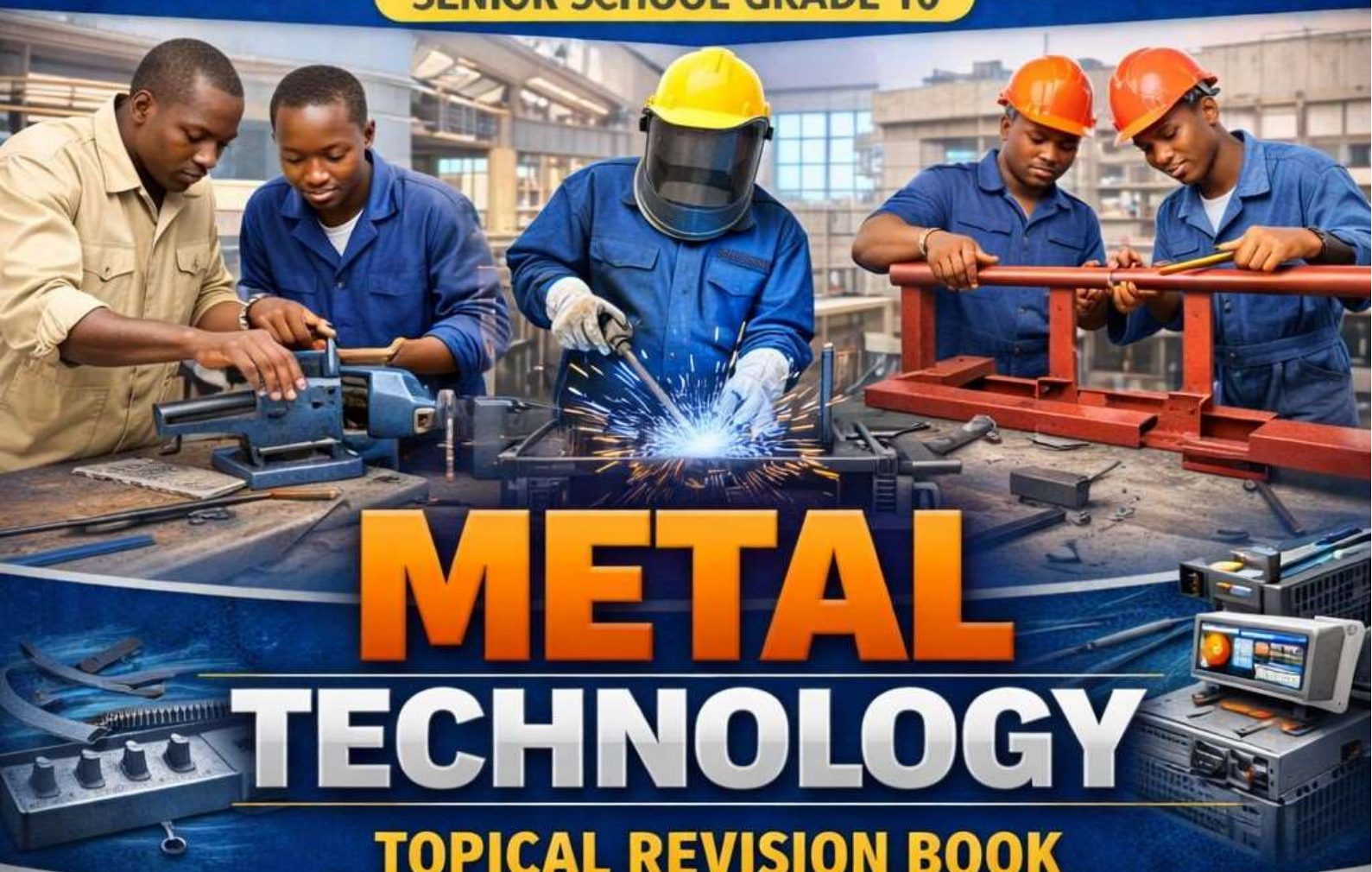
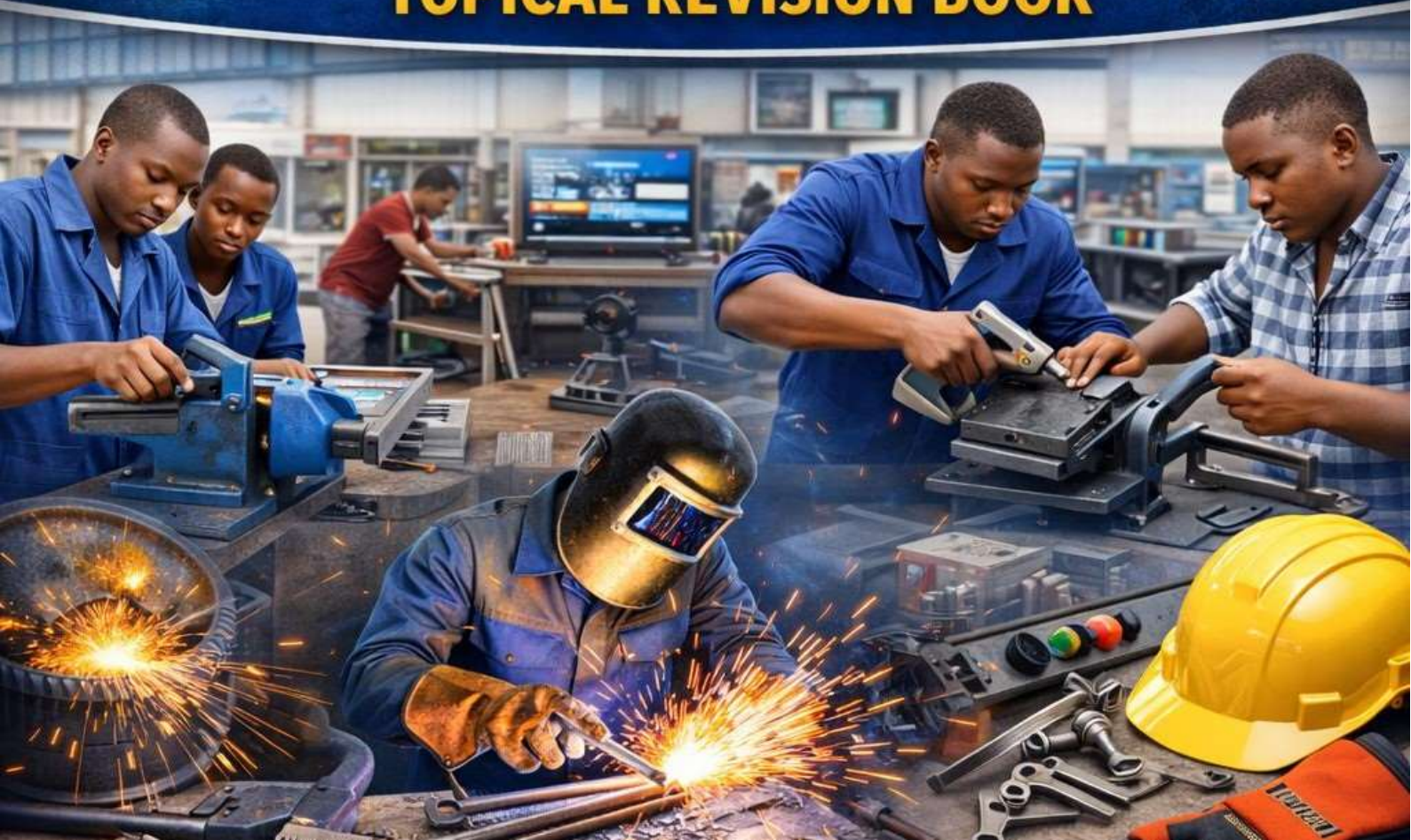
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SENIOR SCHOOL GRADE 10



METAL TECHNOLOGY

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GRADE 10 METAL TECHNOLOGY EXAM

STRAND 1.0: FUNDAMENTALS OF METALWORK

SECTION A:

1. Define the term **metal**. (1)

2. Define the term **metalwork**. (1)

3. Define the term **material**. (1)

4. Define the term **tools**. (1)

5. Define the term **machines**. (1)

6. What is meant by **personal protective equipment (PPE)**? (1)

7.

