GEOMETRICAL AND MECHANICAL DRAWING **7040/01**

Paper 1

October/November 2006

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.
All dimensions are in millimetres unless otherwise stated.
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.

This document consists of **7** printed pages, **1** blank page.

UNIVERSITY *of* CAMBRIDGE
International Examinations

Section 1 Plane Geometry

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

1 (a) Inscribe a regular pentagon within a circle of 70 mm diameter. [10]

(b) Construct a square equal in area to the constructed pentagon. [9]

(c) Measure and state the size of this square. [1]

2 Fig. 1 shows the incomplete view of an impeller for an air compressor.

(a) Draw the given view and construct the involute curves from the 50 mm base circle diameter. [14]

(b) Construct a tangent to the involute at point **P**. [6]

involute curve generated from the 50 dia. base circle
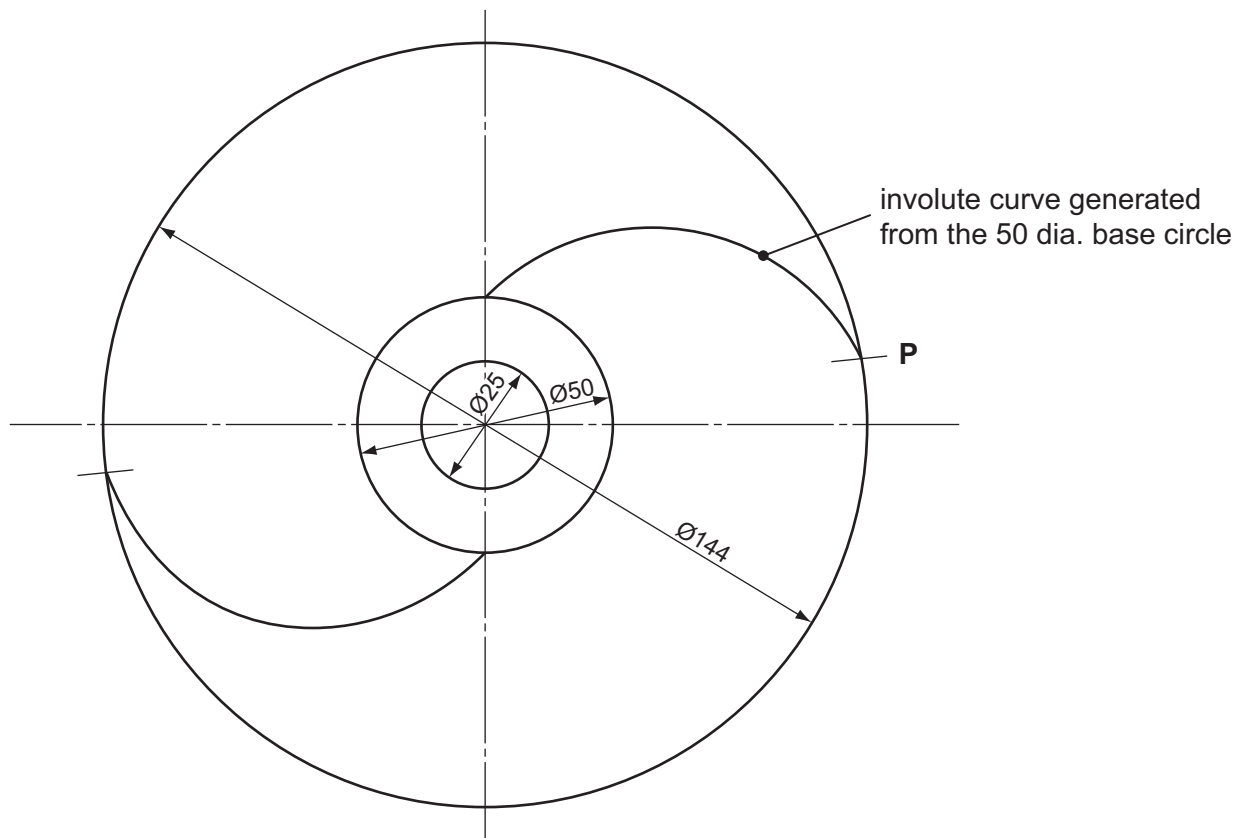
P

Ø25   Ø50   Ø144

Fig. 1

3 A circle of 50 mm diameter rolls without slipping, around the inside of a circle 300 mm in diameter.

Plot the locus of a point on the periphery of the smaller circle, when this point has completed one revolution.

