SMARTWIZ

GRADE10 ENGINEERING GRAPHICS AND DESIGN (EGD) EXAM

MARKS: 100

MARKS	

TIME: 2 hours

SCHOOL _____

CLASS (e.g. 4A) _____

SURNAME _____

NAME _____

Instructions for Learners:

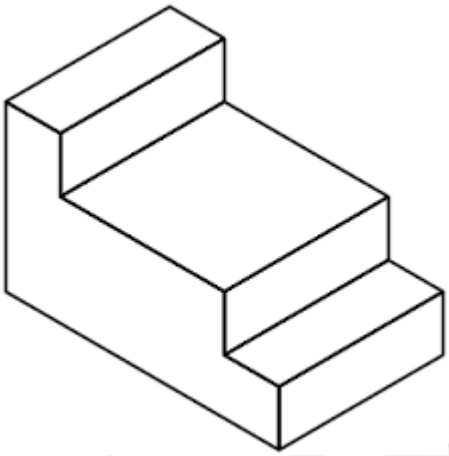
- Read all the instructions carefully before you begin the exam.
- Write your name and learner number clearly on the answer sheet/booklet.
- Answer all the questions unless otherwise instructed.
- Show all your work/calculations where applicable.
- Write neatly and legibly.
- Use only blue or black ink. *Do not use correction fluid or tape.*
- No electronic devices (calculators, phones, etc.) are allowed unless explicitly permitted.
- Raise your hand if you have any questions.
- Do not talk to other learners during the exam.
- Any form of cheating will lead to disqualification.

This test consists of 6 pages including the cover page.

📝 SECTION A: GRAPHIC COMMUNICATION (30 marks)

QUESTION 1: 2D WORKING DRAWING (10 marks)

Using **first-angle orthographic projection**, draw the **front view** and **top view** of the shaped block shown in the isometric drawing below.

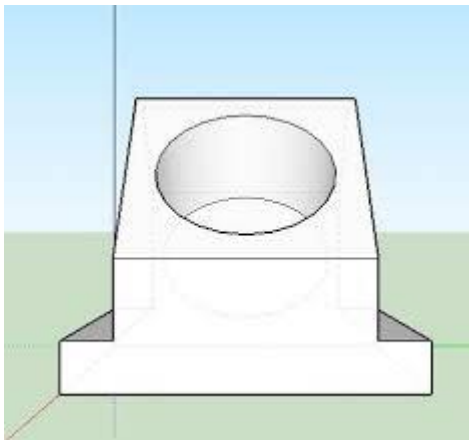


Use the space below to complete your drawing:

Drawing space:

QUESTION 2: PICTORIAL DRAWING (OBLIQUE) (10 marks)

2.1 Draw the **oblique view** of the following object. Use **Cavalier projection**. (6)



2.2 Label the dimensions on your drawing (4)

Drawing space:

QUESTION 3: DRAWING CONVENTIONS (10 marks)

Match the correct **drawing symbol or convention** with its description. Write only the letter (A–F) next to the number.

No.	Description	Symbol
3.1	Centre line	
3.2	Cutting plane	
3.3	Hidden detail	
3.4	Dimension line	
3.5	Section lining (hatching)	

Symbols:
A. ▒▒▒▒▒▒▒▒
B. – – – – –
C. ─ • ─ • ─

D. →———←
E. Thick dashed line
F. Alternating thick/thin line

3.1 ____
3.2 ____
3.3 ____
3.4 ____
3.5 ____

💻 SECTION B: DESIGN PROCESS & CAD (30 marks)

QUESTION 4: DESIGN APPLICATION (10 marks)

4.1 Define the **design brief** in your own words. (2)

4.2 Explain the purpose of the following steps in the design process:
a) Investigate (2)
b) Generate ideas (2)
c) Develop solution (2)
d) Evaluate (2)

QUESTION 5: BASIC CAD TOOLS (10 marks)

5.1 Name any **four basic tools or commands** used in CAD software. (4)

5.2 Explain the use of the following CAD commands:
a) Trim – _____ (2)
b) Offset – _____ (2)
c) Dimension – _____ (2)

QUESTION 6: TITLE BLOCK DESIGN (10 marks)

Design a **simple title block** that includes the following:

- Drawing name
- Scale
- Drafter's name
- Date
- Projection symbol

Use the block below:

Drawing area:

🧱 SECTION C: ENGINEERING MATERIALS & PRACTICES (40 marks)

QUESTION 7: ENGINEERING MATERIALS (15 marks)

7.1 Match the material with its correct property and application. Write only the number and letters (e.g., 1-A-C). (5)

No.	Material	A. Property	B. Application
1	Steel	High tensile strength	Car chassis
2	Copper	Good electrical conductor	Wiring
3	Aluminium	Lightweight	Aircraft parts
4	Glass	Transparent and brittle	Windows
5	Plastic	Flexible and cheap	Packaging

7.2 Why is **aluminium** used in airplanes? (2)

7.3 Give two **advantages** and two **disadvantages** of using plastic. (4)
Advantages:

1. _____
2. _____

Disadvantages:

