

**GAUTENG PROVINCE**

Department: Education

REPUBLIC OF SOUTH AFRICA

TECHNOLOGY
GRADE 8 sample**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

Name: _____ : Class _____

SECTION A	QUESTION	TYPE OF QUESTION	POSSIBLE MARK	LEARNER'S MARK
Section A	Question 1	Multiple choice	10	
Section B	Question 2	Structures	13	
Section C	Question 3	Processing	12	
Section D	Question 4	Mechanical systems and control	16	
Section E	Question 5	Electrical systems and control	9	
Section F	Question 6	Design problem	40	
TOTAL			100	

INSTRUCTIONS FOR CANDIDATES

- This paper consists of SIX sections: Sections A-F.
- Read all instructions carefully.
- Answer all Sections from section A to F unless otherwise specified.
- Write neatly and answer all the questions in the spaces provided in this question paper.
- Please use a pencil for all drawings.
- Where required to calculate show all working out.
- Write your name in the space provided above.
- Use scale 1:1 if the scale is not stated.
- For drawings all construction lines and projections must be shown.
- Check spelling and sentence construction carefully

SIGNATURE OF TEACHER: _____ DATE: _____

SIGNATURE OF HOD: _____ DATE: _____

SECTION A: MULTIPLE CHOICE**QUESTION 1****[10]**

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write the letter (A-D) next to the number (1.1 – 1.10) in the ANSWER book.

1.1.1 A gear train...

- A Consists of an odd number of gears B
Is when two or more gears work together
C Always has the input and output gears moving in the same direction.
D None of the above.

1.1.2 A cam can be defined as...

- A A mechanism that converts rotary motion into reciprocating movement.
B A wheel that has grooves in it.
C A wheel that has teeth around it.
D An electrical system.

1.1.3 This is an example of structural failure

- A Cross bracing. B
Fractures C
Triangulation D All
of the above.

1.1.4 The type of motion which moves in a forward straight line direction:

- A Oscillating movement
B Reciprocating movement
C Linear movement
D Rotary movement

1.1.5 Study the diagram below and choose the correct answer:



Source: indiamart.com/proddetail/bevel-gear-10499081988.html

The picture in the above diagram shows what type of gear?

- A Bevel B
Rack and Pinion C

- Worm and worm wheel
D Spur

1.1.6 Biodegradable substances are substances that....

- A Cannot degrade and decay B
Can choke fish in the sea C
Can degrade and decay D
None of the above

1.1.7 Shaft mining refers to mining activity that occurs:

- A In sand dunes B On
the surface of the Earth C
Underground D In
rivers

1.1.8 The fulcrum in levers can be defined as the point where:

- A The point at which the lever pivots B
The point that resists a pushing or pulling force C
The that experiences a push or pull force D The
point which gains mechanical advantage

1.1.9 An advantage of technology is...

- A It has increased the amount of pollution in the air
B That it has increased the unemployment rate in various industries
C It has made communication much easier and faster D
Resulted an increased amount of non-biodegradable substances

1.1.10 A torsion force refers to a.....

- A Squashing / pushing force B
Slicing force C
Twisting force D
Pulling force [10x1/2=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

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).

[10x1/2=5]

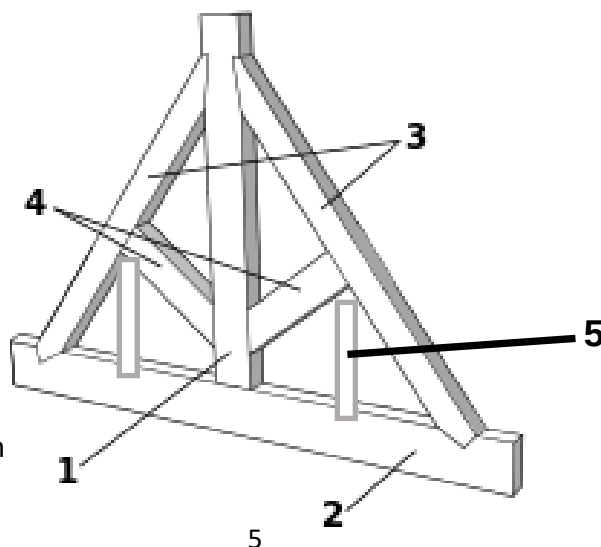
COLUMN A	COLUMN B	ANSWER
1.2.1 Insulator	A: Converts chemical energy into electrical energy	_____
1.2.2 Tie	B: A horizontal structural member	_____
1.2.3 Current	C: A system of components that are put together to form a complete electric path.	_____
1.2.4 Guy	D: A flexible structural member that adds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