Start your construction at the common point of contact. [20]

3

Section 2 Solid Geometry

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

4 Fig. 2 shows, in first angle projection, the plan and elevation of a cast bracket.

    (a) Draw the given views. [4]

    (b) Draw an end elevation. [6]

    (c) Project an auxiliary view on **X₁Y₁** looking in the direction of arrow **A**. [10]
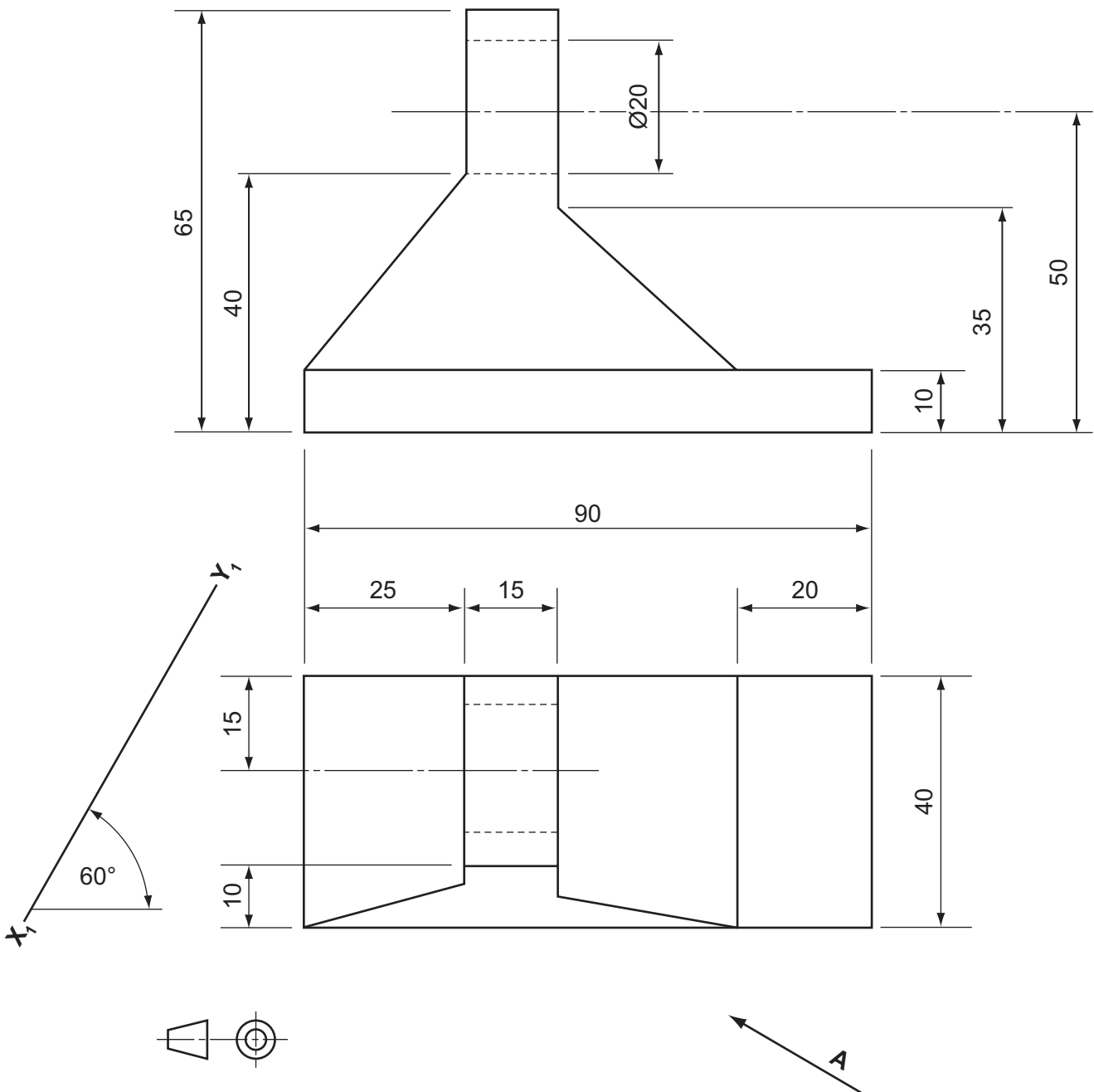

