



TECHNOLOGY GRADE 8

NOVEMBER EXAM

MARKS : 100

TIME : 90 MIN

SPECIFIC AIMS

TECHNOLOGICAL PROCESSES AND SKILLS	50%
TECHNOLOGICAL KNOWLEDGE AND UNDERSTANDING	30%
TECHNOLOGY, SOCIETY AND THE ENVIRONMENT	20%

This question paper consists of 15 pages

SECTION A: MULTIPLE CHOICE

QUESTION 1

[10]

1.1

(5)

Answer grid

1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.1.6	1.1.7	1.1.8	1.1.9	1.1.10
B ✓	A ✓	B ✓	C ✓	A ✓	C ✓	C ✓	A ✓	C ✓	C ✓

1.2 Match the description in COLUMN B with the correct term in COLUMN A. Write down the letter of the descriptions in COLUMN C (ANSWER COLUMN). (5)

COLUMN A	COLUMN B	ANSWER
1.2.1 Insulator	A: Converts chemical energy into electrical energy	G ✓
1.2.2 Tie	B: A horizontal structural member	J ✓
1.2.3 Current	C: A system of components that are put together to form a complete electric path.	E ✓
1.2.4 Guy	D: A flexible structural member that adds supports by pulling away from a structure	D ✓
1.2.5 Circuit	E: The flow of electricity in a circuit along a wire.	C ✓
1.2.6 Lintel	F: A vertical structural member	H ✓
1.2.7 Conductor	G: Does not allow electricity to flow through it.	I ✓
1.2.8 Beam	H: A horizontal structural member that is placed above a door or window for additional support.	B ✓
1.2.9 Cell	I: Allows electricity to flow through it.	A ✓
1.2.10 Column	J: Structural members that are under tension and support structures.	F ✓
	K: The roof truss that has the fewest members	

[10x1/2=5]

SECTION B: STRUCTURES**QUESTION 2****[13]**

2.1 Study the diagram below and answer the questions that follow

2.1.1 What structure is shown in the diagram above?

Roof truss ✓ (1)

2.1.2 Is this an example of a shell or frame structure? Explain your answer. (2)

Frame structure: Has a structural framework that protects the roof from the inside. ✓✓

2.1.3 Name ONE type of force that could be exerted in this type of structure? (1)

Compression✓ / tension ✓ (Any one)

2.1.4 Provide labels for parts labelled 1-5 (5)

1. King post ✓ 2. Beam ✓ 3. Rafter ✓ 4. Struts ✓

5. Queen posts ✓

2.2 Study the following diagrams of different types of bridges along with the statements underneath each diagram, and use this collective information to name the type of bridge.

A Beam bridge ✓ (1)

B Suspension bridge ✓ (1)

C Cantilever bridge ✓ (1)

D Cable – stayed Cantilever Bridge✓ (1)

SECTION C: PROCESSING (IMPACT OF TECHNOLOGY)

QUESTION 3 [12]

3.1 What are synthetic materials?

Manmade materials✓, they do not occur naturally ✓ (Any one) (1)

3.2 Give two advantages of plastic technology

a) Plastic is easier to colour✓ (1)

b) it is cheap✓, (1)

there are now biodegradable plastics that are available✓. (Accept any two relevant answers) (2)

3.3 Why does Hayley Mc Lellan want to see the complete ban of plastic bags in South Africa? Give three reasons.

a) Plastics are non-biodegradable and can last up to a 1000 years at a landfill site✓. (1)

b) Landfills are becoming endangered✓ (1)

c) Animals can ingest the plastics which can kill the animals✓. (1)

3.4 What has happened in South Africa since the levies on plastic bags were enforced?

The use of plastic bags first dropped and then rapidly increased again. ✓✓ (2)

3.5 Did the meeting decide if it was realistic to do away with plastic bags completely?

The meeting found that plastic bags do serve a purpose, but they are handed out too easily. ✓ (1)

3.6 What suggestion was made by the meeting regarding plastic bags?

The meeting found that the people who use plastic that should take responsibility. ✓ (1)

3.7 Why is plastic destructive to the environment (Name two factors)?

a) Plastics pollute our environment✓, (1)

b) They do not degrade✓, (1)

Animals can choke on the plastic and die✓ which results in the destruction of ecosystems ✓. (Any two / any two relevant answers)

SECTION D: MECHANICAL SYSTEMS AND CONTROL

QUESTION 4

[16]

4.1 Study the diagram below and answer the questions that follow:

4.1.1 Identify the driver and driven gear.

A: Driver ✓ (1)

