

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

GEOMETRICAL AND MECHANICAL DRAWING

7040/01

Paper 1

May/June 2004

2 hours 40 minutes

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

READ THESE INSTRUCTIONS FIRST

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

Use both sides of the drawing paper for your answers.

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 **9** printed pages and **3** blank pages.



Section 1 Plane Geometry

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

1 Fig. 1 shows the elevation of a metal plate ABCDEF.

- (a) Draw, full size, the given elevation. Show clearly the construction used to determine the centre of arc BCD and the 90° angle AFE. [8]
- (b) Construct a similar elevation having an increased area in the ratio of 7:5 to that of plate ABCDEF. [12]

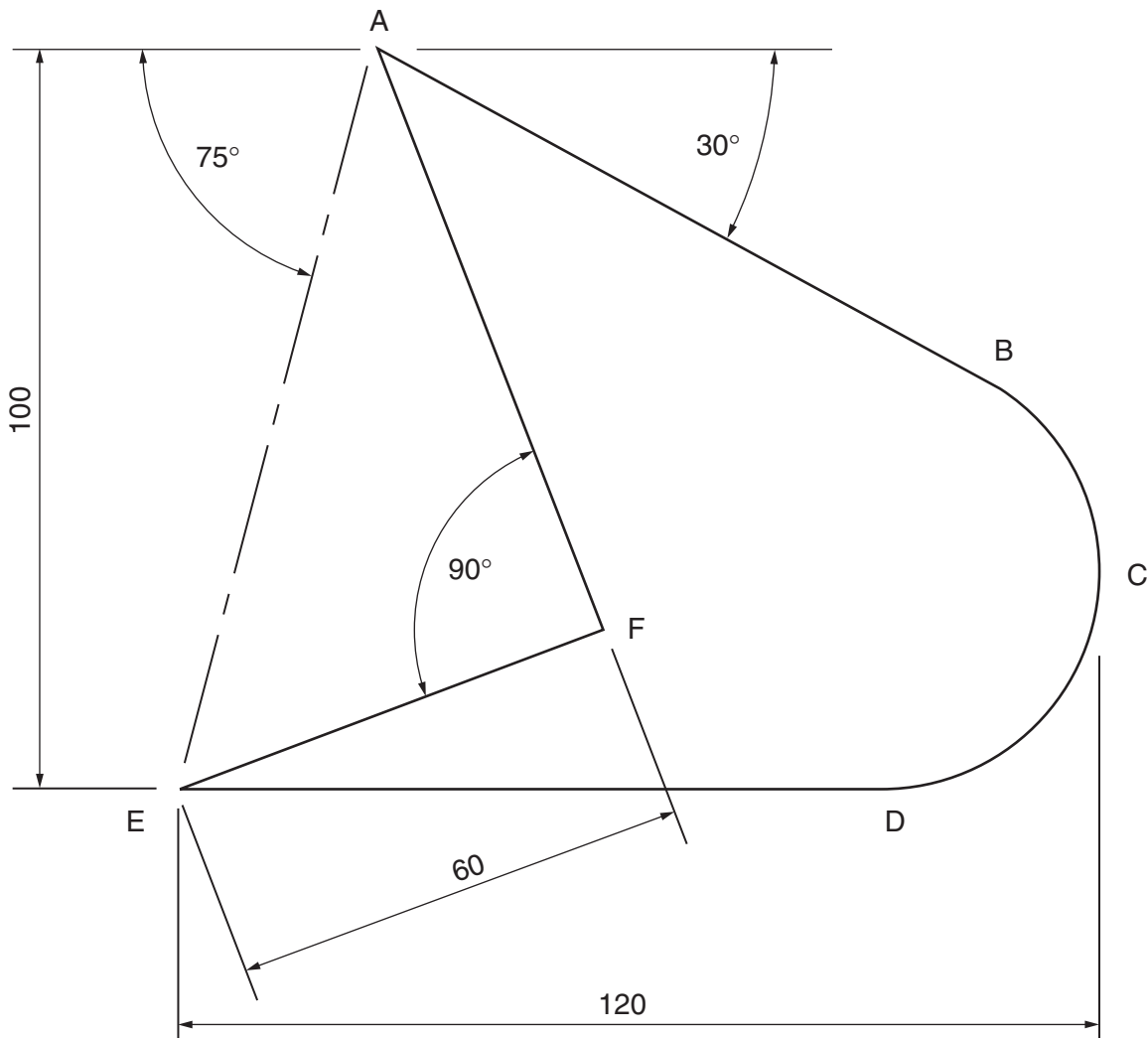


Fig. 1

2 A rubber wheel of 50 mm diameter, attached to a machine table, rolls without slip down a vertical guide as shown in Fig. 2.

- (a) Construct the locus for **P**, a point on the circumference of the rubber wheel, as the table moves from the start to stop position. [13]
- (b) Name the curve you have drawn. [2]
- (c) Construct a tangent to the locus of point **P**, when **P** has moved 60 mm vertically downwards from the start position. [5]

