Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination, 2017

Technical Graphics
Higher Level
Section B
(280 marks)

Monday, 19 June
Morning, 9:30 - 12:30

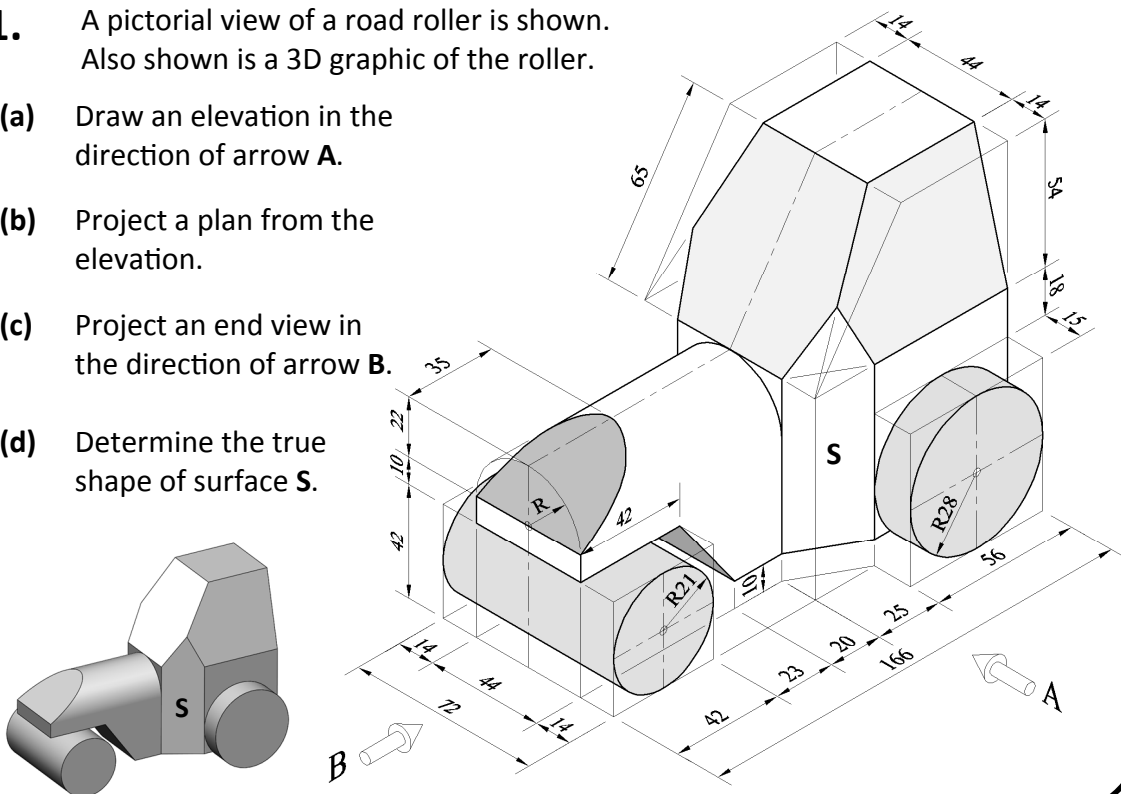*Instructions*

(a)   Answer **any four** questions.

(b)   Construction lines must be clearly shown.

(c)   All questions in this section carry equal marks.

(d)   The number of the question must be distinctly marked by the side of each answer.

(e)   Work on **one side** of the paper only.

(f)   Write your examination number on each sheet of paper used.

SECTION B. Answer **any four** questions. All questions carry equal marks.