Fig. 2

5 Fig. 3 shows two views of an aluminium bracket drawn in third angle projection.

Draw an isometric view of the bracket with the corner **C** in the foreground of the view.

Do not use an isometric scale and do not show any hidden details. [20]
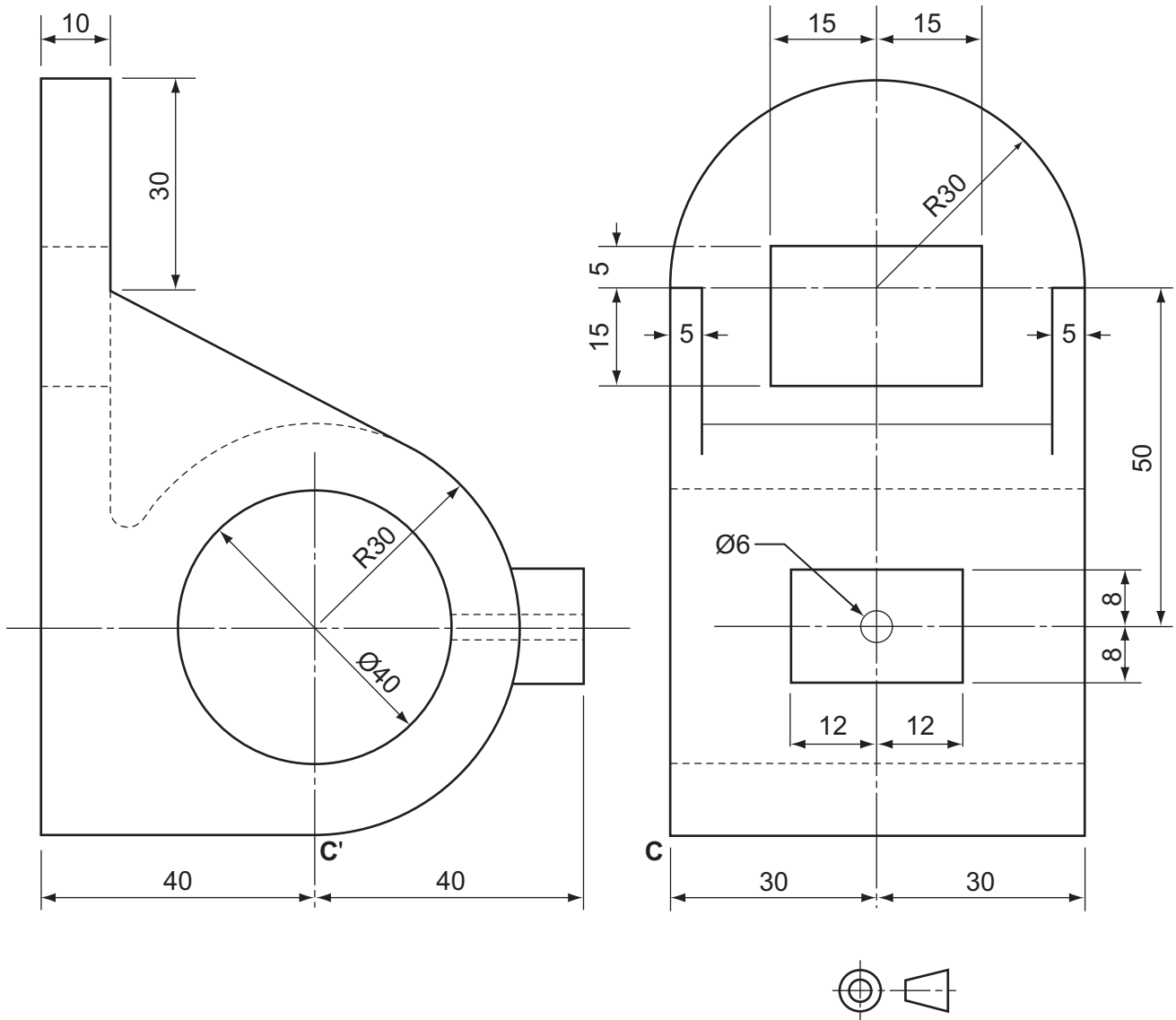