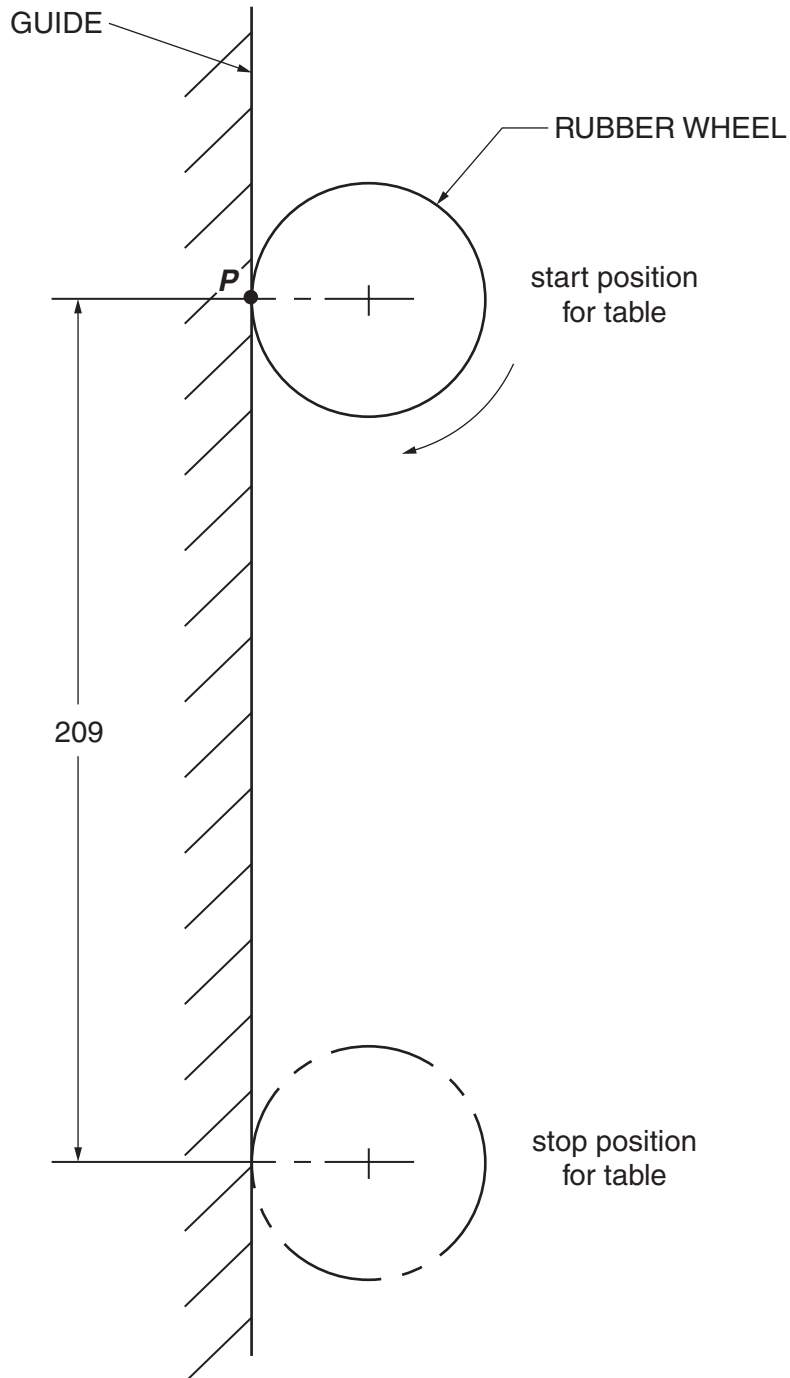


Fig. 2

- 3 Fig. 3 shows the curved shape formed by the centre line of a metal arm.

Ignoring the thickness of the material, draw, full size, the given centre line of the arm, clearly showing the construction used for both curves and tangent. [20]