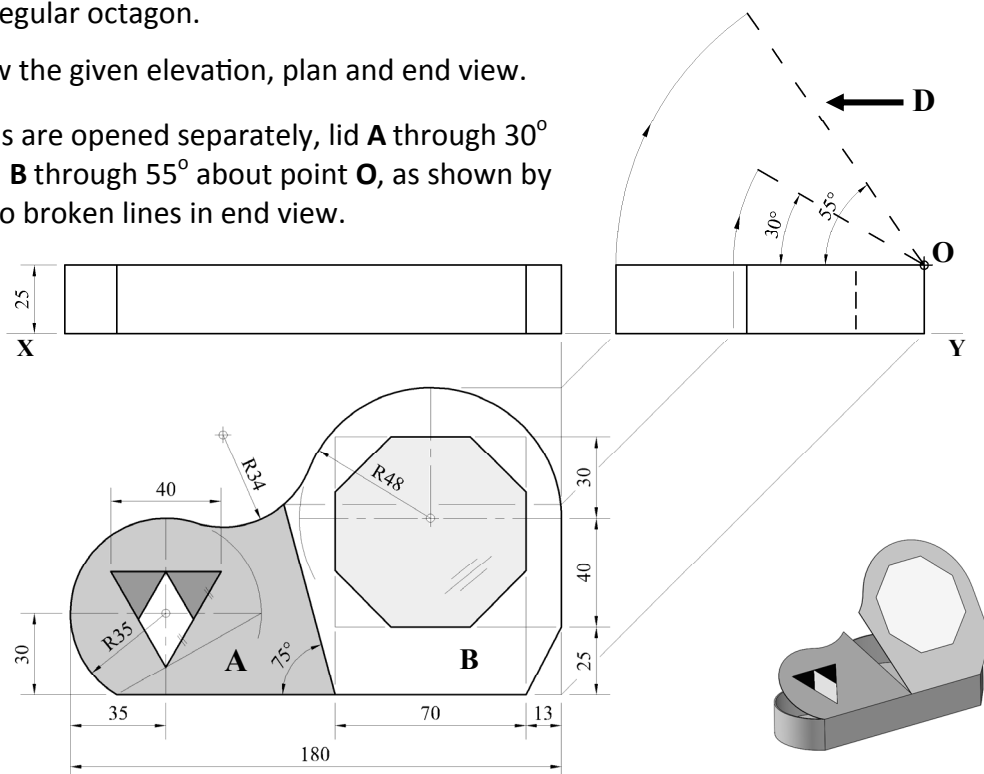**1.** A pictorial view of a road roller is shown. Also shown is a 3D graphic of the roller.

(a) Draw an elevation in the direction of arrow **A**.

(b) Project a plan from the elevation.

(c) Project an end view in the direction of arrow **B**.

(d) Determine the true shape of surface **S**.

2. The elevation, plan, end view and a 3D graphic of a jewellery box are shown. The logo on lid **A** is based on an equilateral triangle. The mirror on lid **B** is based on a regular octagon.

(a) Draw the given elevation, plan and end view.

The lids are opened separately, lid **A** through 30° and lid **B** through 55° about point **O**, as shown by the two broken lines in end view.
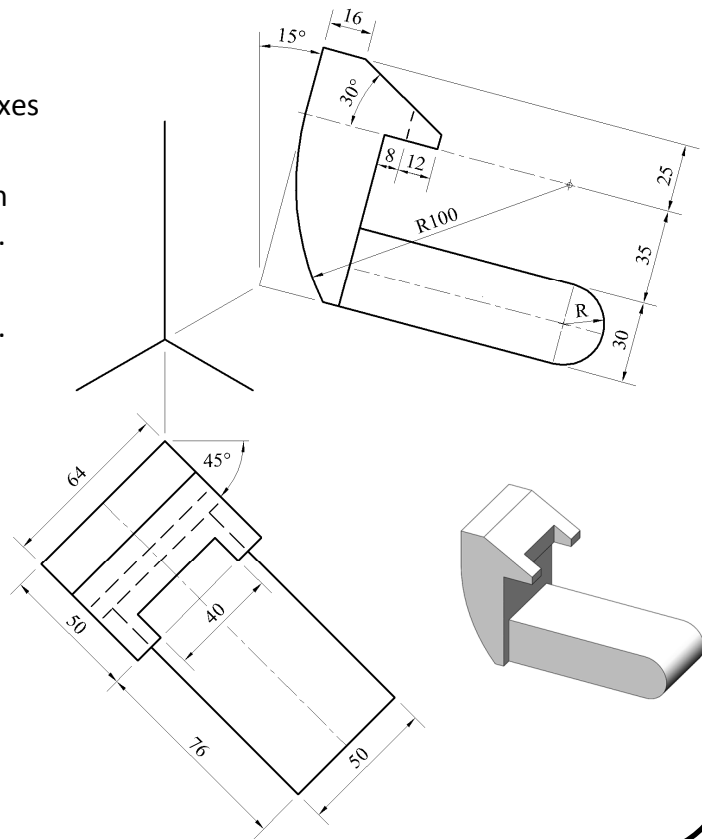

(b) Project an elevation of the lids in the direction of arrow **D** to show **both** lids in their rotated positions.

