Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination, 2016

Technical Graphics
Higher Level
Section B

(280 marks)

Monday, 20 June
Morning, 9:30 - 12:30

Instructions

(a) ***Any four*** *questions to be answered.*

(b) *All questions in this section carry equal marks.*

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

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

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

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

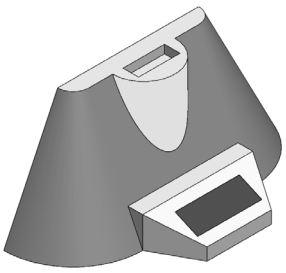
1. A pictorial view of an MP3 music system is shown. Also shown is a 3D graphic of the music system.

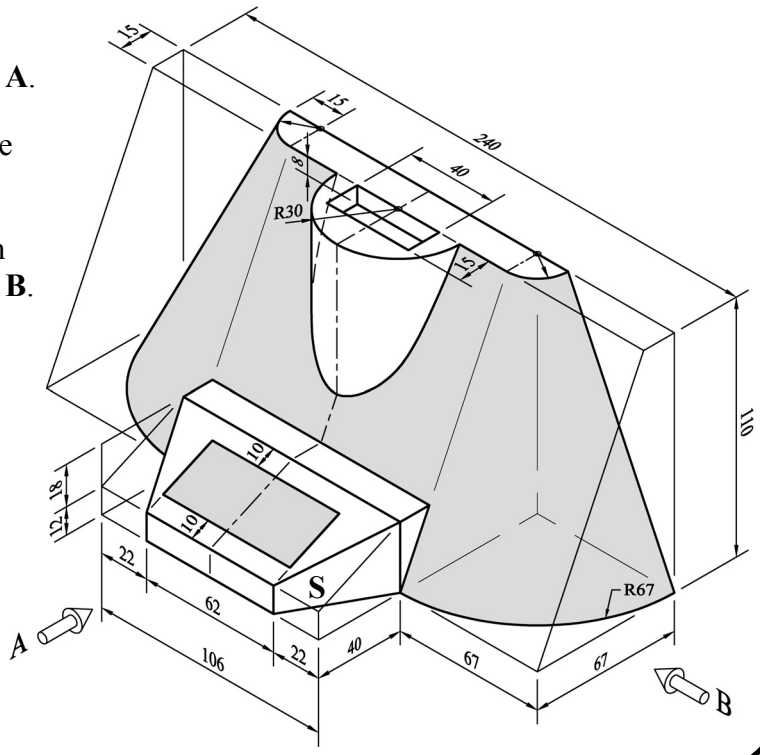
(a) Draw an elevation in the direction of arrow **A**.

(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**.



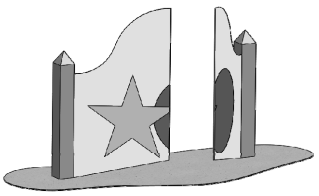


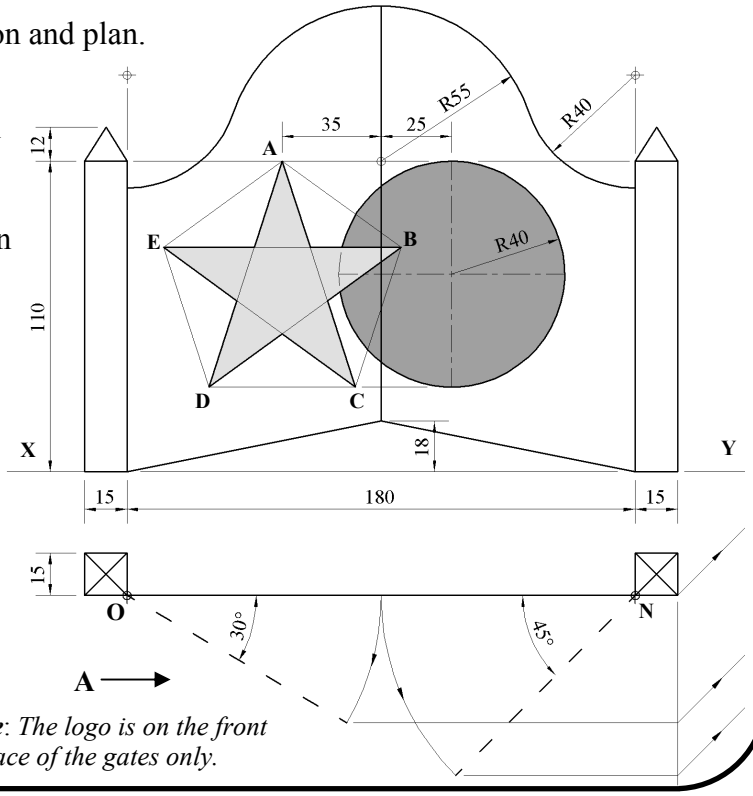
2. The elevation, plan and a 3D graphic of entrance gates to a sports ground are shown. The logo on the gates is based on a regular pentagon **ABCDE** and a circle.

