

# SMARTWIZ

## GRADE 12 ENGINEERING GRAPHICS AND DESIGN (EGD) EXAM

MARKS: 100

MARKS	

TIME: 2 HOURS

SCHOOL \_\_\_\_\_

CLASS (eg. 4A) \_\_\_\_\_

SURNAME \_\_\_\_\_

NAME \_\_\_\_\_

### Instructions for Learners:

- Read all instructions carefully before you begin the exam.
- Write your full name and student number clearly on the answer sheet/book.
- Answer all questions unless otherwise instructed.
- Show all your work/calculations where necessary.
- Write neatly and clearly.
- Use only a blue or black pen. Do not use correction fluid or tape.
- Electronic devices (calculators, cell phones, etc.) are not allowed unless explicitly permitted.
- Raise your hand if you have any questions.
- Do not talk to other learners during the exam.
- Any form of dishonesty will result in immediate disqualification from the exam.

**This exam consists of Five pages, including the cover page.**

## QUESTION 1: MULTI-VIEW DRAWING [25 marks]

### Visual Description:

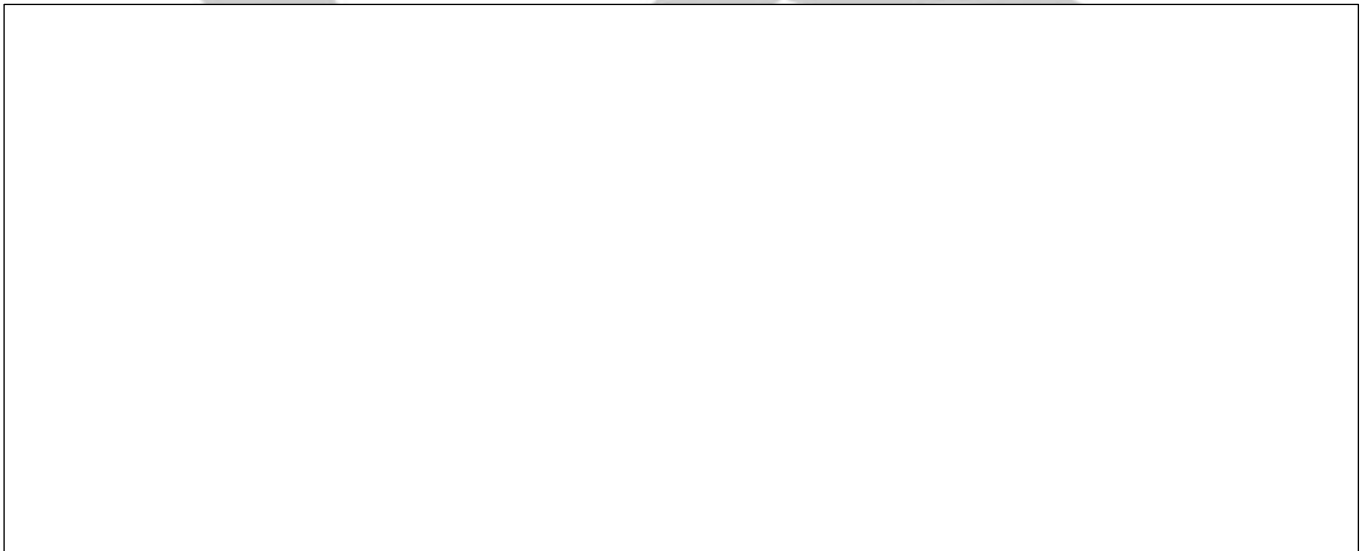
A **step block** consists of three rectangular steps:

- Bottom step: 80 mm long, 40 mm wide, 20 mm high
- Middle step: 60 mm long, 40 mm wide, 20 mm high, placed on top of bottom step at one end
- Top step: 40 mm long, 40 mm wide, 20 mm high, placed on middle step at the same end

### Tasks:

1. Draw the **front view** showing the steps clearly.
2. Draw the **top view** showing the outline of the steps.
3. Draw the **right side view**.