3. The axonometric axes required for the isometric projection of an exercise treadmill are shown. The elevation, plan and a 3D graphic of the treadmill are also shown.

(a)

(i) Draw the axonometric axes as shown.

(ii) Draw the given elevation inclined at 15° as shown.

(iii) Draw the given plan inclined at 45° as shown.

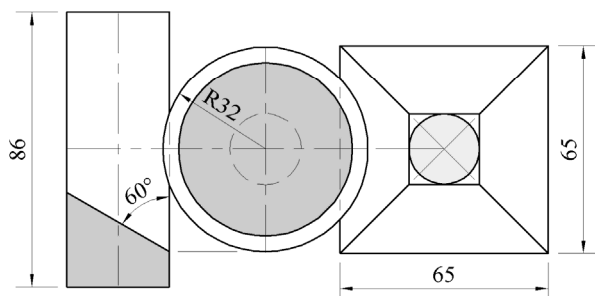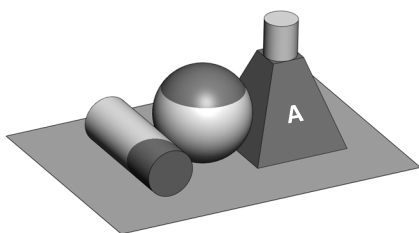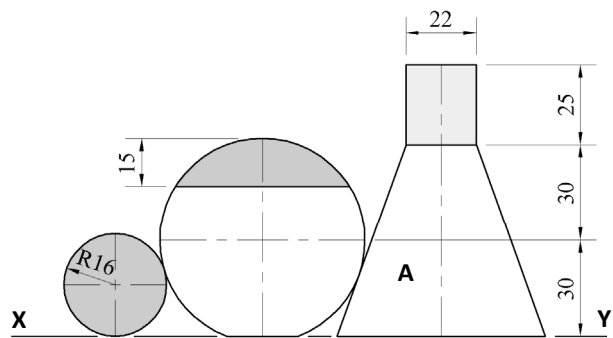(iv) Draw the completed axonometric projection of the treadmill.

OR

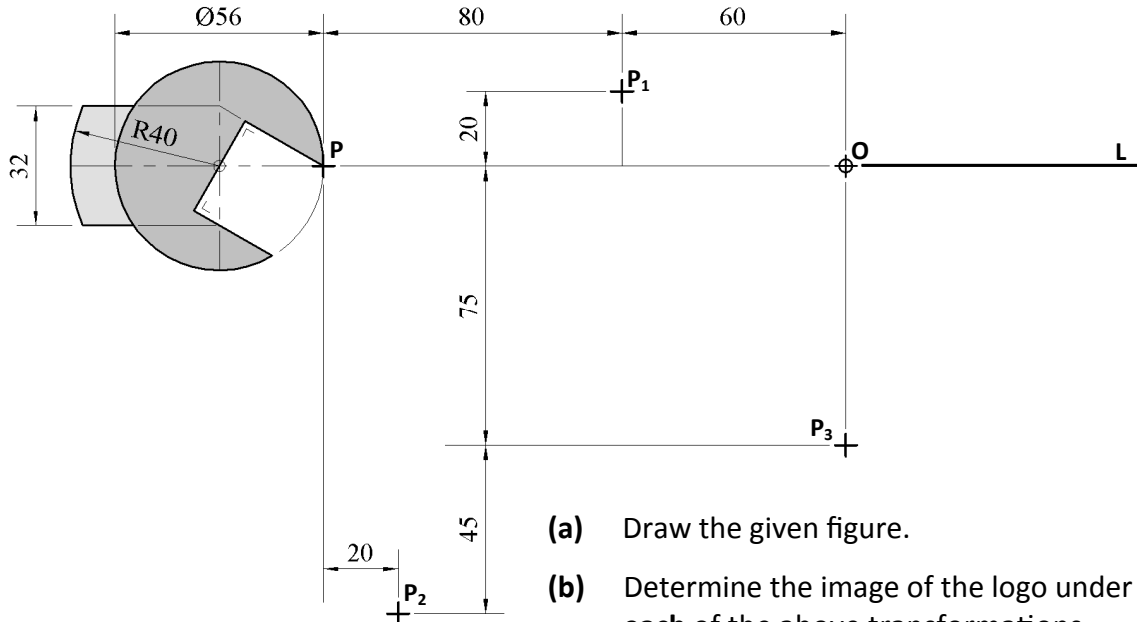**(b)** Draw the isometric projection of the treadmill using the isometric scale method.