SECTION B: STRUCTURES

QUESTION 2

[13]

2.1 Study the diagram below and answer the questions that follow



Source: <http://wikiwand.com>

2.1.1 What structure is shown in the diagram above? (1)

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

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

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

1_____ 2_____ 3_____ 4_____

5_____

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.



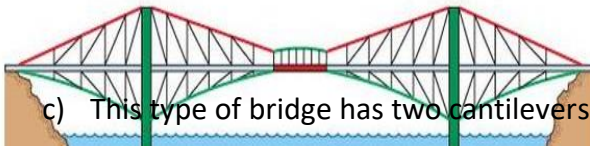
Source: [http/CNN.com](http://CNN.com)

a) This type of bridge is the simplest design of a bridge and consists of a horizontal structural beam that is supported by columns at each end. (1)



Source: [http/CNN.com](http://CNN.com)

- b) This type of bridge has at least two queen posts, with two very strong cables that are spun between these two towers. The bridge deck is suspended from these strong cables.
(1)



Source: <http://CNN.com>

- c) This type of bridge has two cantilevers extending over a gap from either side
(1)



Source: <http://CNN.com>

- d) This type of bridge has two cantilevers extending over a gap from either side. In addition, the centre piece has a single king post for the centre of the beam.
(1)

SECTION C: PROCESSING (IMPACT OF TECHNOLOGY)

QUESTION 3

[12]

Read the following extract from a newspaper article and answer the questions that follow.

Plastic pollution leads to desperate measures



Hayley McLellan – Senior Bird Trainer at Two Oceans Aquarium.

On March 2011 a first meeting to attempt to ban plastic bags from South Africa was held at the Two Oceans Aquarium in Cape Town.

“The plastic bag we want banned is the checkout bag at supermarkets. Cashiers just hand them to you and ask: would you like a bag?” says Hayley McLellan, senior bird trainer at the Aquarium and initiator of the Ban the bag campaign.

A significant increase in plastic usage is seen over the last 40 years.

“If we don’t do something soon we’ll be swamped in our own rubbish. We live in a ‘throwaway culture,’ but what people don’t realise is there is no “away” McLellan says.

Our landfills are becoming endangered. Cape Town’s landfill is expected to be

saturated within the next 15 to 30 years. The global consumption of plastic bags is about 500 billion to one trillion per year. Even though South Africa saw a reduction in the amount of plastic bags used when levies were enforced, the usage has increased rapidly again. We have even obtained an international reputation as having plastic bags as our ‘national flower’.

Plastic bags can last up to 1000 years in a landfill site.

“Sometimes animals ingest the bags, it kills them.”

The meeting found that plastic bags do serve a purpose, but they are handed out too easily. It’s the people who use plastic that should take responsibility.

Source: <http://www.thegreentimes.co.za/stories/shopping/item/286-plastic-pollution-leads-to-desperate-measures>, 21 October, 2011)