Draw in the space below (or on separate sheets):

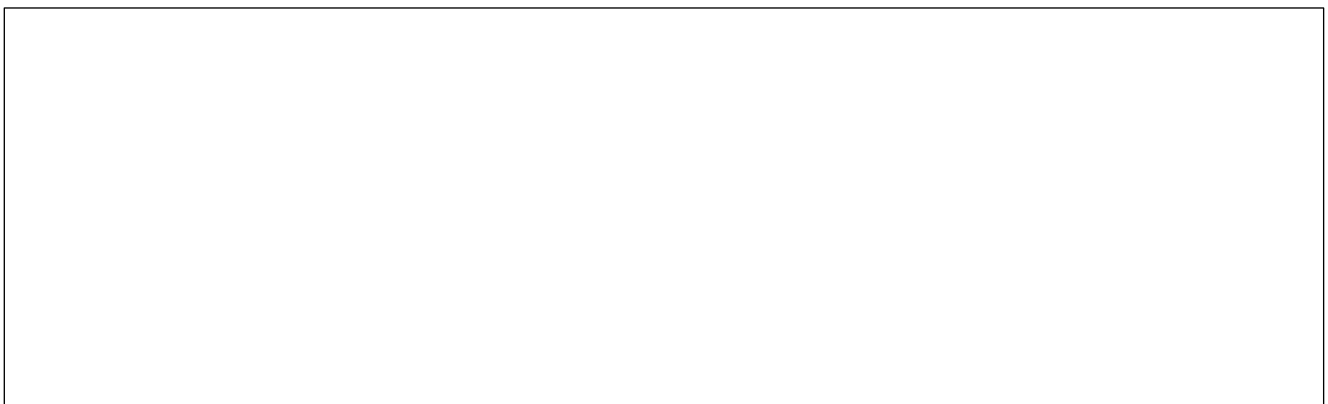


## QUESTION 2: ISOMETRIC DRAWING [20 marks]

Draw an isometric view of the following:

- A **hexagonal pyramid** with a base edge of 40 mm and height of 60 mm.

Draw your isometric projection here:



### QUESTION 3: INTERPRETING A WORKING DRAWING [20 marks]

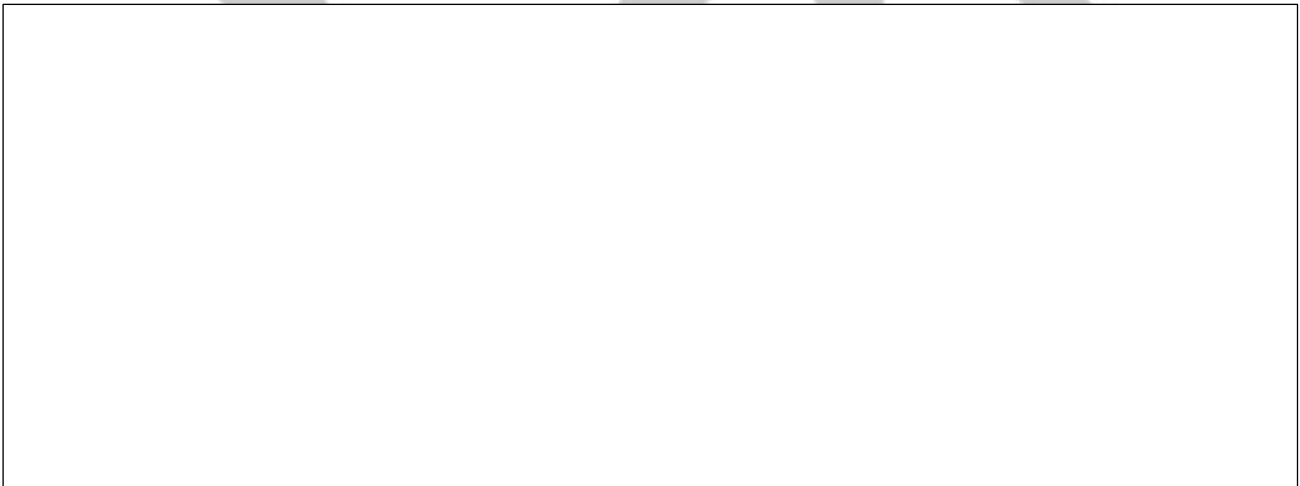
Below is a simplified description of a **mechanical bracket**:

- A rectangular plate 100 mm long, 60 mm wide, 20 mm thick.
- Two circular holes of diameter 15 mm drilled through the plate at 20 mm from each end along the length and centered along the width.

