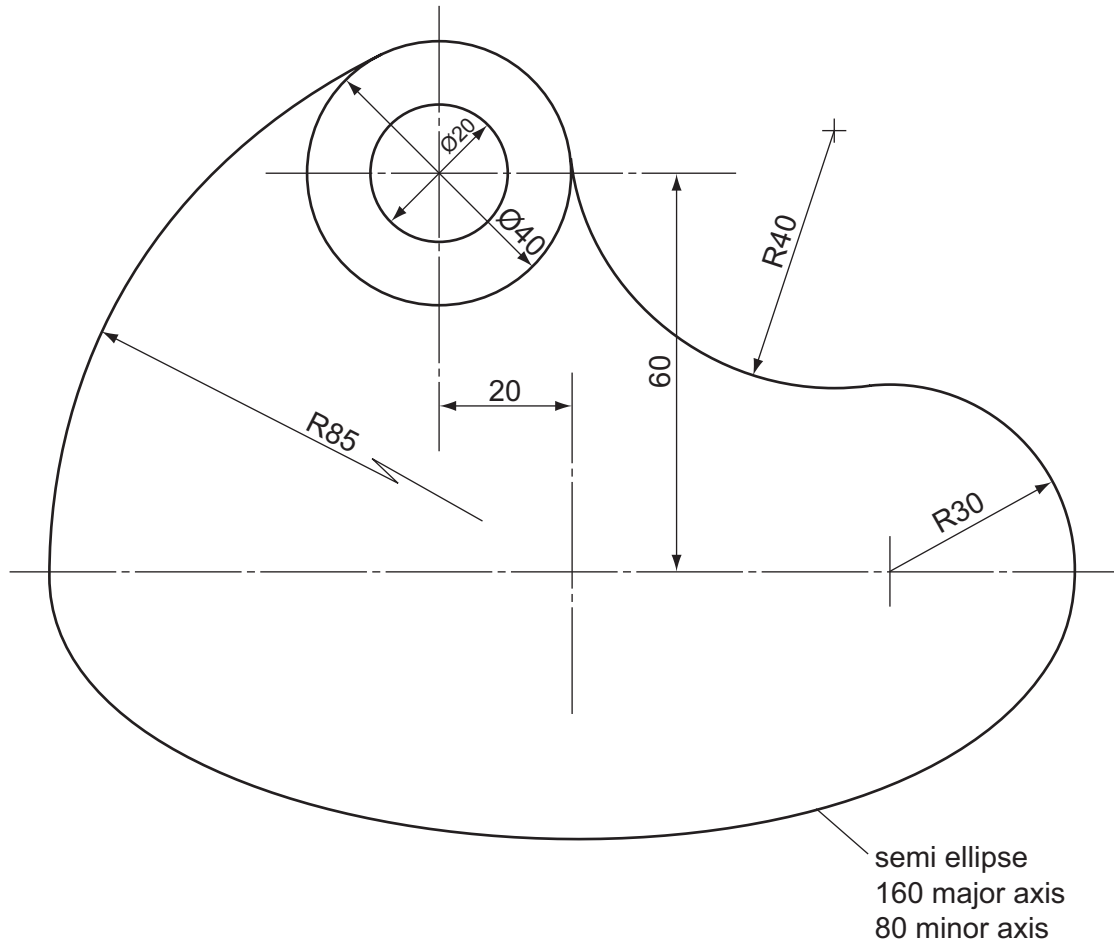
This document consists of **8** printed pages.



Section 1 Plane Geometry

Answer not more than **three** questions from this section.

- 1 Construct, full size, the cam shown in Fig. 1, showing clearly the method of construction used to determine the centres of radii. Indicate clearly the points of tangency. [20]



- 2 Fig. 2 shows diagrammatically a simple valve mechanism, in which the crank **OA** revolves about a fixed centre **O**. The arm **CB** oscillates about a fixed centre **C** and the piston **P** moves in a constrained horizontal path along the centre line **X–X**.

A, B, C, D and **P** are all pin jointed.