3.1 What are synthetic materials? (1)

3.2 Give two advantages of plastic technology (2)

a) _____

b) _____

3.3 Why does Hayley McLellan want to see the complete ban of plastic bags in South Africa? Give three reasons. (3)

a) _____

b) _____

c) _____

3.4 What has happened in South Africa since the levies on plastic bags were enforced? (2)

3.5 Did the meeting decide if it was realistic to do away with plastic bags completely? (1)

3.6 What suggestion was made by the meeting regarding plastic bags? (1)

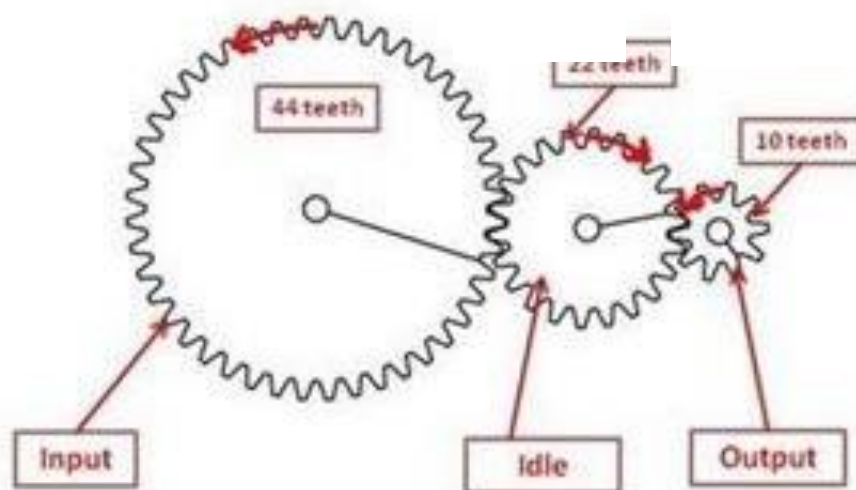
3.7 Why is plastic destructive to the environment (Name two factors)? (2)

SECTION D: MECHANICAL SYSTEMS AND CONTROL

QUESTION 4

[16]

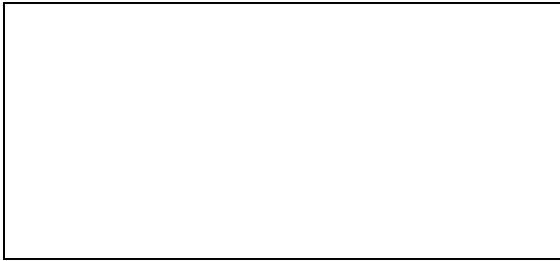
4.1 Study the diagram below and answer the questions that follow:



4.1.1 Identify the driver and driven gear. (2)

4.1.2 What is the gear ratio between gear B and C?

(2)



4.1.3 Which of the gears above is the idler gear?

(1)

4.2

4.2.1 What is a lever?

(1)

4.2.2 Use simple diagrams to illustrate the difference between different levers systems.
(2x3) (6)

Assessment/ class:

Name of class

Drawing/sketch

Labels

Correct placement of labels

Lever 1:

Lever 2

Lever 3

- 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)

- 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)

SECTION E: SYSTEMS AND CONTROL (ELECTRICAL SYSTEMS)

QUESTION 5

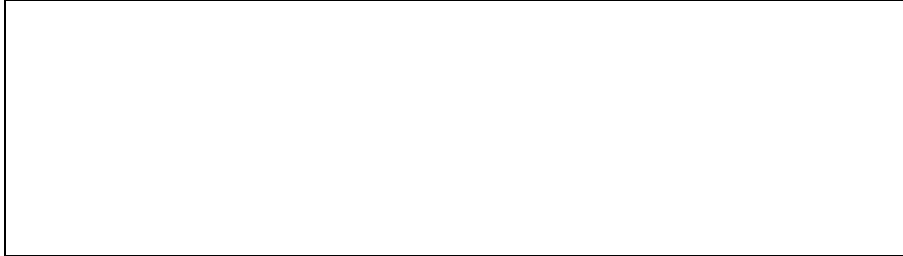
[9]

- 5.1 Draw an electrical circuit with the following components: (5)

- Two cells connected in series
- Two light bulbs
- A closed switch
- An ammeter
- Indicate the flow of conventional current

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



SECTION F: DESIGN PROCESS SKILLS

QUESTION 6

[40]

6.1 The Problem Scenario

Imagine that a commercially-viable ore reef containing platinum has been found on land belonging to a tribe in rural North West Province. Drill samples have proved that the reef lies at a relatively shallow depth, only 500m below the surface. A decision was taken to sink a shaft to this depth. This will be used to conduct bulk sampling on a small scale before deciding on a mining method that is best suited for the size and value of the resource.