(a) Draw the given elevation and plan.

The gates are opened separately, one through 30° about point **O**, and the other through 45° about point **N**, as shown by the broken lines in plan.

(b) Project an end view of the gates in the direction of arrow **A** to show the gates in their rotated positions.





Note: *The logo is on the front surface of the gates only.*

3. The axonometric axes required for the isometric projection of a torch are shown. The elevation, end-view and a 3D graphic of the torch are also shown.

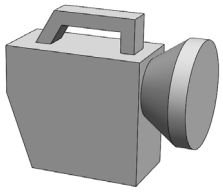
(a)

(i) Draw the axonometric axes as shown.

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

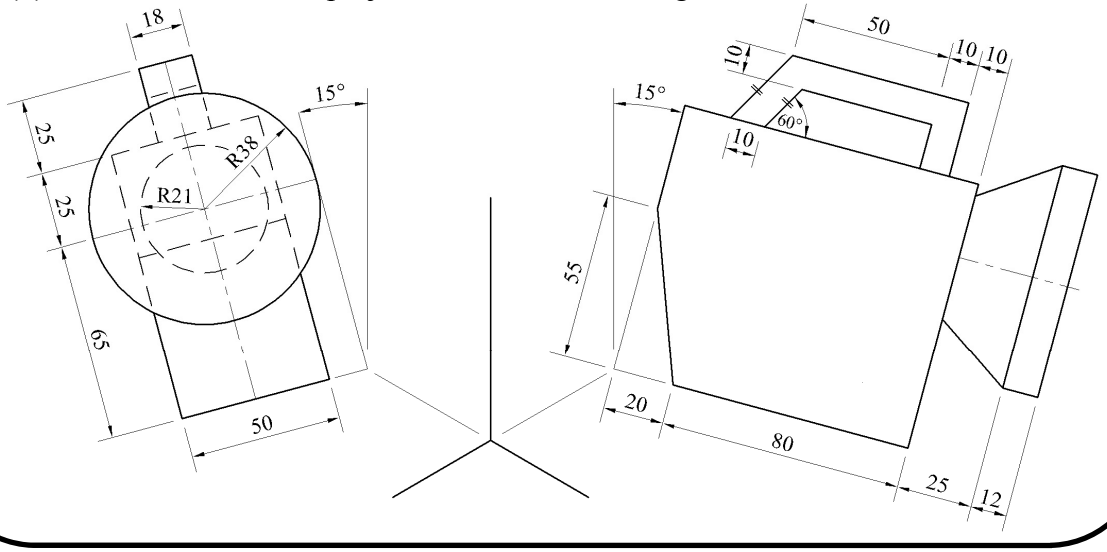
(iii) Draw the given end view inclined at 15° as shown.

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



OR

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



4. The elevation and plan of a safety guard for a garden strimmer are shown. The safety guard consists of a truncated semi-cone **A** and a cylinder **B**, which is also truncated as shown.

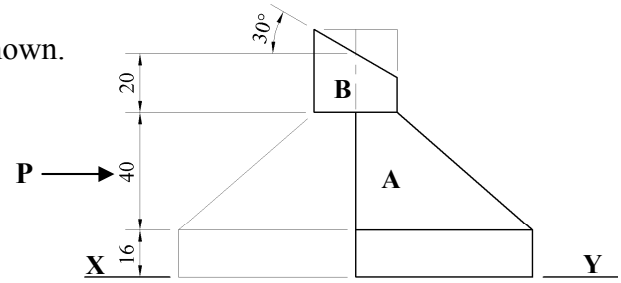
A 3D graphic of the guard is also shown.