- (a) Draw the given view. [4]
- (b) Plot the locus of the point **D** for one complete revolution of crank **OA**. [12]
- (c) Determine the maximum and minimum horizontal displacement of the piston pin **P** measured from a vertical line drawn through **C**. [4]

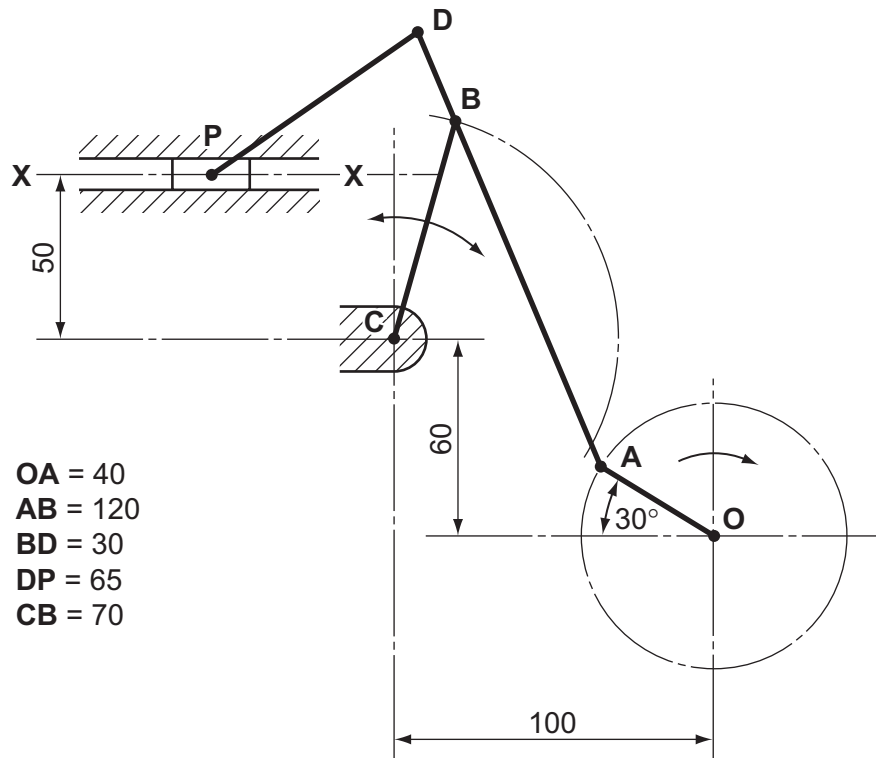


Fig. 2

- 3 Fig. 3 shows the elevation of a cylinder, which houses a spring. The spring is fixed to the 20 mm diameter spindle at the anchor point **P** and takes the form of an involute until it reaches a radius of 30 mm. At this point, the spring takes the form of an archimedean spiral for two convolutions before reaching the 180 mm inside diameter of the cylinder, where it is attached at the point of contact.

Construct full size, the elevation of the mechanism, representing the construction of the spring as a single line. [20]