Fig. 3

6 Fig. 4 shows the plan and incomplete elevation of a cylinder intersected by a square duct.

    (a) Draw the given plan. [4]

    (b) Complete the elevation showing the curves of intersection between the cylinder and the square duct. [8]

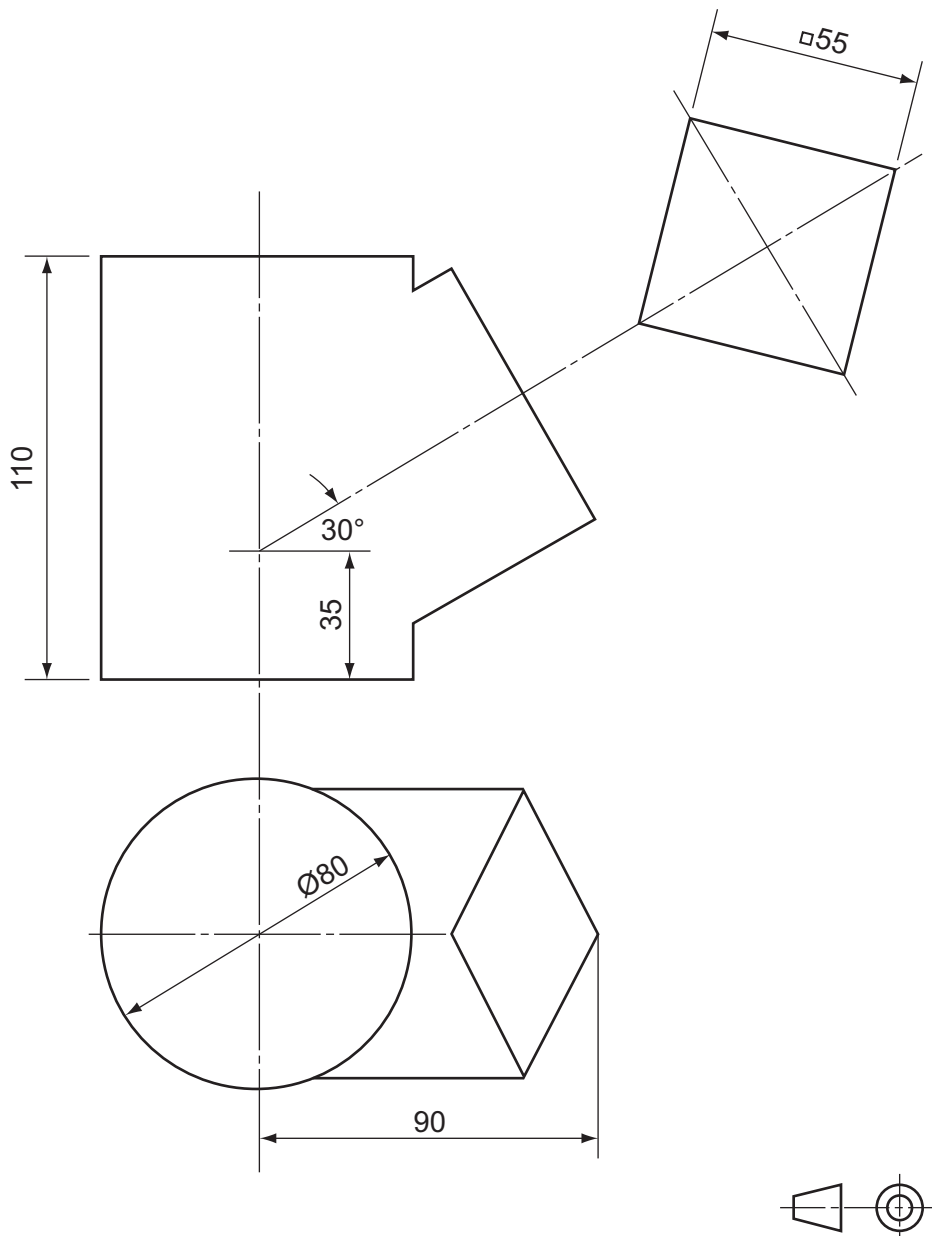   **(c)** Construct the development of the square duct. [8]