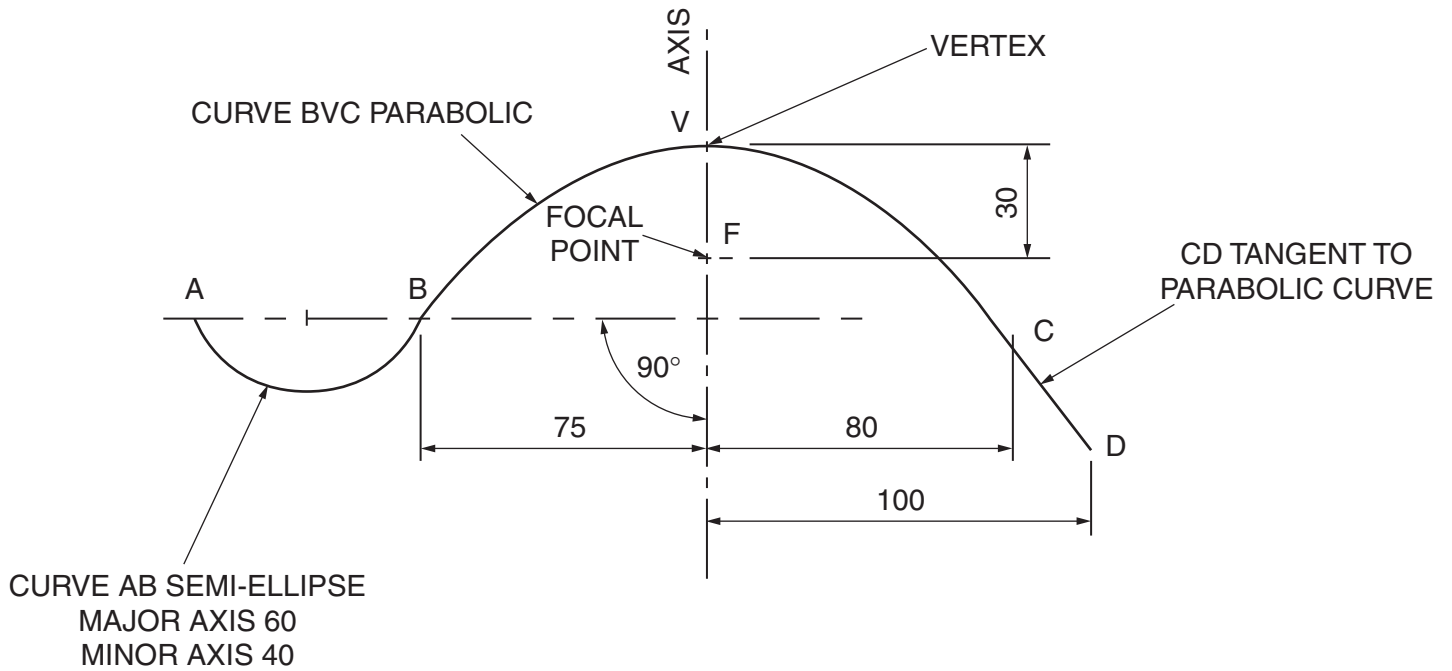


Fig. 3

Section 2 Solid Geometry

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

- 4 A lampshade is to be made from thin sheet material, based on a right circular cone as shown in Fig. 4.

