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: ORTHOGRAPHIC PROJECTION [25 marks]

A **triangular prism** has a base length of 60 mm, base height 40 mm, and length 80 mm.

1.1 Draw the front view showing the triangular face.

1.2 Draw the plan (top) view showing the rectangular face.

1.3 Draw the end view showing the triangular shape.

QUESTION 2: ISOMETRIC DRAWING [20 marks]

Draw an **isometric projection** of a rectangular block 80 mm long, 50 mm wide, and 30 mm high, with a square hole through it:

- Hole is 20 mm × 20 mm square, centrally located on the top surface, going through the entire height.

Draw your isometric view here:

QUESTION 3: DEVELOPMENT OF SURFACES [20 marks]

A **hexagonal prism** has a base edge length of 25 mm and height of 70 mm.

3.1 Draw the front elevation and plan view of the prism.

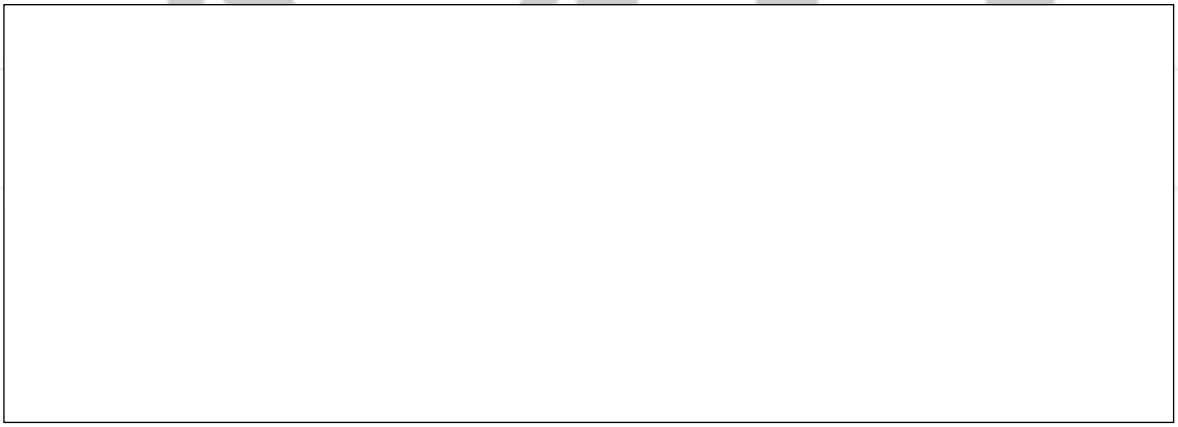
3.2 Draw the development (net) of the hexagonal prism.

QUESTION 4: SECTIONAL VIEWS [15 marks]

A cube with side length 60 mm has a cylindrical hole with diameter 25 mm drilled through the centre, front to back.

4.1 Draw the front elevation in full section showing the hole.

4.2 Draw the top view showing the hole.



QUESTION 5: THEORY QUESTIONS [20 marks]

Answer the following briefly:

5.1 What are auxiliary views and when are they used?

5.2 Explain the difference between a first-angle and a third-angle orthographic projection symbol.

5.3 What is the role of CAD software in modern engineering graphics?

✅ **END OF EXAM**

TOTAL : 100

MEMO

QUESTION 1: ORTHOGRAPHIC PROJECTION [25 marks]

- **1.1 Front view:**
  - Correct triangular face shown with base 60 mm and height 40 mm.
  - Proper lines and dimensions visible. (9 marks)
- **1.2 Plan (top) view:**
  - Correct rectangular shape 80 mm long and 60 mm wide (length × base length).
  - Proper edges shown clearly. (8 marks)
- **1.3 End view:**
  - Triangular face shown with correct dimensions (base 60 mm, height 40 mm).
  - Proper projection alignment. (8 marks)

QUESTION 2: ISOMETRIC DRAWING [20 marks]

- Rectangular block correctly drawn: 80 mm long, 50 mm wide, 30 mm high with proper isometric angles (30° from horizontal). (10 marks)
- Square hole (20 mm × 20 mm) positioned centrally on top and extending through entire height shown clearly. (10 marks)

QUESTION 3: DEVELOPMENT OF SURFACES [20 marks]

- **3.1 Front elevation:**
  - Hexagon drawn accurately with each edge 25 mm and height 70 mm.
- **Plan view:**
  - Hexagonal base correctly drawn with equal edges 25 mm. (8 marks)
- **3.2 Development (net):**
  - Six rectangular faces (70 mm height × 25 mm edge length) arranged in a strip.
  - Two hexagons drawn for top and bottom faces. (12 marks)

QUESTION 4: SECTIONAL VIEWS [15 marks]

- **4.1 Front elevation in full section:**
  - Cube 60 mm × 60 mm correctly drawn.
  - Hole represented by a rectangle of width 25 mm with correct section hatch lines. (8 marks)
- **4.2 Top view:**
  - Square base 60 mm × 60 mm drawn.
  - Circular hole (diameter 25 mm) shown centrally. (7 marks)

QUESTION 5: THEORY QUESTIONS [20 marks]

- **5.1 Auxiliary views:**
  - Used to show features that are inclined or oblique and not clearly visible in standard views.
  - Helps to display true size and shape of inclined surfaces. (6 marks)
- **5.2 First-angle vs third-angle projection symbol:**
  - First-angle symbol: Object placed between observer and plane, view layout opposite to third-angle (Europe).
  - Third-angle symbol: Plane between observer and object, used in USA, views arranged differently. (7 marks)
- **5.3 Role of CAD software:**
  - Enables precise, fast, and editable technical drawings.
  - Facilitates 3D modelling, simulation, and easy modification.
  - Improves accuracy and communication in design. (7 marks)

✅ **END OF MEMO**

TOTAL : 100