C: Driven ✓ (1)

4.1.2 What is the gear ratio between gear B and C? (2)

$$\begin{aligned}\text{Gear ratio} &= \text{number of teeth in the driven gear} \div \\ &\quad \text{number of teeth in the driver gear} \\ &= 22 \div 11 \checkmark \\ &= 2 \\ &= 2:1 \checkmark\end{aligned}$$

4.1.3 Which of the gears above is the idler gear?

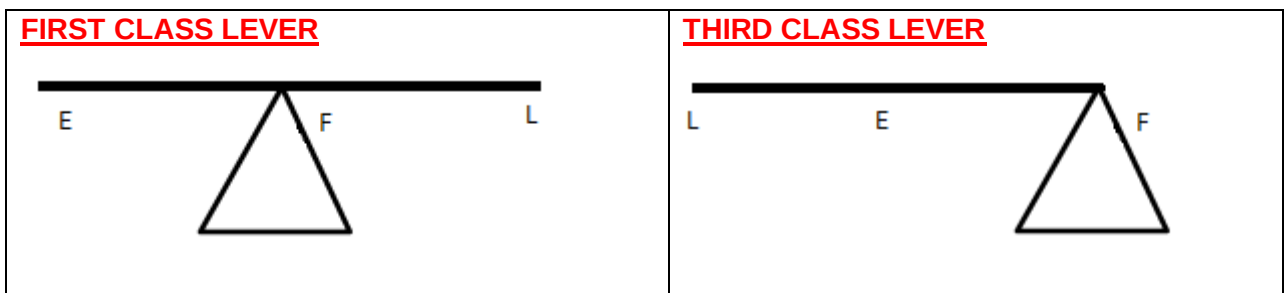
Gear B ✓ (1)

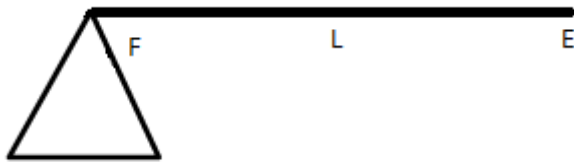
4.2

4.2.1 What is a lever?

A bar that pivots about a fulcrum to transfer a force. ✓ (1)

4.2.2 Use simple diagrams to illustrate the difference between different levers systems. (6)



SECOND CLASS LEVER**Assessment:**

Name of class ✓

Drawing/sketch ✓

Labels ✓

Correct placement of labels ✓

4/2= 2 each

4.2.3 Calculate the mechanical advantage of a lever if: the effort = 80 cm, and the load = 20 cm. Use the formula: $MA = \text{load} \div \text{effort}$. (2)

$$MA = \text{load} \div \text{effort}$$

$$= 20 \div 80 \checkmark$$

$$= \frac{1}{4}$$

$$= 1:4 \checkmark$$

4.2.4 Calculate the distance moved by the load in a lever system if the velocity ratio = 3, and the distance moved by the effort = 300 mm. Use the formula $\text{velocity ratio} = \text{distance moved by the effort} \div \text{distance moved by the load}$. (2)

$$\text{Velocity ratio} = \text{distance moved by the effort} \div \text{distance moved by the load.}$$

$$\text{Therefore: distance moved by the load} = \text{distance moved by the effort} \div \text{velocity ratio}$$