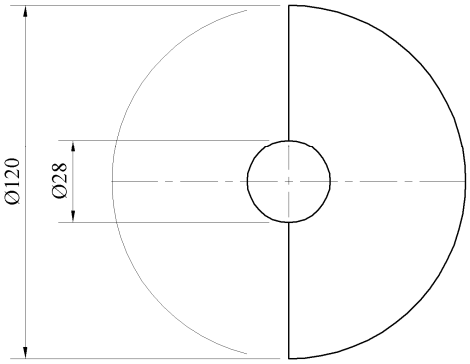
(a) Draw the given plan and elevation.

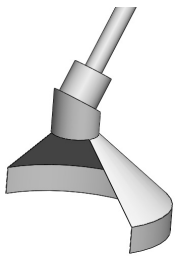
(b) Project an end view in the direction of arrow **P**.

(c) Draw the development of the conical surface **A**.

(d) Draw the development of the cylindrical surface **B**.



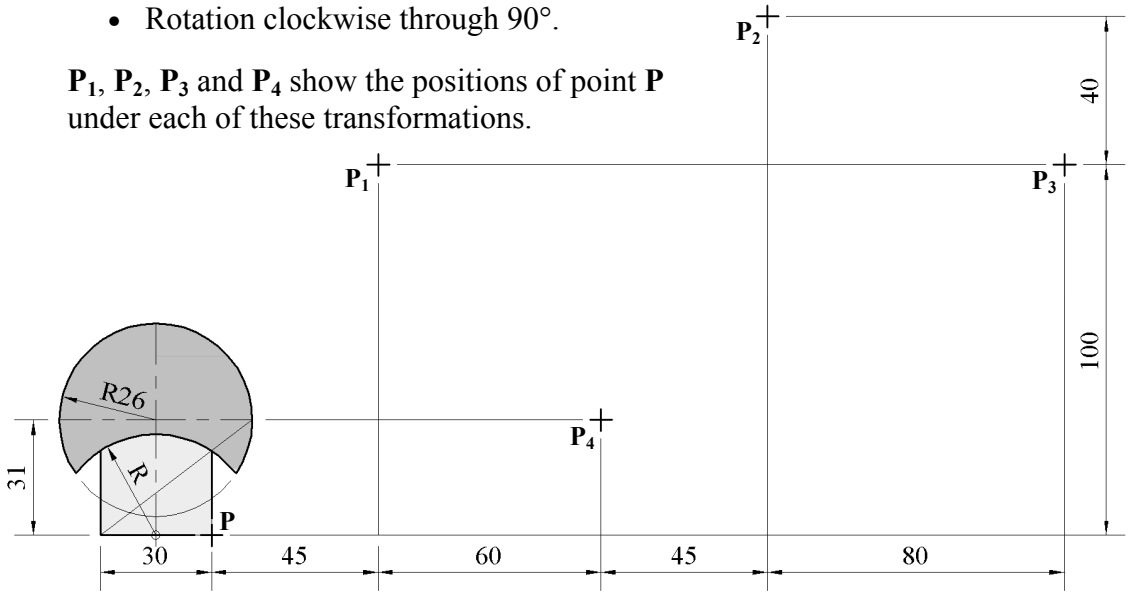




5. The figure shows the design of a video game character.
The shape is subject to transformations in the following order:

- Translation
- Axial Symmetry
- Central Symmetry
- Rotation clockwise through 90°.

$\mathbf{P_1}$, $\mathbf{P_2}$, $\mathbf{P_3}$ and $\mathbf{P_4}$ show the positions of point **P** under each of these transformations.



(a) Draw the given figure.

(b) Determine the image of the figure under **each** of these transformations.

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

6. The figure shows the design for a child's piggy bank.
The curve **ABCDE** is an ellipse and point **B** is a point on the curve.
Determine the length of the major axis and draw the ellipse.
The curve **KMN** is a parabola with vertex at **M**.

The lines **PQ** and **RS** are tangents to the ellipse from points **P** and **R**.

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