1. _____
2. _____

7.4 Explain the difference between a **ferrous** and **non-ferrous** metal. Give one example of each. (4)

_____

_____

_____

QUESTION 8: SAFETY AND DRAWING ROOM PRACTICE (10 marks)

8.1 State **3 safety rules** that apply in a technical drawing room. (3)

_____

_____

_____

8.2 Why should you not **eat or drink** while using CAD equipment? (2)

_____

8.3 Explain the correct **storage method** for drawing instruments (2)

_____

8.4 What should you do if your drawing is torn or damaged? (1)

_____

_____

QUESTION 9: BASIC MECHANICAL COMPONENTS (15 marks)

9.1 Name and draw **3 types of fasteners** used in engineering. (6)

1. _____ [Drawing space]

2. _____ [Drawing space]

3. _____ [Drawing space]

9.2 What is the function of a **nut and bolt**? (2)

9.3 Describe how to prevent a bolt from loosening. Give two methods. (4)

9.4 State one **difference** between a rivet and a bolt. (1)

9.5 What is a **washer** used for in fastening? (2)

End of Paper ✅

TOTAL : 100

MEMO

📝 SECTION A: GRAPHIC COMMUNICATION (30 marks)

QUESTION 1: 2D WORKING DRAWING (10 marks)

- Correct front view: 3 marks
- Correct top view: 3 marks
- Alignment and projection between views: 2 marks
- Line work and conventions (line types, visibility): 2 marks

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QUESTION 2: OBLIQUE DRAWING (10 marks)

- Correct use of Cavalier projection: 2 marks
- Shape and form drawn correctly: 2 marks
- Lengths and angles accurate: 2 marks
- Neatness and presentation: 2 marks
- Correct and clear dimensions shown: 2 marks

QUESTION 3: DRAWING CONVENTIONS (10 marks)

3.1 C – Centre line
3.2 F – Cutting plane
3.3 B – Hidden detail
3.4 D – Dimension line
3.5 A – Section lining

(Each correct match = 2 marks)

💻 SECTION B: DESIGN PROCESS & CAD (30 marks)

QUESTION 4: DESIGN APPLICATION (10 marks)

4.1 Design brief: A short description of the problem and solution (2)

4.2
a) Investigate – Collect information and data to understand the problem (2)
b) Generate ideas – Sketch or brainstorm possible solutions (2)
c) Develop solution – Choose best idea and refine it (2)
d) Evaluate – Test or assess if the solution meets requirements (2)

QUESTION 5: BASIC CAD TOOLS (10 marks)

5.1 Four basic tools: Any four from: Line, Circle, Trim, Offset, Mirror, Dimension, Move, Rotate (1 mark each = 4)

5.2
a) Trim – Removes unwanted parts of lines (2)
b) Offset – Creates parallel copies of objects at a set distance (2)
c) Dimension – Adds size/measurement labels to drawings (2)

QUESTION 6: TITLE BLOCK DESIGN (10 marks)

Mark breakdown (assess on neatness, spacing, correctness):

- Title block structure: 2 marks
- Drawing name included: 2 marks
- Drafter's name + date: 2 marks
- Scale included: 2 marks
- Projection symbol (1st angle symbol): 2 marks

SECTION C: MATERIALS & PRACTICES (40 marks)

QUESTION 7: MATERIALS (15 marks)

7.1
1-A-B: Steel – High tensile strength – Car chassis
2-A-B: Copper – Good conductor – Wiring
3-A-B: Aluminium – Lightweight – Aircraft parts
4-A-B: Glass – Transparent – Windows
5-A-B: Plastic – Flexible – Packaging
(1 mark per correct set = 5 marks)

7.2 Aluminium is light, strong, and corrosion-resistant, making it ideal for aircraft parts. (2)

7.3
Advantages:

1. Cheap to produce
2. Easily moulded

Disadvantages:

1. Non-biodegradable/pollutes environment
2. Not heat-resistant or durable in some cases
   (4 marks)

7.4

- Ferrous: Contains iron (e.g., Steel) – magnetic, may rust
- Non-ferrous: No iron (e.g., Aluminium) – corrosion-resistant
  (2 × 2 = 4 marks)

QUESTION 8: SAFETY & DRAWING PRACTICE (10 marks)

8.1 Any 3 rules:

- No running
- Use sharp tools carefully
- Keep workspace clean
  (1 mark each)

8.2 Reason:
Liquids can damage keyboards or CAD devices; it's unsafe. (2)

8.3 Store instruments in a case or drawer to prevent damage/loss. (2)

8.4 Tape or redraw it; never submit torn work. (1)

QUESTION 9: FASTENERS & COMPONENTS (15 marks)

9.1
Any 3 from:

- Bolt
- Nut
- Rivet
- Screw
- Washer
  (Each named and correctly drawn: 2 marks each = 6)

9.2 A nut and bolt hold two or more parts together tightly. (2)

9.3
Methods:

- Use a lock nut

- Apply thread-locking fluid
  (2 × 1 = 2)

9.4 Rivets are permanent; bolts can be removed. (1)

9.5 A washer spreads the load and protects the surface under the bolt. (2)

✅ **TOTAL: 100 MARKS**