8. State **one example** of a metalwork-related business found in the community. (1)

_____

_____

9. Mention **one importance** of studying Metalwork. (1)

_____

_____

10. Name **one type of workshop** where metalwork activities take place. (1)

11. Give **one example** of a PPE used in metalwork. (1)

12. State **one metal product** commonly used in day-to-day life. (1)

13. Write the meaning of the term **Jua Kali**. (1)

14. State **one place** where welding services are offered. (1)

15. State **one safety item** that protects the eyes in metalwork. (1)

16. State **one safety item** that protects the hands in metalwork. (1)

17. State **one item** that protects the feet in a workshop. (1)

18. State **one tool** used for measuring in metalwork. (1)

19. State **one machine** used in metalwork. (1)

20. State **one reason** why a workshop must be clean. (1)

21. Give **one example** of digital media used to research metalwork terms. (1)

22. State **one example** of print media used to research metalwork terms. (1)

23. Mention **one metalwork activity** done in a welding workshop. (1)

24. State **one reason** why PPE must be worn. (1)

25. Name **one metalwork business** that repairs metal items. (1)

SECTION B: STRUCTURED QUESTIONS – 50 MARKS

26. Metalwork Terms and Meanings (6 Marks)

(a) Explain the meaning of the term **tools** as used in metalwork. (2)

(b) Explain the meaning of the term **machines** as used in metalwork. (2)

(c) State the difference between a **tool** and a **machine**. (2)

27. Importance of Studying Metalwork (7 Marks)

(a) State **three reasons** why studying Metalwork is important for learners. (3)

(b) Explain **two ways** Metalwork supports career development. (4)

28. Metalwork in the Community (6 Marks)

(a) List **three metalwork-related businesses** found in your community. (3)

(b) State **three services** offered by Jua Kali metalwork businesses. (3)

29. Mention six careers in metal technology.

30. PPE and Safety in Metalwork (7 Marks)

(a) List **four items** of PPE used in metalwork. (4)

(b) State **three dangers** that PPE protects a learner from in a workshop. (3)

31. Workshop Environment (5 Marks)

(a) State **three features** of a good metalwork workshop. (3)

(b) Explain **two reasons** why a workshop should be well ventilated. (2)

32. Metalwork in Day-to-Day Life (7 Marks)

(a) Identify **four metal items** commonly used in daily life. (4)

(b) Explain **three reasons** why metal is preferred for making tools and structures. (3)

33. Community Visit Report (7 Marks)

You visited a welding workshop within your locality.

(a) State **two activities** you observed being done. (2)

(b) State **two tools** you saw being used. (2)

(c) State **two PPE items** used by workers. (2)

(d) State **one lesson** you learnt from the visit. (1)

SECTION C:– 25 MARKS

34. Problem Solving: Choosing a Career Path (8 Marks)

A Grade 10 learner says, *"Metalwork is not important because I want an office job."*

(a) Give **three arguments** to prove that Metalwork is still important. (3)

(b) Explain **two career opportunities** that can come from studying Metalwork. (4)

(c) Give **one reason** why practical subjects are valuable in life. (1)

35. Critical Thinking: Metalwork Business Growth (9 Marks)

A Jua Kali metalwork business wants to grow and attract more customers.

(a) State **three services** they should offer to increase customers. (3)

(b) Explain **three ways** the business can improve safety and professionalism. (6)

36. Safety Decision-Making Scenario (8 Marks)

During a metal cutting activity, a learner refuses to wear PPE, saying it is uncomfortable.

(a) State **three possible injuries** that may occur without PPE. (3)

(b) Explain **three reasons** why PPE must be worn even if uncomfortable. (3)

(c) Suggest **two ways** the workshop teacher can encourage PPE use. (2)

2.0 FUNDAMENTALS OF METALWORK (SAFETY)

SECTION A: (25 MARKS)

1. Define the term **workshop safety**. (1)

2. State the meaning of **OSHA**. (1)

3. Name **one** category of safety in a metal workshop. (1)

4. Mention **one** example of **personal safety** in metalwork. (1)

5. Mention **one** example of **equipment safety** in metalwork. (1)

6. Mention **one** example of **environment safety** in metalwork. (1)

7. Mention **one** example of **vehicle safety** in a workshop compound. (1)

8. State **one** reason why safety rules are important in metalwork. (1)

9. Give **one** cause of accidents in a metal workshop. (1)

10. State **one** cause of accidents outside a metal workshop. (1)

11. Name **one** item found in a first aid kit. (1)

12. State **one** first aid procedure for a minor cut. (1)

13. State **one** safety sign commonly found in workshops. (1)

14. Name **one** PPE used when grinding metal. (1)

15. State **one** safety precaution when using machines. (1)

16. Mention **one** danger of loose clothing in a workshop. (1)

17. State **one** rule about handling sharp tools. (1)

18. Mention **one** way to prevent fire in a workshop. (1)

19. Name **one** type of accident casualty in metalwork. (1)

20. State **one** way of keeping floors safe in a workshop. (1)

21. Mention **one** feature of a good workshop layout. (1)

22. State **one** reason why a workshop must have clear exits. (1)

23. State **one** reason why machines must be spaced properly. (1)

24. Mention **one** way of learning safety using digital media. (1)

25. State **one** benefit of visiting a workshop for safety learning. (1)

SECTION B: (50 MARKS)

26. Categories of Safety in Metalwork (8 Marks)

(a) List **four aspects of safety** in a metal workshop. (4)

(b) Explain **two ways** personal safety reduces accidents. (2)

(c) Explain **two ways** environmental safety improves work efficiency. (2)

27. OSHA Rules and Regulations (7 Marks)

(a) State **three workshop rules** that are consistent with OSHA safety regulations. (3)

(b) Explain **two reasons** why OSHA rules must be followed in school workshops. (4)

28. Causes of Accidents in and Outside the Workshop (10 Marks)

(a) State **five causes** of accidents **inside** a metal workshop. (5)

(b) State **three causes** of accidents **outside** a metal workshop. (3)

(c) Identify **two causes** of accidents that occur both inside and outside workshops. (2)

29. First Aid Procedures for Casualties (10 Marks)

A Form 2 learner is injured during a metalwork practical lesson.

(a) Outline **four first aid steps** for a learner who has a **deep cut** on the hand. (4)

(b) Outline **three first aid steps** for a learner who has a **burn** caused by hot metal. (3)

(c) Outline **three first aid steps** for a learner who has **fainted** in the workshop. (3)

30. Workshop Rules and Behaviour (7 Marks)

(a) State **four general workshop rules** learners must follow. (4)

(b) Explain **three consequences** of ignoring workshop rules. (3)

31. Learning Safety (8 Marks)

(a) Give **four workshop hazard**

(b) Give **three examples of careers in metal technology**

(c) Explain **three advantages** of learning safety. (3)

SECTION C: (25 MARKS)

32. Workshop Layout and Safety (Application) (10 Marks)

Below is a workshop layout plan.

DIAGRAM 1: WORKSHOP LAYOUT A

```
-----------------------------------------
| TOOL STORE | WORKBENCH AREA | GRINDING CORNER |
|----------|-------------|-----------------|
| MACHINE | WELDING AREA | FIRST AID + FIRE KIT |
| AREA | | |
|----------|-------------|-----------------|
| MAIN DOOR / EXIT |
-----------------------------------------
```

(a) Identify **three safety advantages** of placing the **first aid and fire kit** near the exit. (3)

(b) Suggest **three improvements** that would make this layout safer. (3)

(c) Explain **four ways** workshop layout can reduce accidents. (4)

33. Accident Investigation Scenario (Reasoning) (8 Marks)

During a practical lesson, a learner slipped and fell near the grinding corner.
The floor had oil, metal filings, and an extension cable crossing the path.

(a) Identify **three causes** of the accident from the scenario. (3)

(b) Suggest **three immediate actions** the teacher should take after the accident. (3)

(c) Give **two long-term solutions** to prevent such accidents. (2)

34. Decision-Making: Safety Inside and Outside the Workshop (7 Marks)

A school metalwork workshop is located near a vehicle parking area.
Learners often cross the parking area when going to the workshop.