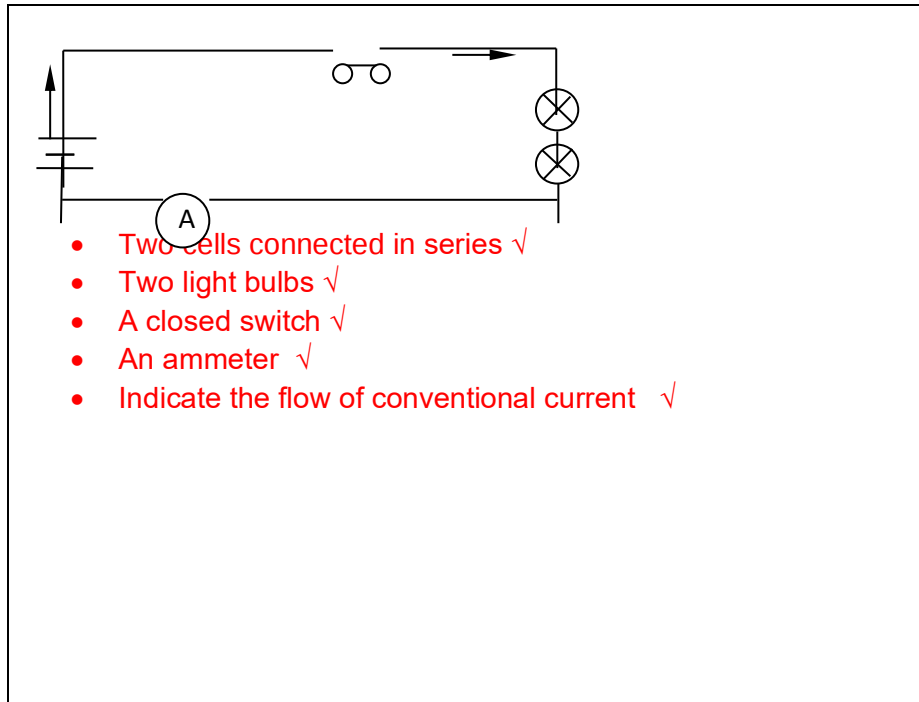
$$= 300\text{mm} \div 3 \checkmark$$

$$= 100\text{mm} \checkmark$$

SECTION E: SYSTEMS AND CONTROL (ELECTRICAL SYSTEMS)**QUESTION 5****[9]**

5.1 Draw an electrical circuit with the following components:

(5)



5.2 Is this a parallel or series circuit? Explain your answer

Series, there is only one pathway for the electric current to flow. ✓✓ (2)

5.3 Calculate the current in this circuit if the voltage = 220 V, and the resistance = 10 ohms. Use the formula $V = IR$ (2)

$$\begin{aligned}
 I &= V \div R \checkmark \\
 &= 220\text{v} \div 10 \Omega \checkmark \\
 &= 22 \text{ A } \checkmark
 \end{aligned}$$

SECTION F: DESIGN PROCESS SKILLS

QUESTION 6

[40]

6.1

6.1.1 What is a shaft headgear and what is it used for? (2)

A headgear is a structure above an underground mineshaft ✓ which is also sometimes called a head frame or winding tower. It is used to support the mechanisms that are used to transport workers and material in and out of the underground mine ✓.

6.1.2 What is the main problem that is highlighted in the scenario above? (2)

An engineering company needs to develop a headgear for a mine. ✓

6.1.3 Write a design brief for the scenario. (2)

Design and make a headgear for a shaft mine. ✓✓

6.1.4 What are the specifications (mention three) (3)

- I. Have a basic frame structure made from any suitable materials. ✓
- II. Include two mechanical systems for lifting: one system will lift the load of platinum ore; the other load will lift the miners. ✓
- III. Have a frame structure that will not fall over, bend or break when the loads are being lifted. ✓

Have an input crank. (Any three)

6.1.5 Mention two constraints? (2)

- i) Financial constraints ✓
- ii) Availability of materials ✓. (Accept any other relevant answer).

6.2 In the space provided below generate a design of the container. This idea must be a free hand sketch done in isometric projection. Make use of labels and dimensions to communicate your idea. (10)

Rubric for assessing 3D drawing (Isometric)

Description	Marks
Drawing is a perfect 3D drawing with all dimensions and relevant information according to the design specifications.	9-10
Drawing is a 3D drawing with all dimensions and relevant information according to the design specifications.	7-8
Drawing is a 3D drawing with almost all dimensions and relevant information according to the design specifications.	5-6
Drawing is a 3D drawing with some dimensions and relevant information according to the design specifications.	3-4
Drawing is not a 3D drawing shows little or no dimensions and relevant information according to the design specifications.	0-2

6.2.2 What three techniques can be applied to an artistic drawing to make it look more artistic? (3)

- i) Shading ✓,
- ii) Adding colour ✓
- ii) Adding texture ✓.

6.2.3 List two **tools** and two **material** for this situation (4)

Materials	Tools
○ Wood/dowel sticks ✓ ○ Wire ✓ ○ Nails ○ Screws	○ Saw ✓ ○ Hammer ✓ ○ Spanners ○ Glue gun

○ Straws Any relevant answer (any two)	○ Glue sticks Any relevant answer (Any two)
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6.2.4 Give two safety precautions that you should consider during the making stage of this container. (2)

- When using a knife, always cut away from your hand. ✓
 - When you pass scissors to another person, give it to them with the handle facing the other person. ✓
 - When you cut wire, be careful not to catch your fingers in the pliers.
- Any relevant answer (Any two)

6.3 (10)

Assessment Criteria

	Possible marks	Marks obtained
Front view	3	
Top view	3	
Left view	2	
45° line	1	
Projection symbol	1	
TOTAL	10	

GRAND TOTAL: 100 MARKS