UNIVERSITY OF LONDON

General Certificate of Education Examination

SUMMER 1972   ORDINARY LEVEL

Technical Drawing (Engineering) 1

Two hours

Answer FIVE questions. All questions carry equal marks.

Candidates are reminded of the necessity for orderly presentation in their answers.

All solutions must be drawn in pencil, FULL SIZE unless contrary instructions are given. Both sides of the drawing paper provided may be used.

All construction lines MUST be left on each solution in order to show the method employed. Lines at right angles to each other and at any other angles which are multiples of 15 degrees may be drawn by means of T-square and set-squares, without constructions being shown. Protractors may be used. The use of aids for the smooth drawing of curves is permitted.
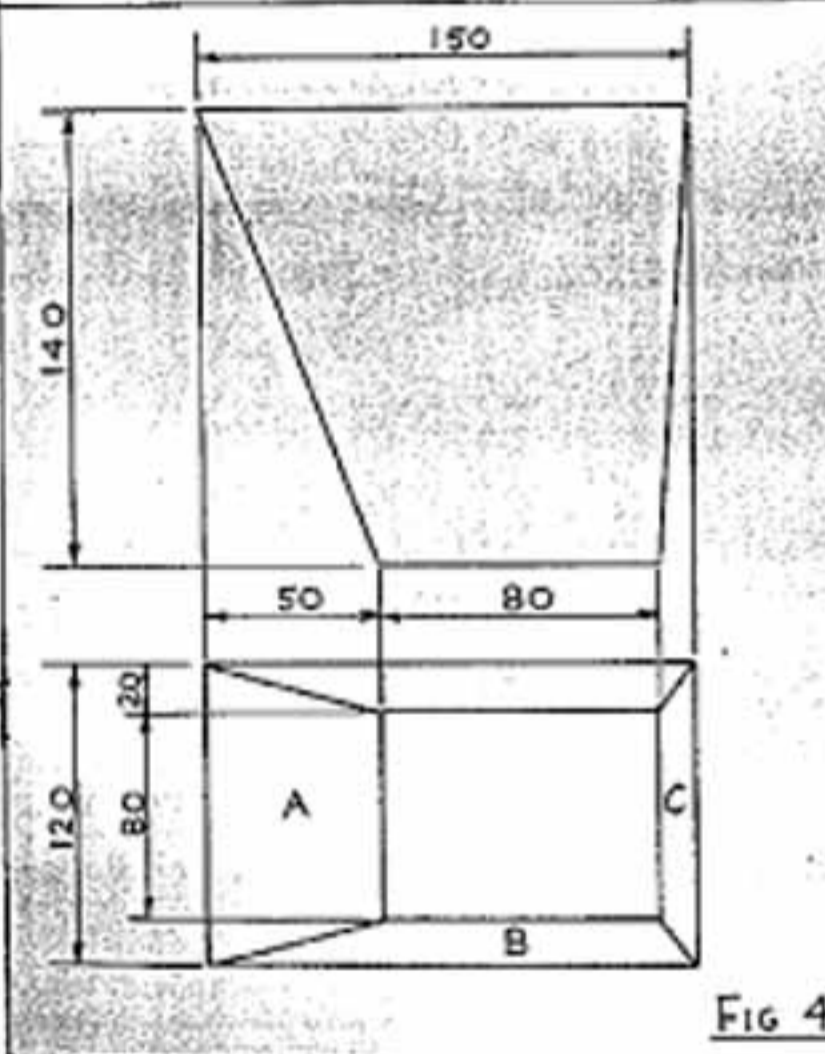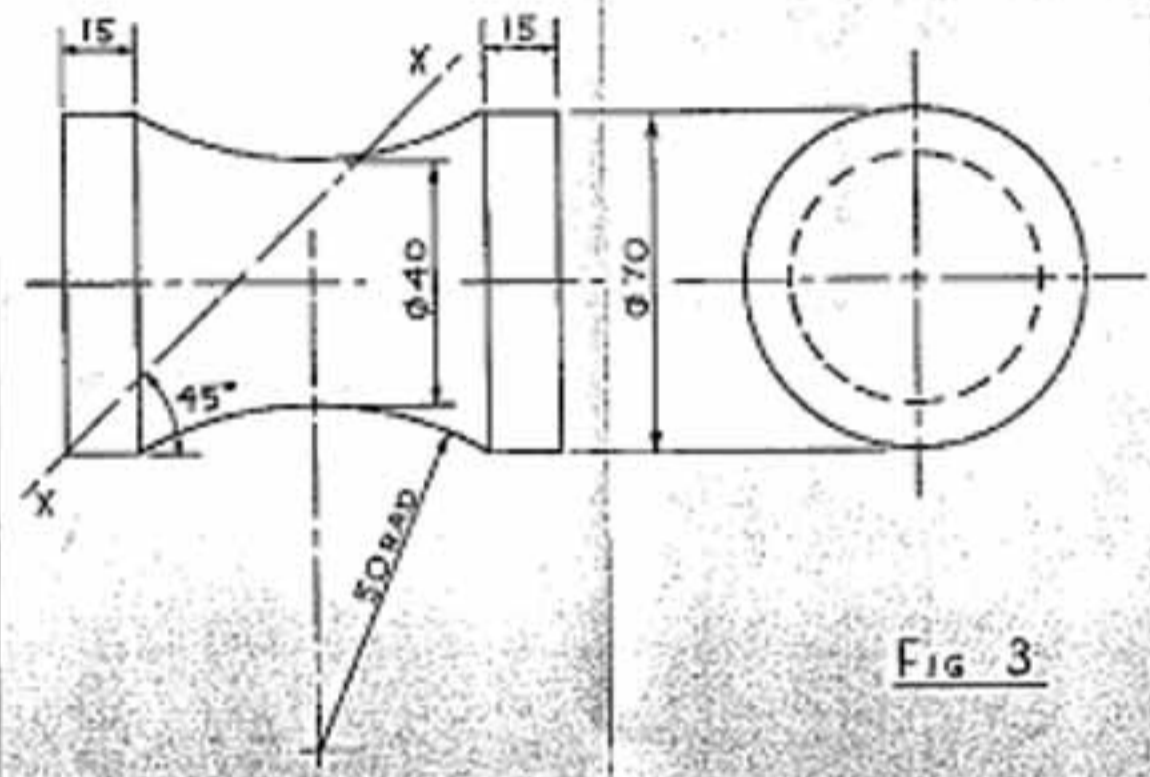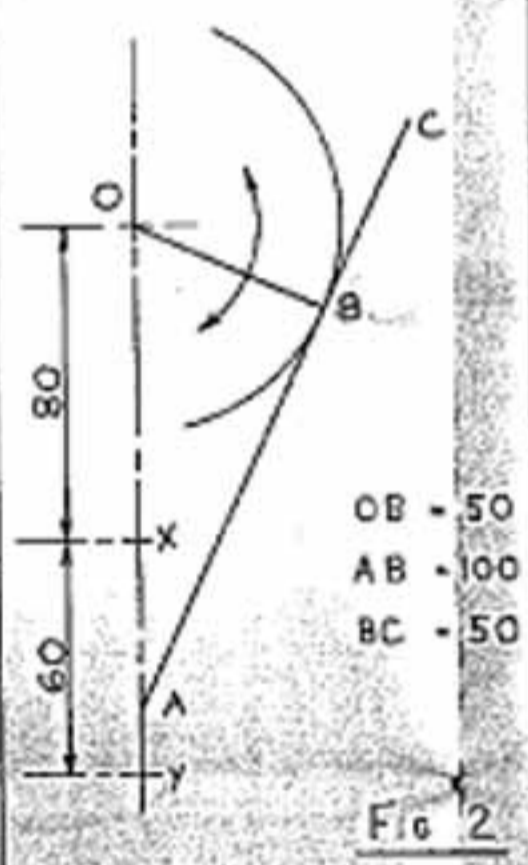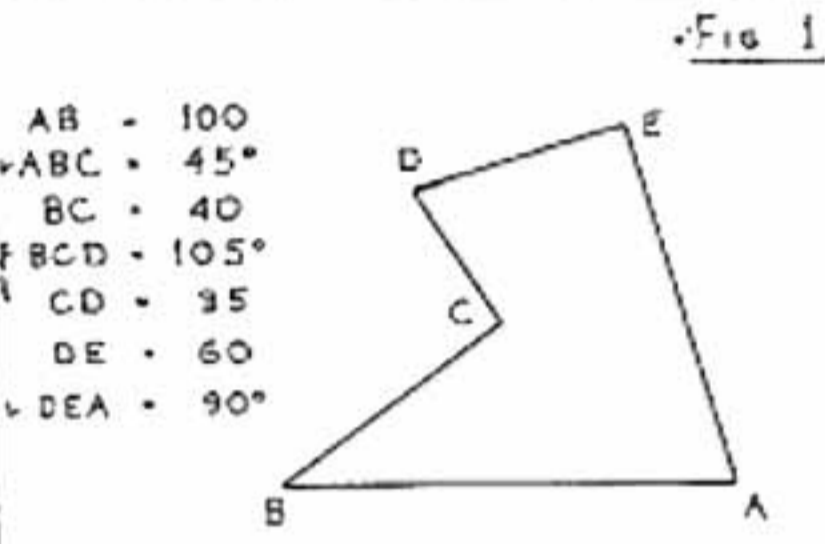
1. At Fig. 1 is shown a pentagon *ABCDE*. By means of a geometrical construction draw a square having the same area as this pentagon; measure and state the length of its side to the nearest millimetre.