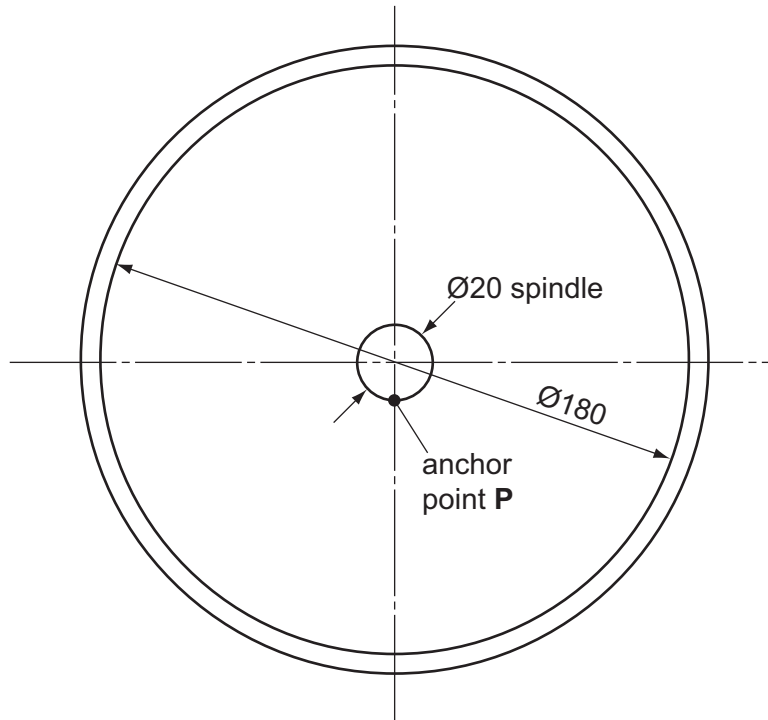


Fig. 3

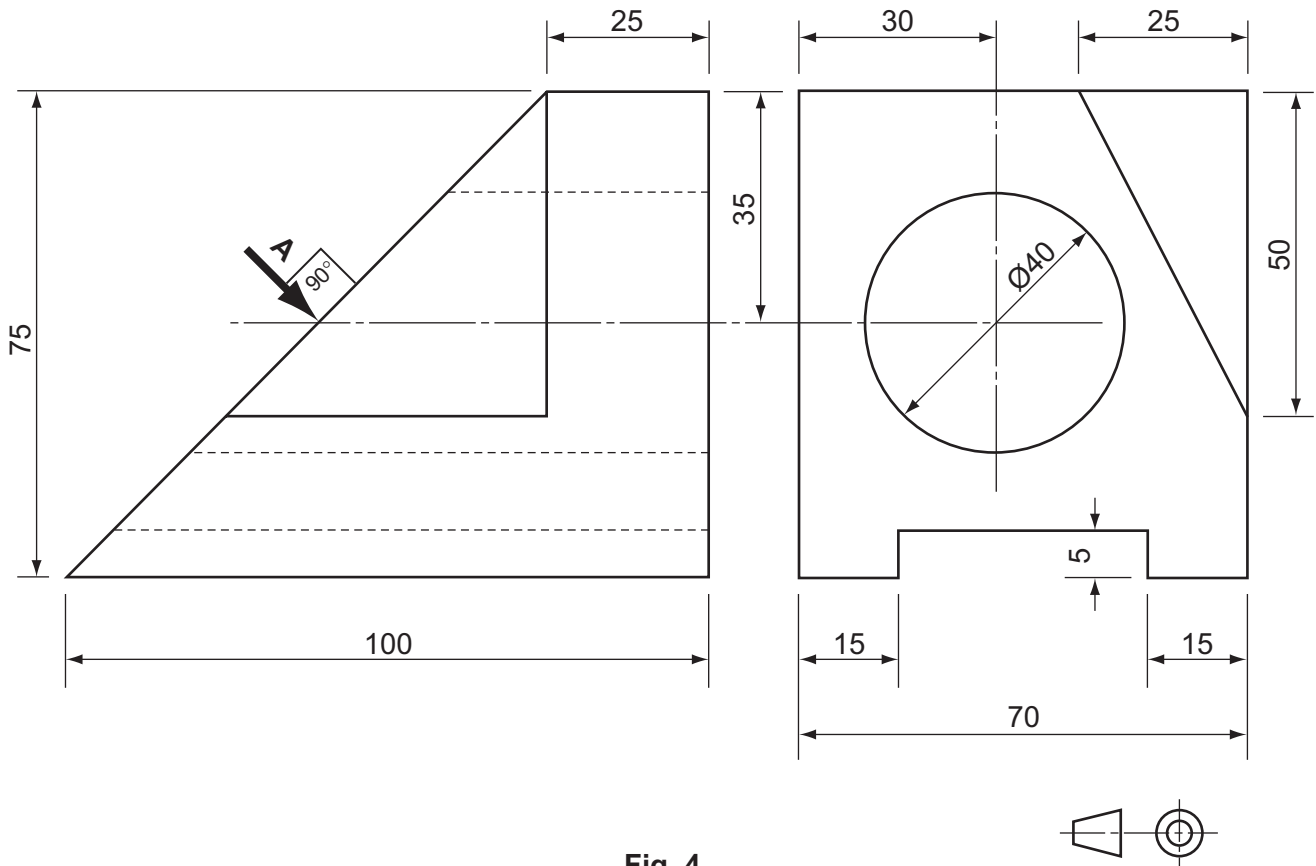
Section 2 Solid Geometry

Answer not more than **three** questions from this section.