Draw, full size, a surface development of the lampshade having the joint line along the shortest edge. [20]

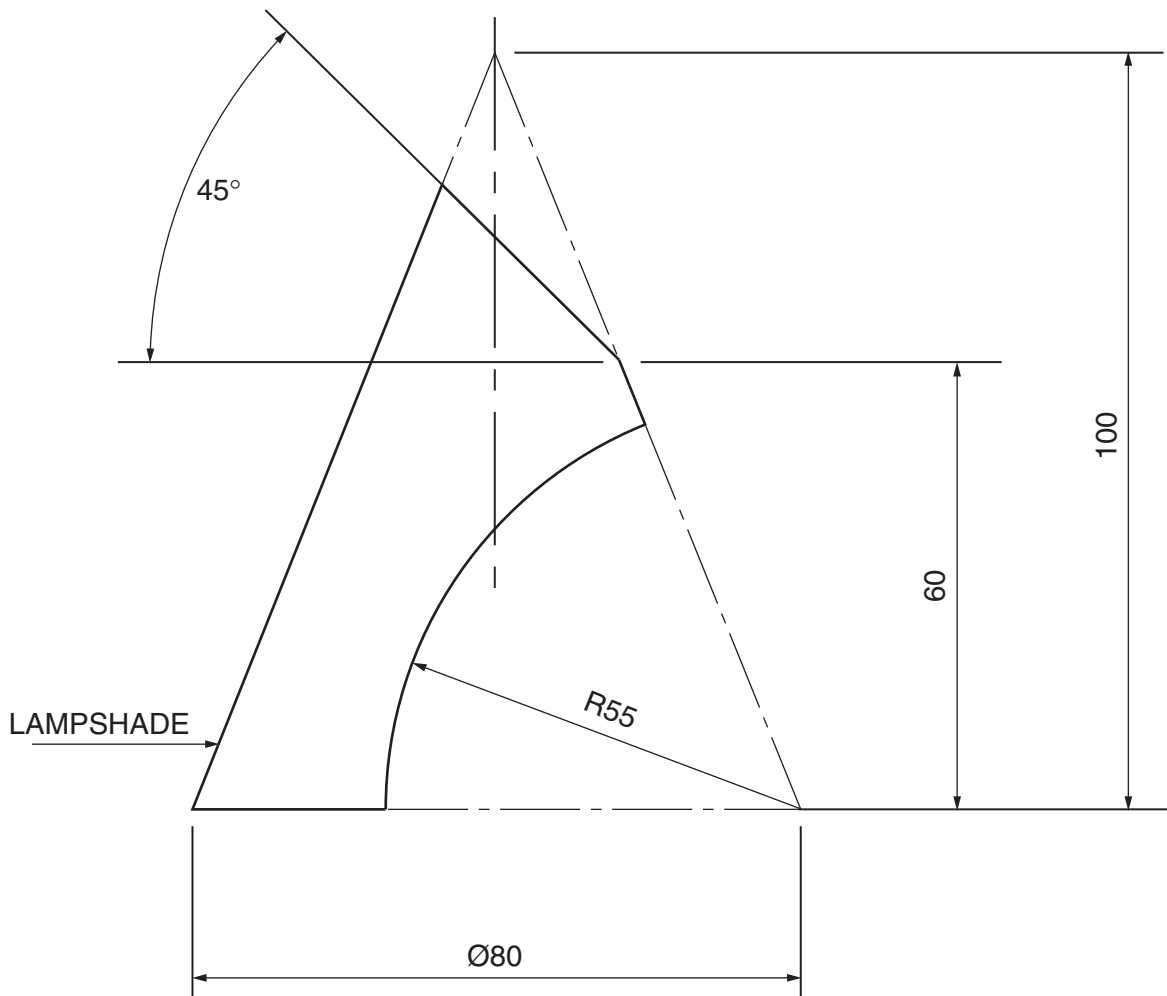


Fig. 4

5 Fig. 5 shows details of a timer case.

With corner **C** in the foreground of your view, draw, full size, an isometric projection of the case.