2. In the mechanism shown at Fig. 2 the straight rod *ABC* has a joint at *B* to which the crank *OB* is pivoted. *OB* is free to oscillate about the fixed point *O* while *A* is constrained to move along the straight line between *X* and *Y*.

   Plot the locus of *C* as *A* moves between *X* and *Y*.

3. At Fig. 3 is shown a solid of revolution. Draw the true shape of the section made by the plane *XX*.

4. At Fig. 4 are shown plan and elevation of a hopper having four flat sides and a square base. To a scale of HALF FULL-SIZE draw the given views and the true shapes of the three sides *A*, *B* and *C*.

5. Make an isometric drawing of the bracket shown at Fig. 5. Corner *X* of the bracket is to be the lowest point of your drawing and hidden edges are not to be shown.

6. A circle of diameter 30 mm rolls without slipping on the outside of a circular arc of radius 75 mm.

   Plot the locus of a point *P*, on the circumference of the circle, for one complete revolution.

7. Three spheres rest on the horizontal plane, each touching the other two. One sphere has a diameter of 70 mm, the others have diameters of 30 mm.

   Draw a plan and elevation of the spheres showing in each view all points of contact between them.

8. The plan of a line PQ is 80 mm long. P is 30 mm in front of the vertical plane and 20 mm above the horizontal plane. Q is 75 mm in front of the vertical plane and 40 mm above the horizontal plane.

   Draw the plan and elevation of the line and determine

   (a) the true length of PQ,

   (b) the angle PQ makes with the vertical plane,

   (c) the shortest distance of R, the mid-point of PQ, from the ground line XY.

Fig 1

AB - 100
ABC - 45°
BC - 40
BCD - 105°
CD - 35
DE - 60
DEA - 90°

Fig 2

OB - 50
AB - 100
BC - 50

Fig 3

All dimensions in millimetres

The figures are not to scale

Fig 4

HOLE 24 sq

45°

Fig 5