4 Fig. 4 shows, in first angle projection, two views of a machined block.

(a) Draw the given views. [4]

(b) Plot an auxiliary view looking in the direction of arrow A. [16]



5 Fig. 5 shows, in first angle projection, three views of a bracket.

Draw an isometric view of the bracket with X as the lowest point in the view.

Do not use an isometric scale or indicate any hidden detail.

[20]

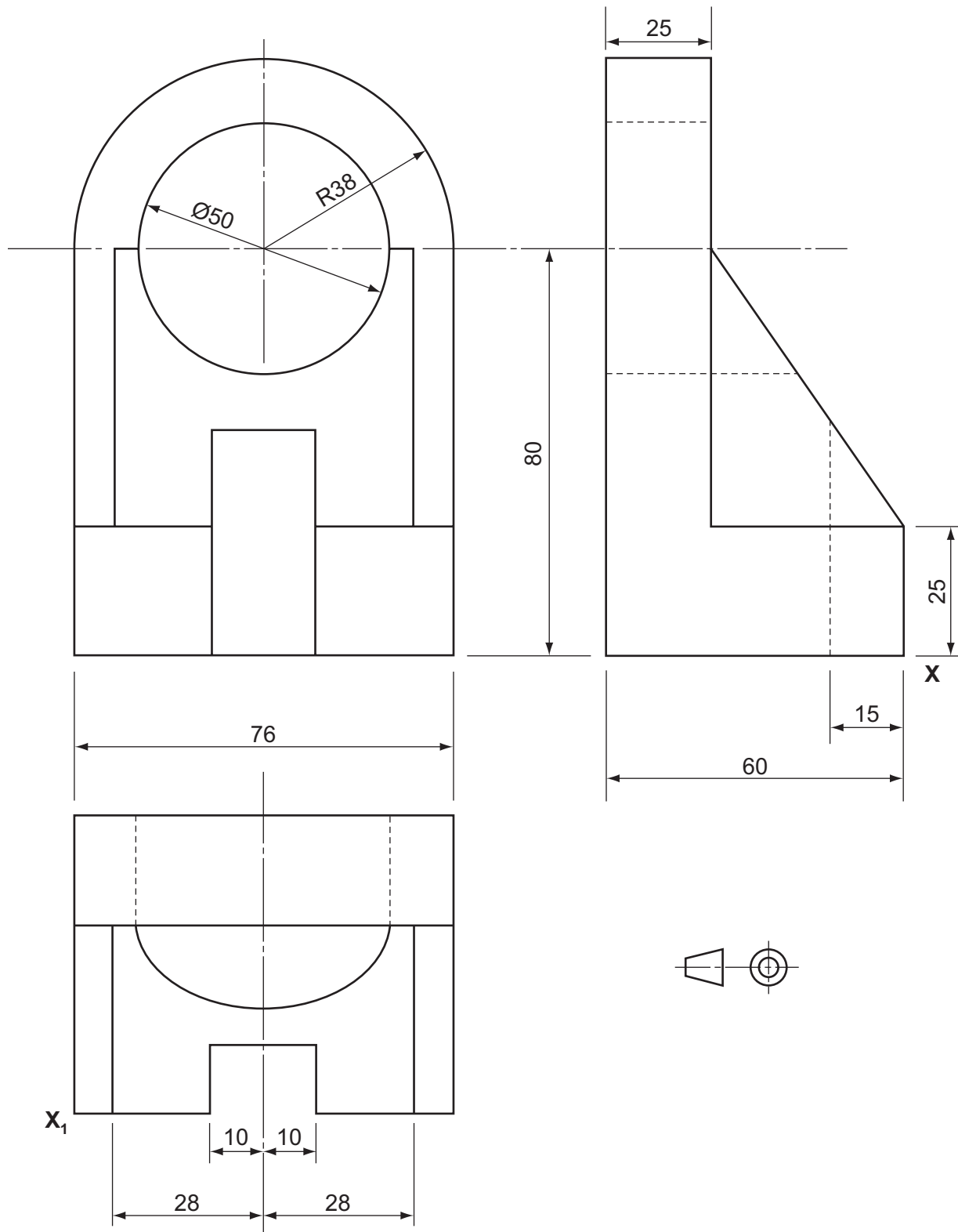


Fig. 5