No hidden detail is required. Do not use an isometric scale.

[20]

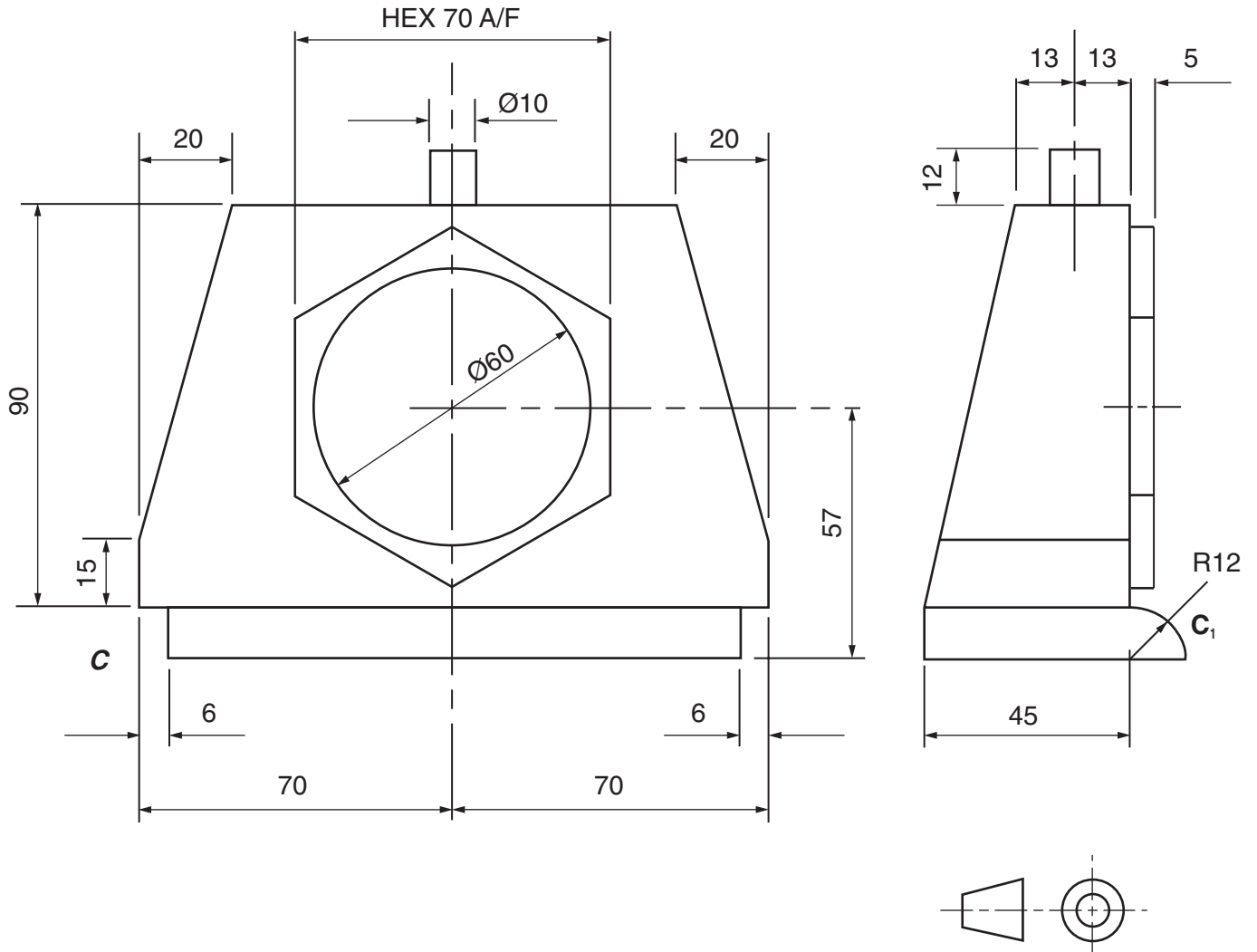


Fig. 5

6 Fig. 6 shows details of a small support bracket.

(a) Draw, full size, the given views. [2]