Fig. 4

7 Fig. 5 shows the projections in elevation and plan of a straight line **AB**.

   (a) Draw the given views. [4]

   (b) Determine the true length of **AB**. [4]

   (c) Determine the true inclination of the line **AB** to the vertical plane. [6]

   (d) Determine the true angle of the line **AB** to the horizontal plane. [6]

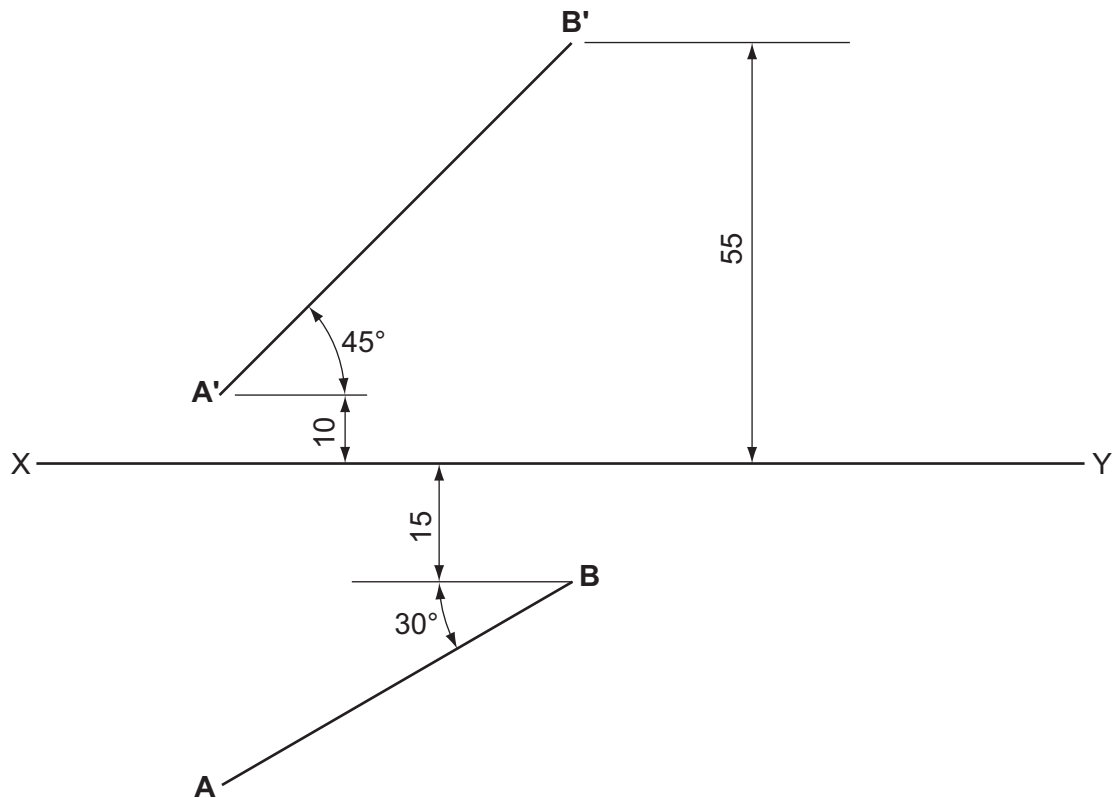   Show your answers clearly, in an appropriate place on your solution.

Fig. 5

8   Fig. 6 shows the profile of a right circular cone.

     The cone is cut along the plane **X–X** which lies parallel to the generator.