- 6 Fig. 6 shows, in third angle projection, the end elevation, the incomplete front elevation and plan of a right circular cone intersected by a square section prism.

Draw:

- (a) the given end elevation; [4]
 (b) the complete front elevation, showing the curves of intersection; [7]
 (c) the complete plan, showing the curves of intersection and all hidden detail. [9]

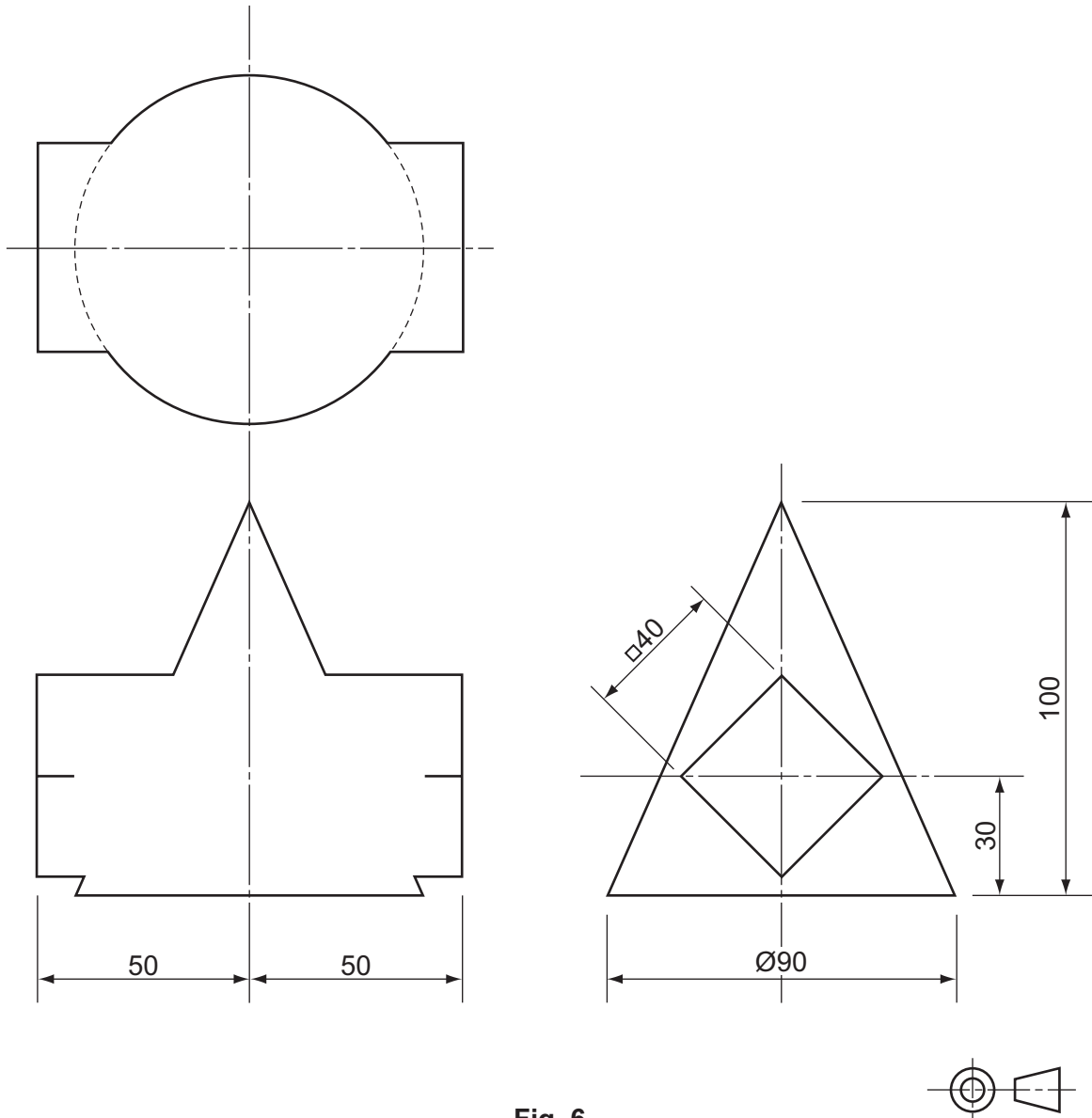
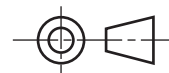