(a) Explain **three safety risks** caused by vehicles near the workshop. (3)

(b) Propose **three safety measures** that should be introduced to protect learners. (3)

(c) Give **one reason** why safety must be applied even outside the workshop. (1)

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STRAND 2.0: TOOLS AND MATERIALS IN METALWORK

SUB-STRAND 2.1: HAND TOOLS AND BENCH TOOLS

SECTION A: (25 MARKS)

1. Define the term **hand tool**. (1)

2. Define the term **bench tool**. (1)

3. Name **one cutting tool** used in metalwork. (1)

4. Name **one driving tool** used in metalwork. (1)

5. Name **one holding tool** used in metalwork. (1)

6. Name **one measuring tool** used in metalwork. (1)

7. Name **one marking out tool** used in metalwork. (1)

8. State **one use** of a hacksaw. (1)

9. State **one use** of a file. (1)

10. State **one use** of a hammer. (1)

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11. State **one use** of a screwdriver. (1)

12. State **one use** of a bench vice. (1)

13. State **one use** of a steel rule. (1)

14. State **one use** of a scriber. (1)

15. Name **one tool** used to hold a workpiece firmly. (1)

16. Name **one tool** used for cutting sheet metal. (1)

17. Name **one tool** used for marking out straight lines on metal. (1)

18. Name **one tool** used to remove sharp edges after cutting. (1)

19. Mention **one danger** of using a blunt cutting tool. (1)

20. State **one way** of storing tools safely. (1)

21. Name **one tool** that is commonly used together with a bench vice. (1)

22. Mention **one safety rule** when using a hammer. (1)

23. Mention **one safety rule** when using a hacksaw. (1)

24. State **one reason** why tools should not be thrown in a toolbox. (1)

25. Name **one tool** that is used to mark the centre of a hole before drilling. (1)

SECTION B: (50 MARKS)

26. Classification of Hand and Bench Tools (10 Marks)

(a) Classify the following tools into the correct groups:
(Cutting, Driving, Holding, Measuring, Marking out) (5)

Tools:

i. Hacksaw
ii. Scriber
iii. Bench vice
iv. Steel rule
v. Screwdriver

(b) State **one use** of each tool above. (5)

TOOL	USE

27. Selecting Tools for a Given Task (10 Marks)

A learner is required to cut a mild steel bar, smooth the edges, and mark out two hole positions.

(a) Name **three tools** required for cutting the bar. (3)

(b) Name **two tools** required for smoothing the edges. (2)

(c) Name **two tools** required for marking out the hole positions. (2)

(d) Name **one holding tool** needed for the whole process. (1)

(e) Give **two reasons** why correct tool selection is important. (2)

28. Safe Use of Hand and Bench Tools (8 Marks)

(a) State **four safety rules** when using cutting tools in metalwork. (4)

(b) State **two safety rules** when using driving tools. (2)

(c) State **two safety rules** when using holding tools. (2)

29. Performing a Task Using Hand and Bench Tools (7 Marks)

A learner is asked to prepare a metal strip for joining.

(a) Outline **four steps** followed when cutting a metal strip using a hacksaw. (4)

(b) State **three steps** for finishing the strip using a file. (3)

30. Care, Maintenance and Storage of Tools (8 Marks)

(a) State **four ways** of maintaining hand tools in a metal workshop. (4)

(b) Explain **two ways** proper tool storage prevents accidents. (4)

31. Importance of Hand and Bench Tools (7 Marks)

(a) State **three benefits** of using appropriate tools in the workshop. (3)

(b) Explain **two ways** correct tools improve quality of work. (4)

SECTION C: (25 MARKS)

32. Workshop Problem Solving: Wrong Tool Use (10 Marks)

A learner uses a screwdriver as a chisel and uses a hammer with a loose head.

(a) Identify **three dangers** of using a screwdriver as a chisel. (3)

(b) Explain **three dangers** of using a hammer with a loose head. (3)

(c) Suggest **two correct tools** that should be used instead of the screwdriver. (2)

(d) Give **two reasons** why learners misuse tools in workshops. (2)

_____

_____

33. Efficiency and Maintenance Analysis (7 Marks)

A school workshop has many blunt hacksaw blades, rusty files, and loose bench vice jaws.

(a) Explain **three ways** poor tool maintenance reduces efficiency in the workshop. (3)

_____

_____

_____

(b) Explain **two ways** poor maintenance increases accidents. (2)

_____

_____

(c) Suggest **two actions** the teacher should take to restore tool efficiency. (2)

_____

_____

34. Workshop Scenario: Tool Selection for Accuracy (8 Marks)

A learner is required to mark out and measure a metal plate accurately for drilling.

(a) Identify **four tools** used for accurate measuring and marking out. (4)

_____

_____

_____

_____

(b) Explain **two reasons** why accuracy is important in marking out. (2)

_____

_____

(c) Suggest **two possible errors** that may occur if wrong tools are used. (2)

_____

_____

35. Give one example of each tool under the following classa

(A) Cutting Tools : _____

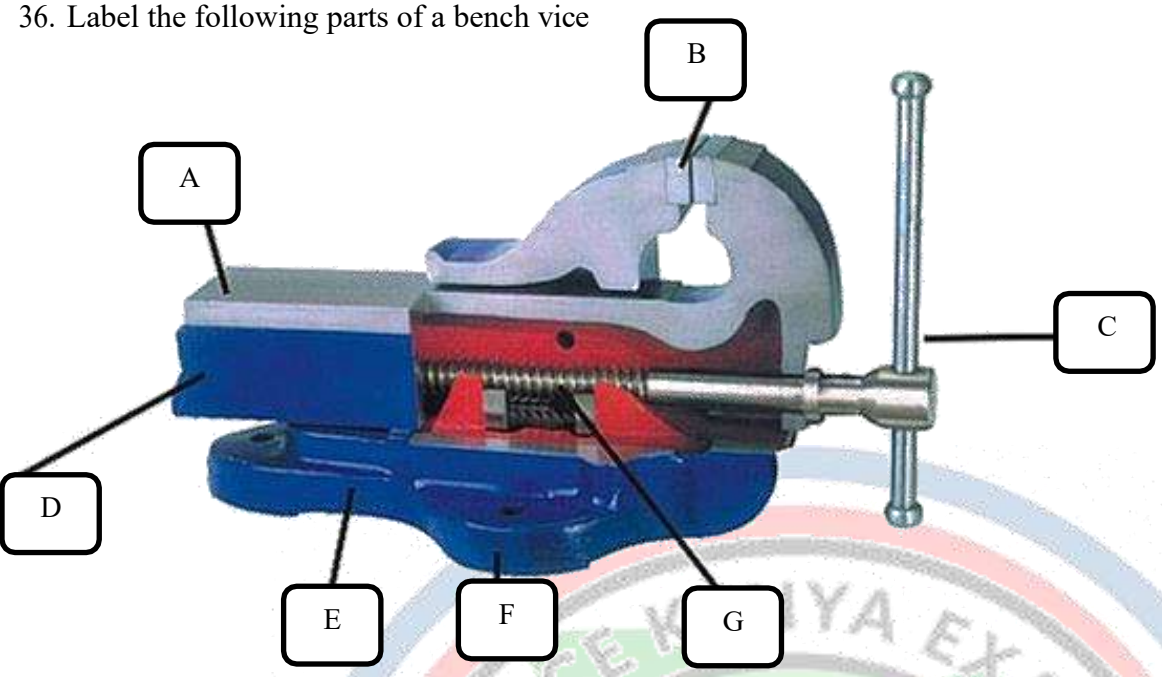
(B) Driving Tools : _____

(C) Holding Tools : _____

(D) Measuring Tools : _____

(E) Marking-out Tools : _____

36. Label the following parts of a bench vice



MEASURING & MARKING OUT TOOLS

SECTION A: (25 MARKS)

1. Define the term **measuring tool**. (1)

_____

_____

2. Define the term **marking-out tool**. (1)

_____

_____

3. Name one measuring tool used in metalwork. (1)

_____

_____

4. Name one marking-out tool used in metalwork. (1)

_____

_____

5. State one use of a **steel rule**. (1)

6. State one use of a **try square**. (1)

7. State one use of a **scriber**. (1)

8. State one use of a **divider**. (1)

9. State one use of an **odd leg caliper**. (1)

10. State one use of an **outside caliper**. (1)

11. State one use of an **inside caliper**. (1)

12. State one use of a **centre punch**. (1)

13. State one use of a **dot punch**. (1)

14. Name one tool used to support a round bar when marking out. (1)

15. Name one tool used for checking right angles. (1)

16. State one safety rule when using a punch. (1)

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17. Mention one safety rule when using a scriber. (1)

18. Mention one safety rule when using a divider. (1)

19. Name one tool used for marking long arcs on metal. (1)

20. State one way of storing measuring tools safely. (1)

21. State one way of preventing rust on measuring tools. (1)

22. Mention one reason why measuring tools should not be dropped. (1)

23. State one reason why marking out must be accurate. (1)

24. Name one flat surface used for marking out. (1)

25. State one advantage of using correct marking-out tools. (1)

SECTION B: (50 MARKS)

26. Identification and Classification of Tools (10 Marks)

(a) Classify the following tools as either **Measuring** or **Marking-out** tools: (6)

i. Steel rule

ii. Try square

iii. Scriber

iv. Divider

v. Centre punch

vi. Inside caliper

(b) State **one use** of each of the tools listed above. (4)

27. Measuring and Marking-Out Tools for a Given Task (10 Marks)

A learner is required to mark out a rectangular plate of **120 mm × 80 mm** and locate the centre for drilling a hole.