(b) Project an auxiliary elevation on X_1Y_1 as seen when looking in the direction of arrow **V**. Ignore hidden detail. [18]

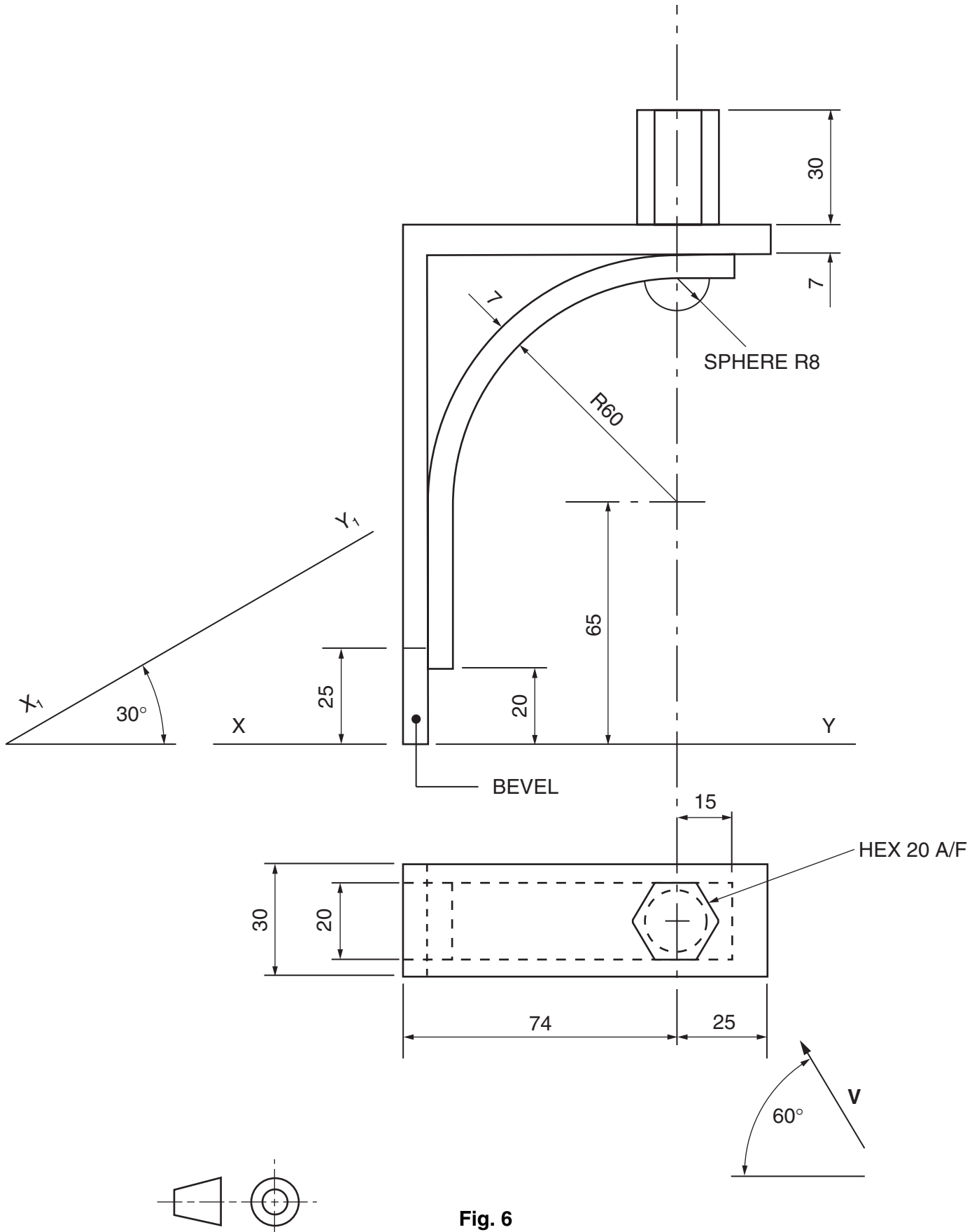


Fig. 6

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[Turn over

- 7 Fig. 7 shows the scaled details of a right cylindrical capsule and a spherical observation dome.