     Draw full size:

     (a) the elevation shown in Fig. 6, but with the portion to the left of the line **X–X** removed;   [1]

     (b) an end elevation looking in the direction of arrow **E**;   [7]

     (c) a plan view looking in the direction of arrow **P**;   [6]
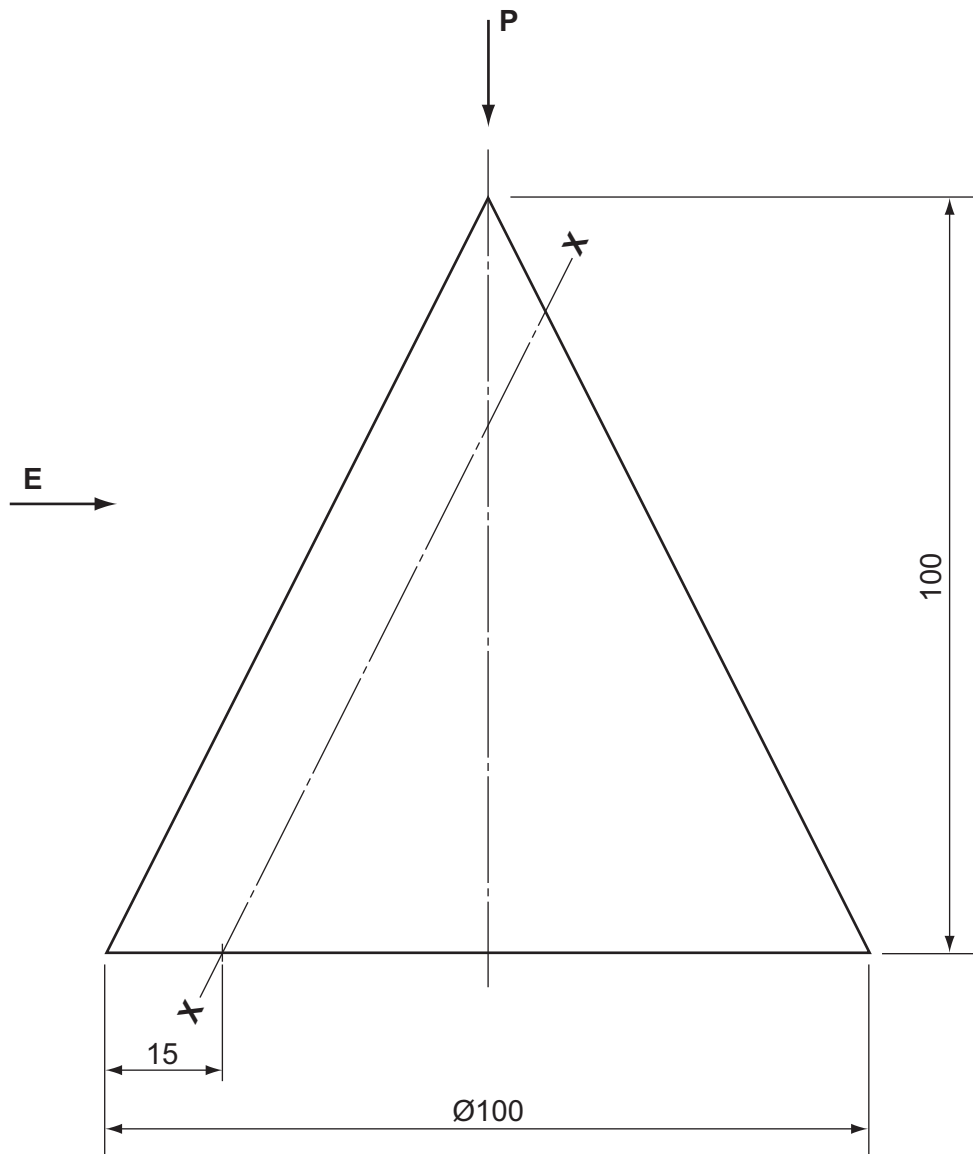
     (d) the true shape of the cut face.   [6]

Fig. 6

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