(a) Name **two tools** used to measure the 120 mm and 80 mm dimensions. (2)

(b) Name **two tools** used to mark straight lines accurately. (2)

(c) Name **two tools** used to locate the centre position of the hole. (2)

(d) Name **one tool** used to confirm the lines are at 90°. (1)

(e) Give **three reasons** why correct tool selection is important in this task. (3)

28. Use of Calipers and Punches (8 Marks)

(a) Differentiate between an **inside caliper** and an **outside caliper**. (2)

(b) State **three uses** of a centre punch in metalwork. (3)

(c) State **three uses** of a dot punch in metalwork. (3)

29. Marking Out Circles and Arcs (7 Marks)

(a) Name **two tools** used for marking circles on metal. (2)

(b) Explain **three steps** for marking a circle accurately on a metal plate. (3)

(c) State **two mistakes** that may occur when marking out circles. (2)

30. Surface Table and Supporting Tools (7 Marks)

(a) State **three uses** of a surface table in marking out. (3)

(b) Explain **two uses** of a Vee-block during marking out. (2)

(c) State **two uses** of angle blocks in metalwork marking out. (2)

31. Maintenance and Storage of Measuring and Marking-Out Tools (8 Marks)

(a) State **four ways** of maintaining measuring and marking-out tools. (4)

(b) Explain **two reasons** why tools should be stored in their correct places. (4)

SECTION C: (25 MARKS)

32. Precision and Tool Selection Analysis (10 Marks)

A learner used a steel rule only (without try square, scriber, or punches) to mark out a drilling position on a metal plate. The hole was drilled off-centre.

(a) Identify **three tools** that should have been used to improve accuracy. (3)

(b) Explain **three reasons** why the hole ended up off-centre. (3)

(c) Suggest **two corrective actions** the learner should take before drilling. (2)

(d) State **two benefits** of accurate marking out in metalwork projects. (2)

33. Workshop Safety Scenario (Application) (7 Marks)

During marking out, a learner carried a scriber and divider in their pocket.
The learner bent over and got pricked.

(a) Identify **three safety mistakes** in the scenario. (3)

(b) Suggest **three safe practices** when carrying marking-out tools. (3)

(c) State **one reason** why sharp marking tools are dangerous. (1)

34. Problem Solving: Trammel, Scribing Block and Surface Table (8 Marks)

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A metalwork learner is required to mark out a large arc on a wide metal plate and also mark parallel lines at a fixed height.

(a) Name the tool best suited for marking a large arc. (1)

(b) Explain **three steps** for using a trammel to mark the arc accurately. (3)

(c) Name the tool best suited for marking parallel lines at a fixed height. (1)

(d) Explain **three steps** for using a scribing block on a surface table. (3)

35. A learner is assigned to cut and shape metal using hand and bench tools.



F **G** **H** **I** **J**

a) Identify **the tools** shown. (5 marks)

F:_____. G:

_____.

H: _____. I:

_____.

J: _____.

b) Explain the **purpose of ANY THREE** tools identified above. (3 marks)

i. _____.

ii. _____.

iii. _____.

c) State **TWO maintenance practices** for hand and bench tools. (2 marks)

i. _____.

ii. _____.

36. Explain the importance of bench tools in performing metalwork tasks. (2 marks)

i. _____.

ii. _____.

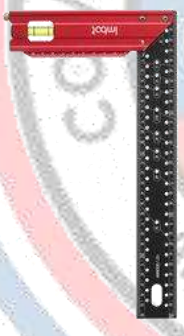
37. Outline three ways of taking care of metal work tools.(3 marks)

i. _____.

ii. _____.

iii. _____.

38. A learner measures and marks metal rods before cutting.

				
V	**W**	**X**	**Y**	**Z**

a) Identify **FIVE measuring and marking out tools** in the illustration. (5 marks)

V: _____. **W:** _____.

X: _____. **Y:** _____.

Z: _____.

b) Explain **TWO uses** of any TWO tools identified. (2 marks)

i. _____.

ii. _____.

39. You are given a flat metal sheet and the following tools: **a steel rule, a scriber, and a try square**. State the use of the following tools. (6 marks)

Tool	Use
Steel rule	
Try square	
Scriber	
Centre punch	
Vernier caliper	

40. a) State **TWO maintenance practices** for measuring and marking out tools. (2 marks)

i. _____.

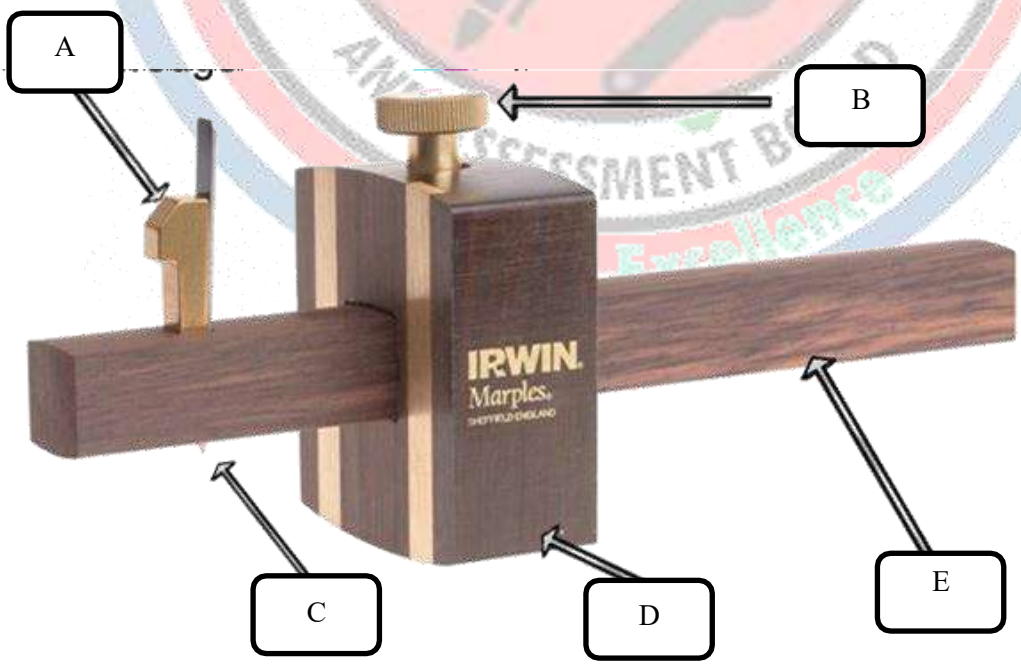
ii. _____.

b) State **TWO importance** of maintaining safety in metal workshop. (2 marks)

i._____

ii._____

41. Name the labelled parts



A: _____. **D:** _____.

B: _____. **E:** _____.

C: _____.

42. Identify the type of punch shown below



A **B** **C**

A: _____.

B: _____.

C: _____.