4. The elevation and plan of three beauty products in mutual contact are shown. A 3D graphic of the cylindrical lipstick, spherical cream container and perfume bottle in the form of a square-based pyramid is also shown.

(a) Draw the given elevation and plan, showing all constructions.

(b) Show all points of contact.

(c) Draw the development of the **four** sloping surfaces of the truncated square-based pyramid **A.**

5. The figure shows the logo for a garage.
The logo is subject to transformations in the following order:

- Central Symmetry **P - P$_1$**
- Axial Symmetry   **P$_1$ - P$_2$**
- Translation   **P$_2$ - P$_3$**
- Rotation about point **O** until point **P$_3$** reaches the line **OL**.

Ø56   80   60

R40

32

P

P$_1$

20

O   L

75

P$_3$

45

20

P$_2$

(a) Draw the given figure.

(b) Determine the image of the logo under **each** of the above transformations.

Note: *All geometric constructions must be clearly shown on your drawing sheet.*

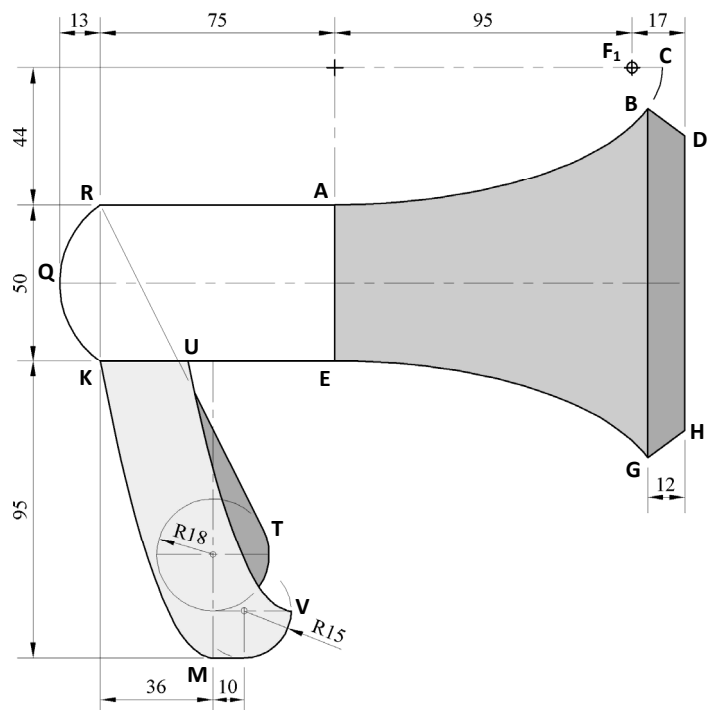**6.** The figure shows a design for a megaphone.

The curve **ABC** is portion of an ellipse with a focal point at **F$_1$**. The curve **EG** is an identical portion of the same ellipse.

The lines **BD** and **GH** are normals to the curves.

The curve **KM** is portion of a parabola with the vertex at **M**. The curve **UV** is portion of an identical parabola with vertex at **V**.

The line **RT** is a tangent to the circle at **T**.

Locate the centre of the arc **KQR** and draw the arc.

13   75   95   17

F$_1$ C

B

D

44

R   A

50   Q

U   E

K

95

R18   T

V   R15

H

G   12

36   M   10

Draw the given design showing clearly all constructions and points of contact.