#### Tasks:

1. Draw the **front view** of the bracket showing the holes.
2. Draw the **top view** showing the hole positions.
3. Add correct dimensioning and labeling.

Draw in the space below:



### QUESTION 4: DEVELOPMENT AND SURFACING [15 marks]

#### Visual Description:

A **right circular cone** with a base diameter of 50 mm and height of 70 mm.

#### Tasks:

1. Draw the **front elevation** and **plan view** of the cone.
2. Draw the **development (net)** of the cone showing the sector (lateral surface) and base circle.

Draw in the space below:



## QUESTION 5: THEORY QUESTIONS [20 marks]

Answer briefly:

**5.1 Define the term “sectional view” and explain when it is used.**

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**5.2 What are hidden lines and how are they represented in drawings?**

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**5.3 Describe the importance of dimensioning in engineering drawings.**

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✓ END OF EXAM

TOTAL : 100

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**MEMO****QUESTION 1: MULTI-VIEW DRAWING [25 marks]**

- **Front view:**
    - Correct depiction of three steps stacked, showing heights (20 mm each).
    - Bottom step 80 mm long × 20 mm high, middle step 60 mm long × 20 mm high on one end, top step 40 mm long × 20 mm high on same end.
    - Clear edges and lines. (9 marks)
  - **Top view:**
    - Outline shows steps reducing in length from 80 mm (bottom) to 40 mm (top).
    - Width constant at 40 mm. (8 marks)
  - **Right side view:**
    - Steps shown with correct heights, aligned properly.
    - Width (40 mm) consistent. (8 marks)
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**QUESTION 2: ISOMETRIC DRAWING [20 marks]**

- Hexagonal base drawn with six equal edges of 40 mm.
  - Pyramid apex positioned correctly at 60 mm above the base center.
  - Proper isometric angles and neat lines. (20 marks)
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**QUESTION 3: INTERPRETING A WORKING DRAWING [20 marks]**

- **Front view:**
    - Rectangle 100 mm long × 20 mm thick × 60 mm wide shown with two circular holes visible as circles.
    - Holes placed 20 mm from each end, centered in width. (8 marks)
  - **Top view:**
    - Rectangle 100 mm × 60 mm with holes shown as circles.
    - Hole positions correct (20 mm from ends, centered). (7 marks)
  - **Dimensioning:**
    - Correct use of dimension lines, arrows, and labels (hole diameters, distances from edges). (5 marks)
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**QUESTION 4: DEVELOPMENT AND SURFACING [15 marks]**

- **Front elevation:**
    - Cone drawn with base diameter 50 mm, height 70 mm. (5 marks)
  - **Plan view:**
    - Circle with diameter 50 mm. (3 marks)
  - **Development (net):**
    - Sector (lateral surface) drawn with arc length = circumference of base ( $\approx 157$  mm).
    - Radius = slant height =  $\sqrt{70^2 + 25^2}$  = approx. 74 mm (show calculation for slant height).
    - Base circle included. (7 marks)
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## QUESTION 5: THEORY QUESTIONS [20 marks]

- **5.1 Sectional view:**
    - A view showing the internal features of an object by cutting through it.
    - Used to reveal hidden internal details that cannot be seen in normal views. (6 marks)
  - **5.2 Hidden lines:**
    - Represent edges or boundaries that are not visible from the viewing angle.
    - Shown as dashed lines (short dashes evenly spaced). (7 marks)
  - **5.3 Importance of dimensioning:**
    - Provides exact sizes, locations, and tolerances for manufacturing or construction.
    - Ensures accurate communication between designer and manufacturer. (7 marks)
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✓ END OF MEMO

TOTAL : 100