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METALS AND MATERIALS IN METALWORK

SECTION A: (25 MARKS)

1. Define the term **ferrous metal**. (1)

2. Define the term **non-ferrous metal**. (1)

3. State one example of a ferrous metal. (1)

4. State one example of a non-ferrous metal. (1)

5. Classify **iron** as ferrous or non-ferrous and state reason. (1)

6. Classify **steel** as ferrous or non-ferrous. (1)

7. Classify **copper** as ferrous or non-ferrous. (1)

8. Classify **aluminium** as ferrous or non-ferrous. (1)

9. Classify **tin** as ferrous or non-ferrous. (1)

10. Classify **lead** as ferrous or non-ferrous. (1)

11. Classify **zinc** as ferrous or non-ferrous. (1)

12. Name one type of ferrous metal. (1)

13. State one example of **low carbon steel** use. (1)

14. State one example of **high carbon steel** use. (1)

15. Define the term **physical property** of a metal. (1)

16. Define the term **mechanical property** of a metal. (1)

17. State one physical property of metals. (1)

18. State one mechanical property of metals. (1)

19. Name one metal supplied in the form of a **wire**. (1)

20. Name one form in which metals are supplied in a workshop. (1)

21. State one form in which steel is supplied in a workshop. (1)

22. Mention one use of metals in day-to-day life. (1)

23. State one reason why metals are important in construction. (1)

24. Name one print media source used to learn about metals. (1)

25. Name one digital media source used to learn about metals. (1)

SECTION B: (50 MARKS)

26. Sorting Metals into Ferrous and Non-Ferrous (10 Marks)

A learner collected the following metals from the workshop store:

iron, steel, copper, aluminium, tin, lead, zinc

(a) Sort the metals into:
(i) Ferrous metals (3)

(ii) Non-ferrous metals (4)

(b) State the main reason why ferrous metals are grouped together. (1)

(c) Give **two advantages** of non-ferrous metals compared to ferrous metals. (2)

27. Types of Ferrous Metals (Steels) (8 Marks)

(a) Name the three types of steel discussed in metalwork. (3)

(b) State **one property** of each type of steel. (3)

(c) Give **two examples** of items made from high carbon steel. (2)

28. Properties of Metals Found in the Workshop (10 Marks)

(a) State **four physical properties** of metals. (4)

(b) State **four mechanical properties** of metals. (4)

(c) Explain the difference between a physical and a mechanical property. (2)

29. Production of Iron from its Ore (12 Marks)

(a) Name **two raw materials** required in the production of iron from its ore. (2)

(b) State **one purpose** of each of the following in the blast furnace: (3)

i. Iron ore

ii. Coke

iii. Limestone

(c) Outline **five main steps** involved in producing iron from iron ore. (5)

(d) State **two products** obtained from a blast furnace besides iron. (2)

30. Forms and Means of Material Supply in a Metal Workshop (10 Marks)

(a) List **five forms** in which metals are supplied in a metal workshop. (5)

(b) State **one use** of each of the following forms: (5)

i. Sheet

ii. Plate

iii. Tube

iv. Wire

v. Bar

SECTION C: (25 MARKS)

31. Decision-Making: Selecting Metals for a Task (10 Marks)

A school wants to make the following items:

i. Water storage tank

ii. Cooking pot

iii. Door hinges

iv. Electrical wire

v. Roofing sheets

(a) Suggest the most suitable metal for each item from the list below: (5)
(steel, aluminium, copper, zinc, tin)

Item	Right metal
Water storage tank	
Cooking pot	
Door hinges	
Electrical wires	
Roofing sheets	

(b) Give **one reason** for each choice made in (a). (5)

32. Problem Solving: Workshop Material Supply (7 Marks)

A learner wants to make a rectangular frame using bars, but the store only has sheets and tubes.

(a) Suggest **two ways** the learner can still complete the project using available materials. (2)

(b) Explain **three advantages** of using tubes instead of solid bars for making frames. (3)

(c) State **two limitations** of using sheets for frame construction. (2)

33. Analysis: Importance of Studying Ferrous and Non-Ferrous Metals (8 Marks)

(a) Explain **four reasons** why studying ferrous and non-ferrous metals is important in metalwork. (4)

(b) Explain **two ways** knowledge of metal properties improves safety in a workshop. (2)

(c) Give **two ways** metals contribute to development in daily life. (2)

34. A workshop receives a shipment of iron, copper, aluminum, and steel.



M



N



O



P

a) Identify the metal used to make the following materials. (4 marks)

M: _____. **N:** _____.

O: _____. **P:** _____.



STRAND 2.0: TOOLS AND MATERIALS

SUB-STRAND 2.4: PROJECT
SECTION A: (25 MARKS)

1. Define the term **community problem**. (1)

_____

_____

2. Define the term **fabrication**. (1)

3. State one meaning of **locally available materials**. (1)

4. Mention one example of a locally available metal material. (1)

5. Mention one example of a locally available non-metal material used in metalwork projects. (1)

6. State one importance of identifying a problem before starting a project. (1)

7. Mention one example of a community problem that can be solved using metalwork skills. (1)

8. Name one fabricated item that can solve a community problem. (1)

9. State one reason why learners should brainstorm before choosing a project. (1)

10. Mention one workshop tool used during fabrication. (1)

11. Mention one workshop machine used during fabrication. (1)

12.

13. Name one measuring tool used when fabricating an item. (1)

14. Name one marking-out tool used in fabrication. (1)

15. State one safety item used during fabrication. (1)

16. State one reason why safety is important in project work. (1)

17. Mention one step in presenting a fabricated item to class. (1)

18. State one reason why learners should work neatly in fabrication. (1)

19. State one reason why metalwork projects must be strong. (1)

20. Mention one advantage of using recycled materials in fabrication. (1)

21. Name one joining method used in fabrication. (1)

22. Mention one finishing method used after fabrication. (1)

23. State one reason why correct tools must be used in fabrication. (1)

24. Mention one factor to consider when selecting a project item. (1)

25. State one benefit of metalwork skills to the community. (1)

26. Mention one way of evaluating a finished project. (1)

SECTION B: (50 MARKS)

26. Identifying Community Problems (10 Marks)

(a) List **five problems** in the community that can be solved using metalwork knowledge and skills. (5)

(b) Explain **three reasons** why metalwork is important in solving community problems. (3)

(c) State **two ways** learners can gather information about community problems. (2)

27. Selecting an Item to Solve a Community Problem (10 Marks)

A village has a problem of **unsafe cooking places** where pots fall easily, causing burns.

(a) Suggest **three items** that can be fabricated to solve this problem. (3)

(b) Select **one item** from your answers in (a) and justify your choice. (3)

(c) State **four materials** needed to fabricate the selected item. (4)

28. Planning for Fabrication (Process Skills) (10 Marks)

(a) State **five steps** followed when fabricating a metalwork item from start to finish. (5)

(b) Explain **three reasons** why marking out must be done carefully before cutting. (3)

(c) State **two consequences** of poor planning in fabrication. (2)

29. Tools, Equipment and Safety During Fabrication (10 Marks)

(a) List **five tools/equipment** used during fabrication of a metal project. (5)

(b) For each tool listed in (a), state one task it performs in fabrication. (5)

30. Presenting the Fabricated Item (10 Marks)

A learner fabricated a simple metal dustbin stand and presented it to the class.

(a) State **four points** that should be included when presenting a fabricated item. (4)

(b) Explain **three ways** the class can evaluate the quality of the item. (3)

(c) State **three improvements** that can be made after feedback from the class. (3)

SECTION C: (25 MARKS)

31. Real-Life Community Project: Problem → Solution (10 Marks)

A school has a problem where students leave bags on the floor, causing accidents and poor organization.

(a) Identify the problem clearly. (1)

(b) Suggest one metalwork item that can solve the problem. (1)

(c) Sketch the item you suggested and label **at least four parts**. (4)

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(d) List **two locally available materials** you would use. (2)

(e) Explain **two safety precautions** during fabrication of the item. (2)

32. Project Decision-Making and Resource Use (7 Marks)

A learner wants to fabricate a metal stool, but only the following are available:

i. Scrap metal bars
ii. Old bicycle spokes
iii. Pieces of sheet metal
iv. Nails and wood

(a) Suggest a suitable stool design using the available materials. (2)

(b) Explain **three reasons** why scrap materials can still produce quality items. (3)

(c) State **two challenges** likely to be faced when using scrap materials. (2)

33. Evaluation and Improvement of a Fabricated Item (8 Marks)

A learner fabricated a wheelbarrow handle support but it bent during testing.