Fig. 6



- 7 Fig. 7 shows, in first angle projection, two views of a truncated pyramid open at the top and bottom, made out of thin metal.

Ignoring the thickness of the metal, draw:

- (a) the two given views; [4]
 (b) the development of the surfaces of the pyramid. [16]

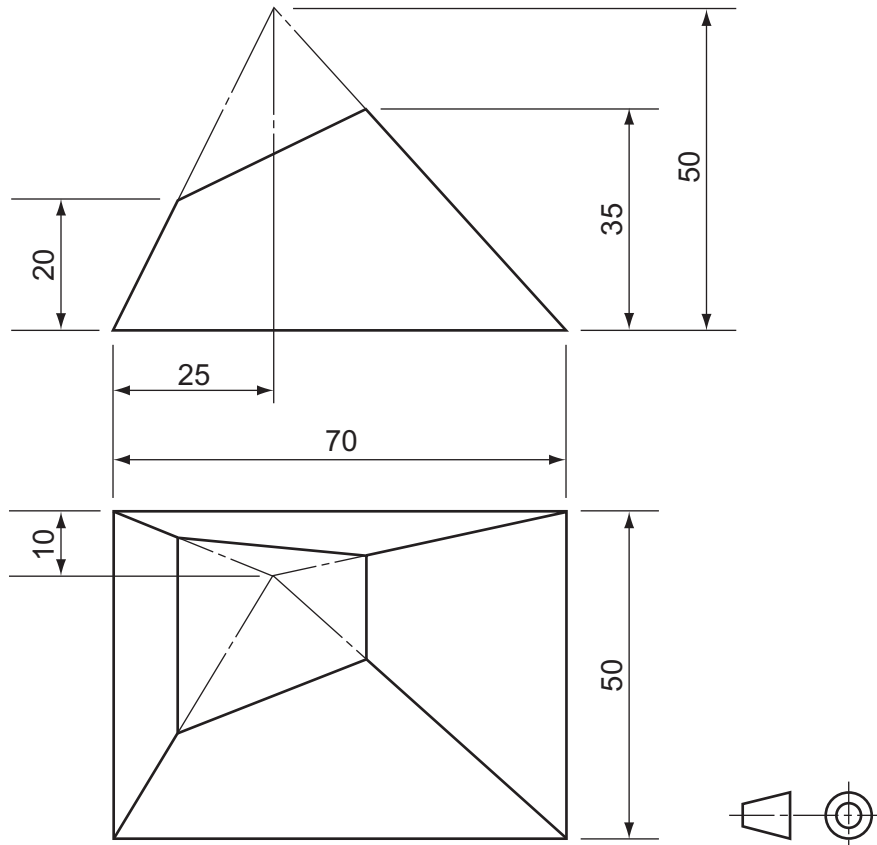


Fig. 7

- 8 Draw two full turns of a single start, right hand square thread, having an outside diameter of 74 mm and a pitch of 24 mm. [20]

Hidden detail not required.