The shape of the dome is produced by the intersection of a sphere of 50 mm radius, positioned **half-way** along a cylinder of 100 mm diameter and measuring 110 mm in length.

The axis of the cylindrical capsule is parallel to the HP and perpendicular to the VP.

Draw:

- (a) the given view; [1]
 (b) a view in direction of arrow **P**; [10]
 (c) a view in direction of arrow **E**. [9]

Include all hidden detail.

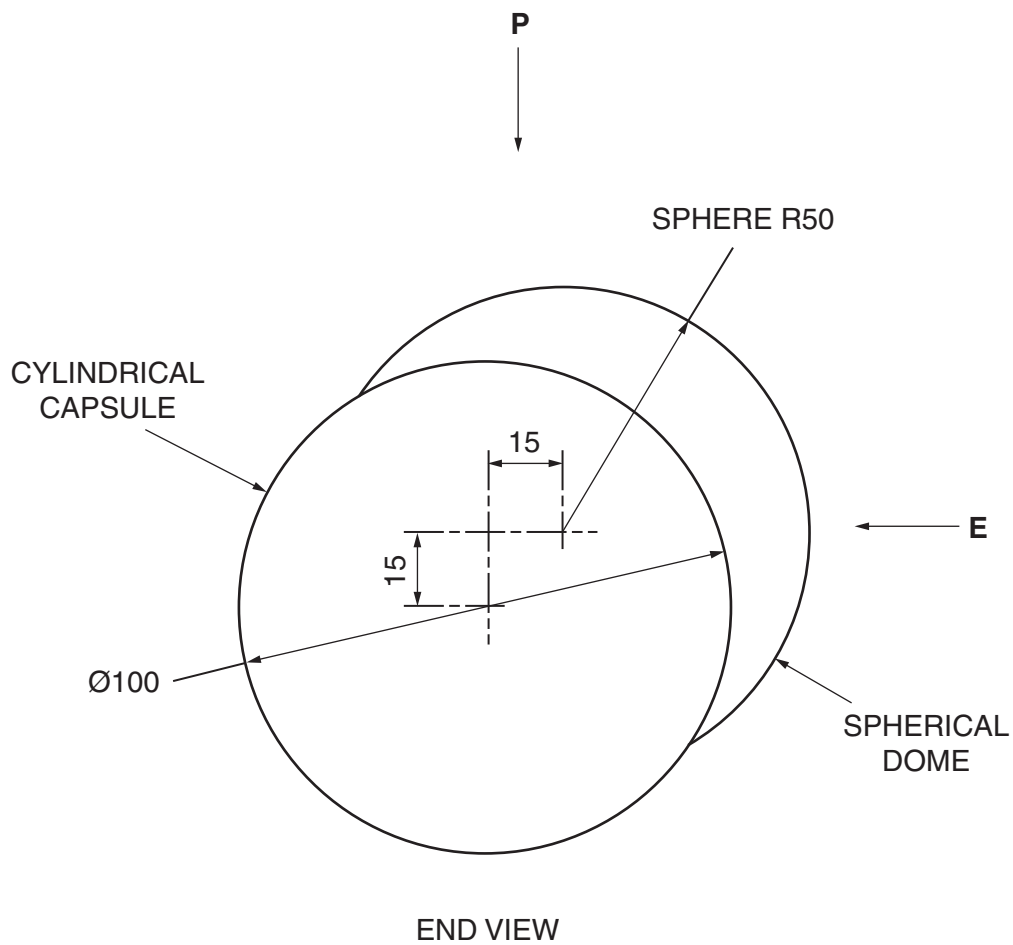


Fig. 7

8 Fig. 8 shows two views of a flat sheet ABCDE. Two lines AC and EC are marked on the upper surface.

- (a) Draw, full size, the given views. [1]
- (b) Determine and state to the nearest mm the true lengths of lines AC and EC. [10]
- (c) Determine the true lengths of all sides of the sheet ABCDE, and use them to construct its true shape. [9]