(a) Identify **three possible causes** of the failure. (3)

(b) Suggest **three improvements** that would make the support stronger. (3)

(c) Explain **two ways** correct tool selection improves the final product. (2)

STRAND 3.0: RELATED DRAWING IN METALWORK

SUB-STRAND 3.1: SCALES AND CONVENTIONS

SECTION A: (25 MARKS)

1. Define the term **symbol** as used in technical drawing. (1)

2. Define the term **abbreviation** as used in technical drawing. (1)

3. Define the term **convention** as used in technical drawing. (1)

4. State one reason why symbols are used in technical drawing. (1)

5. State one reason why abbreviations are used in technical drawing. (1)

6. State one reason why conventions are used in technical drawing. (1)

7. Write the abbreviation for **diameter**. (1)

8. Write the abbreviation for **radius**. (1)

9. Write the abbreviation for **centre line**. (1)

10. Write the abbreviation for **millimetres**. (1)

11. Write the abbreviation for **metres**. (1)

12. State the meaning of the symbol **Ø**. (1)

13. State the meaning of the symbol **R** on a drawing. (1)

14. State the meaning of the symbol ± on a drawing. (1)

15. State one use of a **centre line** in drawing. (1)

16. State one use of a **dimension line**. (1)

17. Name one type of scale used in technical drawing. (1)

18. Define the term **scale**. (1)

19. State one example of a **full scale**. (1)

20. State one example of a **reduction scale**. (1)

21. State one example of an **enlargement scale**. (1)

22. State one tool used when constructing a scale. (1)

23. Name one type of technical drawing scale. (1)

24. State one use of diagonal scale. (1)

25. State one importance of correct scaling in drawing. (1)

SECTION B: (50 MARKS)

26. Symbols and Abbreviations in Technical Drawing (10 Marks)

(a) State the meaning of each of the following symbols: (5)
(i) Ø_____
(ii) R_____
(iii) ±_____
(iv) ⌵ _____
(v) ⌴ _____

(b) Write the correct abbreviation for the following terms: (5)
(i) Centre line_____
(ii) Diameter_____
(iii) Radius_____
(iv) Number_____
(v) Thickness_____

27. Drawing Conventions (8 Marks)

(a) State **four conventions** used in technical drawing. (4)

(b) Explain **two reasons** why conventions must be followed. (4)

28. Interpretation of Drawing Information (10 Marks)

A drawing has the following notes:

- ✓ **Ø20 mm hole**
- ✓ **R10 corner**
- ✓ **2 × Ø8 holes**
- ✓ **±0.5 mm tolerance**

(a) Explain the meaning of each note above. (8)

(b) State **two reasons** why tolerances are important in metalwork drawings. (2)

29. Constructing a Plain Scale (12 Marks)

(a) Define a **plain scale**. (2)

(b) Construct a plain scale of **1:5** to read up to **1 metre**, showing metres and decimetres. (8)

(c) Using your scale, show the following measurements: (2)
(i) 0.7 m
(ii) 0.3 m

30. Constructing a Diagonal Scale (10 Marks)

(a) Define a **diagonal scale**. (2)

_____

_____

(b) State **two advantages** of a diagonal scale over a plain scale. (2)

_____

_____

(c) Construct a diagonal scale of **1:10** to read up to **1 metre**, showing metres, decimetres and centimetres. (6)

SECTION C: (25 MARKS)

31. Application: Symbols and Conventions in a Metalwork Drawing (10 Marks)

A learner is required to fabricate a metal plate with:

- 2 holes of Ø10 mm
- One rounded corner of R15 mm
- Thickness 3 mm

(a) Sketch a simple plate and indicate the above features using correct symbols. (5)

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(b) State **three conventions** that must be followed in the sketch. (3)

(c) Explain **two reasons** why correct symbols improve fabrication accuracy. (2)

32. Problem Solving: Wrong Scale Used (7 Marks)

A learner drew a workshop project using a scale of **2:1** instead of **1:2**.

(a) Explain the difference between 2:1 and 1:2. (2)

(b) State **three problems** that may arise during fabrication due to wrong scale use. (3)

(c) Suggest **two ways** learners can avoid scale errors. (2)

33. Critical Thinking: Why Symbols, Abbreviations and Conventions are Used (8 Marks)

(a) Explain **four reasons** why symbols, abbreviations and conventions are used in technical drawing. (4)

(b) Explain **two ways** technical drawing language helps people in different countries understand the same drawing. (2)

(c) Give **two examples** of how drawings improve safety in a metal workshop. (2)

STRAND 3.0: RELATED DRAWING IN METALWORK

SUB-STRAND 3.2: PICTORIAL DRAWING

SECTION A: (25 MARKS)

1. Define the term **pictorial drawing**. (1)

2. State one reason why pictorial drawings are used in Metalwork. (1)

3. Name **any two** types of pictorial drawings used in Metalwork. (2)

4. State one difference between **pictorial drawing** and **orthographic drawing**. (1)

5. Identify the projection where the receding lines are drawn at **30°** to the horizontal. (1)

6. Name the projection where the front face is drawn in true shape and size. (1)

7. State one feature of **isometric projection**. (1)

8. State one feature of **oblique projection**. (1)

9. Name the three isometric axes. (1)

10. State the meaning of the term **three-dimensional figure**. (1)

11. Name one example of a **prism** used in metalwork projects. (1)

12. Name one example of a **pyramid** used in metalwork projects. (1)

13. State one reason why correct dimensioning is important in pictorial drawings. (1)

14. Write the symbol used for **diameter** in dimensioning. (1)

15. Write the symbol used for **radius** in dimensioning. (1)

16. State the meaning of the abbreviation **mm**. (1)

17. State one use of leader lines in pictorial drawings. (1)

18. Name one tool used when drawing pictorial drawings. (1)

19. State one common mistake learners make when drawing isometric figures. (1)

20. State one common mistake learners make when drawing oblique figures. (1)

21. What is meant by **dimensioning**? (1)

22. State one rule of dimensioning. (1)

23. Name one type of line used in dimensioning. (1)

24. State one reason why pictorial drawings are displayed in class. (1)

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25. Mention one way pictorial drawings support safe fabrication in a workshop. (1)

SECTION B: (50 MARKS)

26. Types of Pictorial Drawings (10 Marks)

(a) Identify FOUR types of pictorial drawings used in Metalwork. (4)

(b) For each type named in (a), state ONE use in a metal workshop. (4)

(c) State TWO advantages of pictorial drawings compared to orthographic drawings. (2)

27. Drawing 3D Figures: Prisms and Pyramids (12 Marks)

(a) Draw a **triangular prism** in freehand pictorial form. (4)

(b) Draw a **square pyramid** in freehand pictorial form. (4)

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(c) State TWO differences between a prism and a pyramid. (4)

28. Isometric Projection: Workshop Block (14 Marks)

A metalwork learner is required to make a steel block for a machine support.

Dimensions:

i. Length = 80 mm

ii. Width = 50 mm

iii. Height = 40 mm

(a) Draw the block in **isometric projection**. (8)

(b) Dimension the isometric drawing correctly. (4)

(c) State TWO rules of isometric drawing that must be followed. (2)

29. Oblique Projection: Bracket Plate (14 Marks)

A bracket is to be fabricated using a mild steel plate.

Front face size: 60 mm × 40 mm
Thickness (receding depth): 30 mm

(a) Draw the bracket in **oblique projection** (Cabinet style). (8)

(b) Dimension the drawing correctly. (4)
(c) State TWO advantages of oblique projection in metalwork drawing. (2)

SECTION C: (25 MARKS)

30. Dimensioning Challenge: Pictorial Object with Hole (10 Marks)

A learner is designing a tool holder block with a drilled hole.

Object dimensions:

- 70 mm × 40 mm × 30 mm
- One hole Ø16 mm drilled through the 40 mm face

(a) Sketch the object in **isometric projection**. (5)

(b) Show the hole correctly using a pictorial method. (2)
(c) Dimension the hole and block correctly using correct symbols. (3)

31. Comparison and Decision Making (7 Marks)

A teacher gives learners a choice to present their project using either isometric or oblique drawings.

(a) Give THREE reasons why a learner may choose isometric projection. (3)

(b) Give TWO reasons why a learner may choose oblique projection. (2)

(c) Suggest TWO situations in metalwork where orthographic drawing is still better than pictorial drawing. (2)

32. Community Application: Metal Product Design (8 Marks)

A community youth group wants to make a simple metal item to solve a local problem such as:

- a charcoal stove stand
- a wheelbarrow support bracket
- a padlock protector
- a window burglar bar joint

(a) Choose ONE item from the list above. (1)

(b) Explain TWO reasons why pictorial drawing is suitable for presenting your idea to the group. (2)

(c) Draw a simple pictorial sketch of the chosen item (isometric or oblique). (3)

(d) Dimension TWO important parts of your sketch. (2)

STRAND 4.0: SHEET METAL JOINING

Sub-Strand: Sheet Metal Joints and Joining Methods
SECTION A: (25 MARKS)

1. Define the term **joint** in sheet metal work. (1)

2. Mention **two types of sheet metal joints**. (2)

3. Define the term **riveting**. (1)

4. Define the term **fastener**. (1)

5. State one safety precaution when joining sheet metals. (1)

6. Mention **one importance** of sheet metal joints in fabrication. (1)

7. Name one tool used in riveting. (1)

8. Name one tool used when making a seam joint. (1)

9. State one method used to join sheet metal other than riveting. (1)

10. Define the term **screw thread** as used in sheet metal joining. (1)

11. State **one reason** why sheet metal joints are important in vehicles. (1)

12. Give **one disadvantage** of a poorly made joint. (1)

13. State **one type of lap joint**. (1)

14. Mention one type of butt joint used in sheet metal. (1)

15. State **one use of fasteners** in joining sheet metal. (1)

16. Name one type of rivet commonly used in sheet metal joining. (1)

17. State **one consequence** of using the wrong type of joint in a sheet metal project. (1)

18.

19. Mention **one method of securing screw threads in sheet metal.** (1)

20. State **one safety rule** to observe when using hand tools in sheet metal joining. (1)

21. Give one example of a **machine part** joined using sheet metal methods. (1)

22. Give one example of a **vehicle part** joined using sheet metal methods. (1)

23. State one difference between lap and seam joints. (1)

24. State one difference between rivets and screws in sheet metal joining. (1)

25. State one reason why joints must be strong in sheet metal projects. (1)

26. State one effect of incorrect alignment when joining sheet metals. (1)

SECTION B: (50 MARKS)

26. Types of Joints (10 Marks)

(a) List **three types of sheet metal joints**. (3)

(b) Sketch each joint and label its main parts. (6)

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(c) State **one application** for each type of joint. (1)

_____

_____

27. Riveting and Fasteners (10 Marks)

(a) Explain the process of **riveting**. (4)

_____

_____

(b) List **two types of rivets** used in sheet metal. (2)

_____

_____

(c) Sketch a **simple rivet joint** and label parts. (4)

28. Seam and Butt Joints (10 Marks)

(a) Describe how a **seam joint** is made in sheet metal. (3)

_____

_____

(b) Describe how a **butt joint** is made in sheet metal. (3)

_____

_____

_____

_____

(c) Sketch each joint and label clearly. (4)

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29. Screw Threads and Fasteners (10 Marks)

(a) Explain **two methods of making a screw thread** in sheet metal. (4)

(b) State **two advantages** of using screws over rivets. (2)

(c) Sketch a **screw fastener joint** and label the parts. (4)

30. Safety and Workshop Practice (10 Marks)

(a) List **five safety precautions** when joining sheet metals. (5)

(b) Explain **two reasons** why correct PPE is important in sheet metal work. (2)

(c) Describe **three steps** to display sheet metal joints in class safely. (3)

SECTION C: (25 MARKS)

31. Fabrication Problem: Vehicle Bracket (10 Marks)

A learner is required to fabricate a vehicle bracket from sheet metal.

(a) Suggest **a suitable joint type** for the bracket. (1)

(b) Sketch the bracket showing the joint clearly. (4)

(c) Explain **two reasons** for choosing this type of joint. (2)

(d) Describe **two safety measures** to observe during fabrication. (2)

(e) List **one finishing process** for the joint. (1)

32. Comparison and Decision Making (7 Marks)

(a) Compare **lap joint and butt joint** in terms of: (4)

- Strength
- Ease of fabrication

	Lap joint	Butt joint
Strength		

Ease of fabrication		

(b) Suggest **two scenarios** where rivets are preferred over screws. (3)

_____

_____

33. Community Application: Sheet Metal Project (8 Marks)

A school intends to fabricate a **metal dustbin** for the compound.

(a) Suggest **one joint type** suitable for assembling the dustbin. (1)

_____

_____

(b) Explain **two reasons** why this joint is suitable. (2)

_____

_____

(c) Draw a **simple pictorial sketch** of the dustbin showing the joint. (3)

(d) Dimension **two important parts** of your sketch. (2)

_____

_____

STRAND 4.0: METAL JOINING AND FINISHING PROCESSES

SUB-STRAND 4.2: SHEET METAL PROCESSES

SECTION A: (25 MARKS)

1. Define the term **sheet metal process**. (1)

_____

_____

2. State one importance of sheet metal processes in day-to-day life. (1)

3. Mention **two sheet metal processes** commonly used in fabrication. (2)

4. Define **edge treatment** in sheet metal work. (1)

5. Define **hollowing** in sheet metal work. (1)

6. Define **sinking** in sheet metal work. (1)

7. Define **raising** in sheet metal work. (1)

8. Name **one tool** used for edge treatment. (1)

9. Name **one tool** used for sinking. (1)

10. Name **one tool** used for raising. (1)

11. State **one safety precaution** to observe when performing sheet metal processes. (1)

12. Mention one effect of using the wrong tool in a sheet metal process. (1)

13. Give **one example of a machine part** shaped using hollowing. (1)

14. Give **one example of a vehicle part** shaped using raising. (1)

15. State one reason why sheet metal processes must be performed accurately. (1)

16. Define **hollowing depth** in sheet metal. (1)

17. Name **one finishing tool** used after a sheet metal process. (1)

18. State one difference between **sinking** and **raising**. (1)

19. Mention **one sheet metal project** in school where edge treatment is necessary. (1)

20. State **one importance** of presenting sheet metal work in class. (1)

21. Define the term **workpiece**. (1)

22. Name **one metal suitable** for sinking processes. (1)

23. Name **one metal suitable** for raising processes. (1)

24. Mention one **measurement tool** used to check the dimensions of sheet metal work. (1)

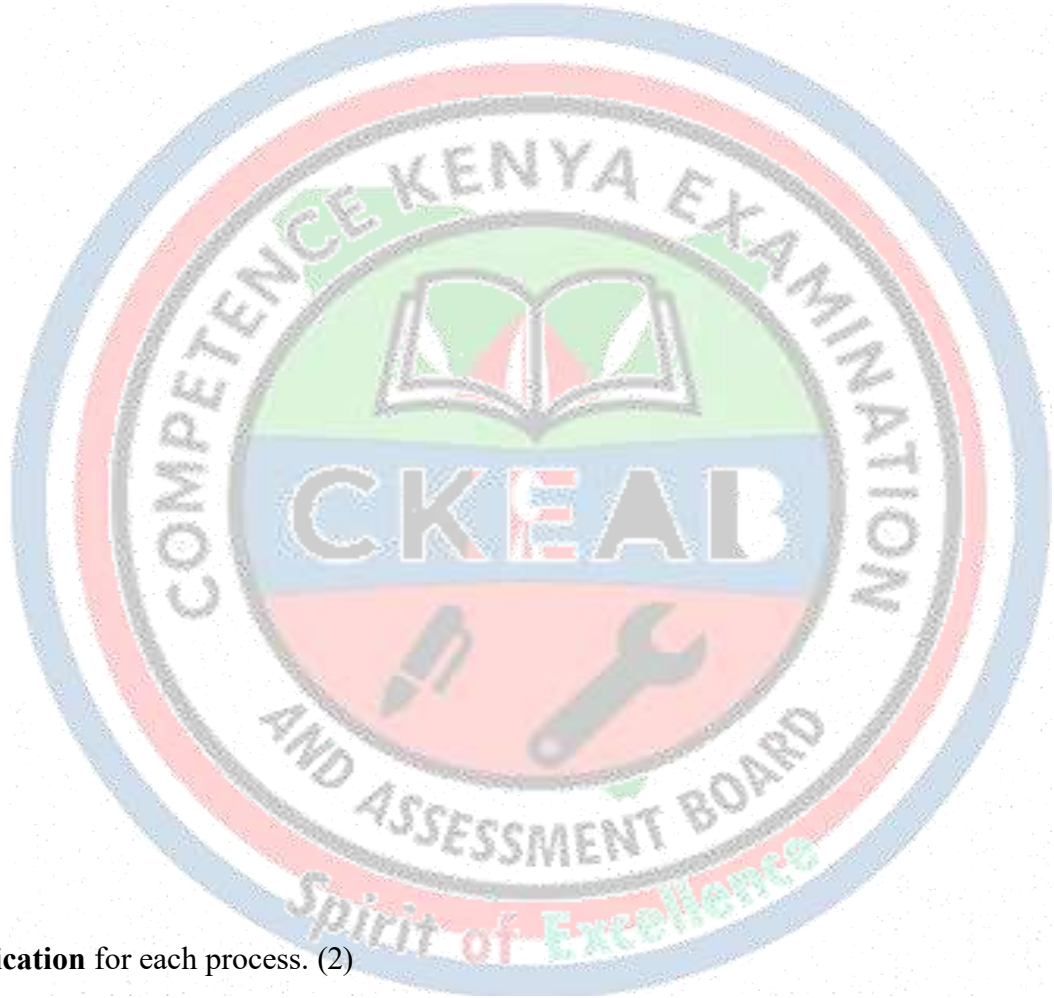
25. State one way to prevent **injury when performing hollowing**. (1)