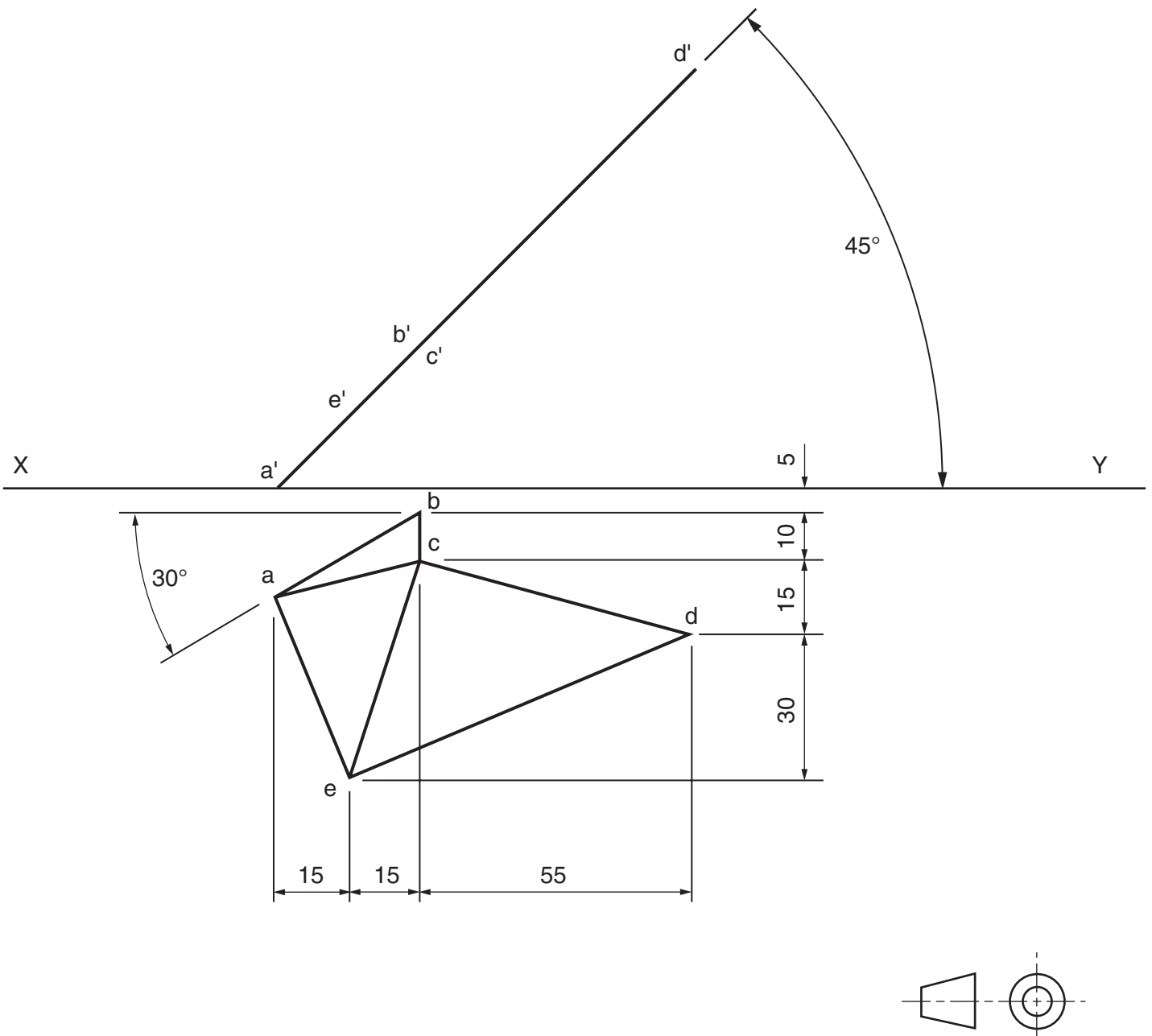


Fig. 8