SECTION B: (50 MARKS)

26. Sheet Metal Processes Identification (10 Marks)

(a) Identify **four sheet metal processes**. (4)

(b) For each process, **sketch a simple illustration** showing the process. (4)



(c) State **one application** for each process. (2)

27. Edge Treatment (10 Marks)

(a) Describe **two types of edge treatment**. (4)

(b) Sketch a sheet metal piece showing **an edge treatment**. (4)

(c) State **two tools** used for edge treatment. (2)

_____

_____

28. Hollowing and Sinking (10 Marks)

(a) Explain the difference between **hollowing** and **sinking**. (4)

_____

_____

(b) Sketch a **hollowed sheet metal object**. (3)

(c) State **three applications** of hollowing and sinking in machine or vehicle parts. (3)

29. Raising Process (10 Marks)

(a) Explain the **raising process** in sheet metal work. (3)

(b) Sketch a **raised sheet metal component**. (4)

(c) State **two advantages** of raising over hollowing. (3)

30. Tools and Equipment Selection (10 Marks)

(a) Select **appropriate tools** for performing the following tasks: (5)

i. Edge treatment
ii. Hollowing
iii. Sinking
iv. Raising
v. Finishing

(b) Explain **two reasons** why selecting the correct tools is important. (2)

(c) State **three safety precautions** to observe when performing any sheet metal process. (3)

SECTION C: (25 MARKS)

31. Fabrication Challenge: Vehicle Component (10 Marks)

A learner is required to fabricate a **metal funnel for a vehicle** using sheet metal.

(a) Suggest **suitable sheet metal processes** to form the funnel. (3)

(b) Sketch the funnel in a **pictorial form** showing at least two processes applied. (4)

c) State **two safety measures** when performing these processes. (2)

(d) State **one finishing step** after fabrication. (1)

32. Problem Solving: Workshop Task (7 Marks)

A metal sheet is to be shaped into a **machine part** using hollowing and raising.

(a) Explain **three possible problems** if the processes are done incorrectly. (3)

(b) Suggest **three solutions** to avoid these problems. (3)

(c) State **one tool** that ensures accuracy. (1)

33. Community Application (8 Marks)

A local community wants to fabricate **metal water tanks** using sheet metal.

(a) Identify **two sheet metal processes** suitable for this task. (2)

(b) Explain **two reasons** why these processes are suitable. (2)

(c) Sketch a simple **pictorial drawing** of the water tank showing the processes. (3)

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(d) Dimension **two important parts** of your sketch. (1)

_____

_____

STRAND 4.0: METAL JOINING AND FINISHING PROCESSES

SUB-STRAND 4.3: SHEET METAL PROJECTS

SECTION A: (25 MARKS)

1. Define the term **sheet metal project**. (1)

_____

_____

2. Mention **one importance** of learning sheet metal processes in the community. (1)

_____

_____

3. Name **two problems in the community** that can be solved using sheet metal skills. (2)

_____

_____

4. Define the term **fabrication**. (1)

_____

_____

5. State **one tool** used in fabricating sheet metal items. (1)

_____

_____

6. State **one safety rule** to observe when carrying out a sheet metal project. (1)

_____

_____

7. Mention **one item** that can be made to solve a waste management problem. (1)

_____

_____

8. Mention **one item** that can be made to solve a water storage problem. (1)

_____

_____

9. State **one benefit** of using locally available materials in sheet metal projects. (1)

10. State **one consequence** of using incorrect tools in a sheet metal project. (1)

11. Name one **finishing process** after fabricating a sheet metal item. (1)

12. State one reason why a fabricated item must be **strong and durable**. (1)

13. State **one advantage** of presenting a fabricated item to the class. (1)

14. Name **one metal suitable** for making a dustbin. (1)

15. Name **one metal suitable** for making a water storage tank. (1)

16. Mention **one skill** acquired when performing edge treatment. (1)

17. Mention **one skill** acquired when performing hollowing. (1)

18. Mention **one skill** acquired when performing raising. (1)

19. Give one example of a **vehicle part** fabricated using sheet metal processes. (1)

20. Give one example of a **machine part** fabricated using sheet metal processes. (1)

21. Define **locally available resources**. (1)

22. Mention **one PPE** necessary when fabricating a sheet metal item. (1)

23. State one reason why **planning a project** is important before fabrication. (1)

24. Mention one **dimensioning tool** used in sheet metal projects. (1)

25. State one importance of using correct **joining method** in fabrication. (1)

SECTION B: (50 MARKS)

26. Community Problem Identification (10 Marks)

(a) Identify **three societal problems** that can be solved using sheet metal processes. (3)

(b) Suggest **one item** for each problem that can be fabricated. (3)

(c) Explain **two reasons** why your chosen items are suitable for solving these problems. (4)

27. Project Planning and Materials Selection (10 Marks)

(a) Outline **four steps** in planning a sheet metal project. (4)

(b) State **two factors** to consider when selecting materials. (2)

(c) Sketch a **simple plan layout** for a fabricated dustbin showing parts and joining points. (4)

28. Fabrication Skills Application (10 Marks)

(a) Explain **two sheet metal processes** that can be applied in making a water tank. (4)

(b) Sketch the water tank showing **two processes applied**. (4)

(c) State **one finishing process** that can be applied after fabrication. (2)

29. Tools and Equipment Selection (10 Marks)

(a) List **four tools** required to fabricate a simple community item (e.g., dustbin or stove). (4)

(b) Explain **two reasons** why selecting the correct tools is important. (2)

(c) State **four safety measures** to observe when using these tools. (4)

30. Presentation and Evaluation (10 Marks)

(a) Explain **three benefits** of presenting your fabricated item to the class. (3)

(b) Suggest **two ways** to improve a fabricated item after class evaluation. (2)

(c) Sketch a **completed sheet metal community item** showing dimensioned parts and joints. (5)

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SECTION C: (25 MARKS)

31. Fabrication Challenge: Dustbin Project (10 Marks)

A learner wants to fabricate a **metal dustbin** for the school compound using sheet metal.

(a) Identify **two sheet metal processes** suitable for making the dustbin. (2)

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(b) Sketch a **pictorial view** of the dustbin showing the processes applied. (4)

(c) State **two safety measures** to observe during fabrication. (2)

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(d) Suggest **one finishing process** to enhance durability. (2)

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32. Decision Making: Process and Material Choice (7 Marks)

(a) Compare **edge treatment and raising** in terms of: (4)

i. Complexity

ii. Application in community projects

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(b) Suggest **two metals** suitable for community items and explain why. (3)

33. Community Problem Solving Scenario (8 Marks)

A local community has a problem with **water storage and spillage**.

(a) Suggest **one item** that can be fabricated to solve this problem. (1)

(b) Explain **two reasons** why sheet metal fabrication is suitable for this item. (2)

(c) Sketch the item showing **one joining method**. (3)

(d) Dimension **two important parts** of your sketch. (2)

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