In order to do this, a new shaft headgear is needed. It must be a strong, rigid and stable steel frame structure. It must also include the mechanisms needed to lift miners to and from the work level, and raise ore and waste in loads not exceeding 10 tons at a time.

Imagine that you are part of a mechanical engineering company, which submits a tender for the construction of the shaft headgear in this scenario.



Source: http://on.wikipedia.org/shaft_mining

Requirements of the shaft headgear model:

The shaft head gear should:

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

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

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

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

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

- I.

- II.

- III.

6.1.5 Mention two constraints?

(2)

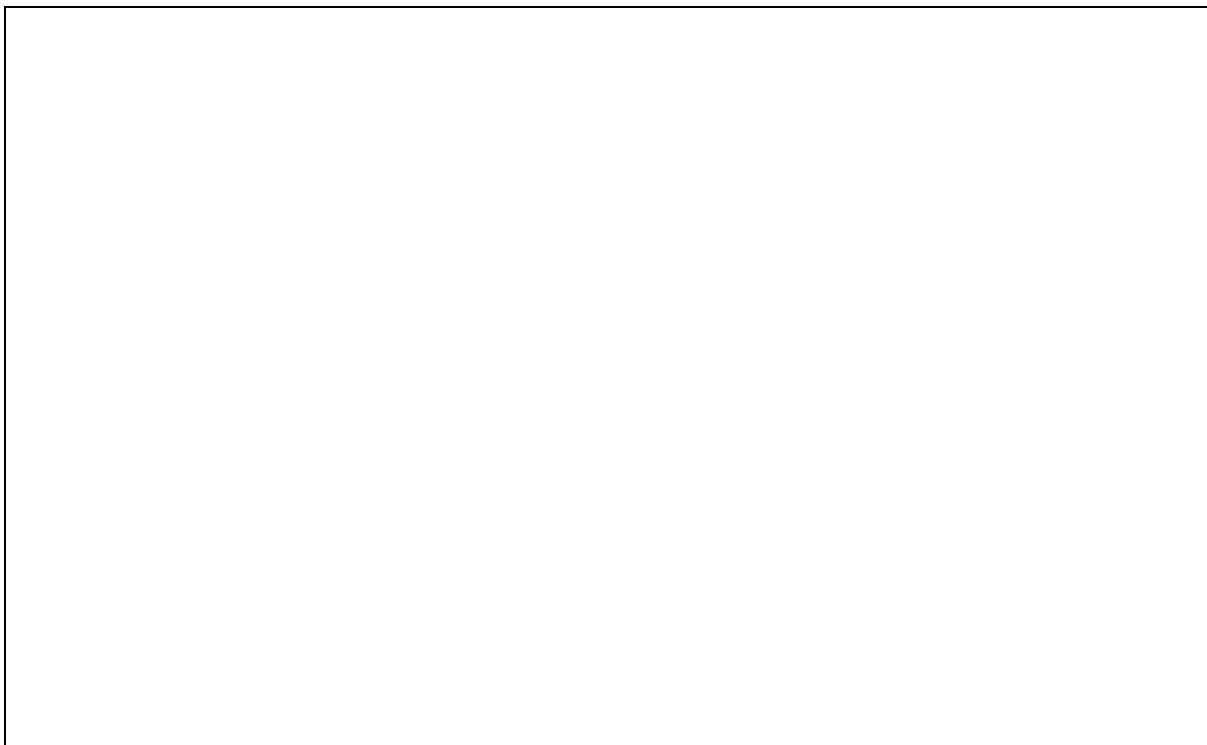
I. _____

II. _____

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. _____

II. _____

III. _____

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

TOOLS	MATERIALS
a) _____	a) _____
b) _____	b) _____

7.2.4 Give two safety precautions that you should consider during the making stage of this container. (2)

a) _____

b) _____

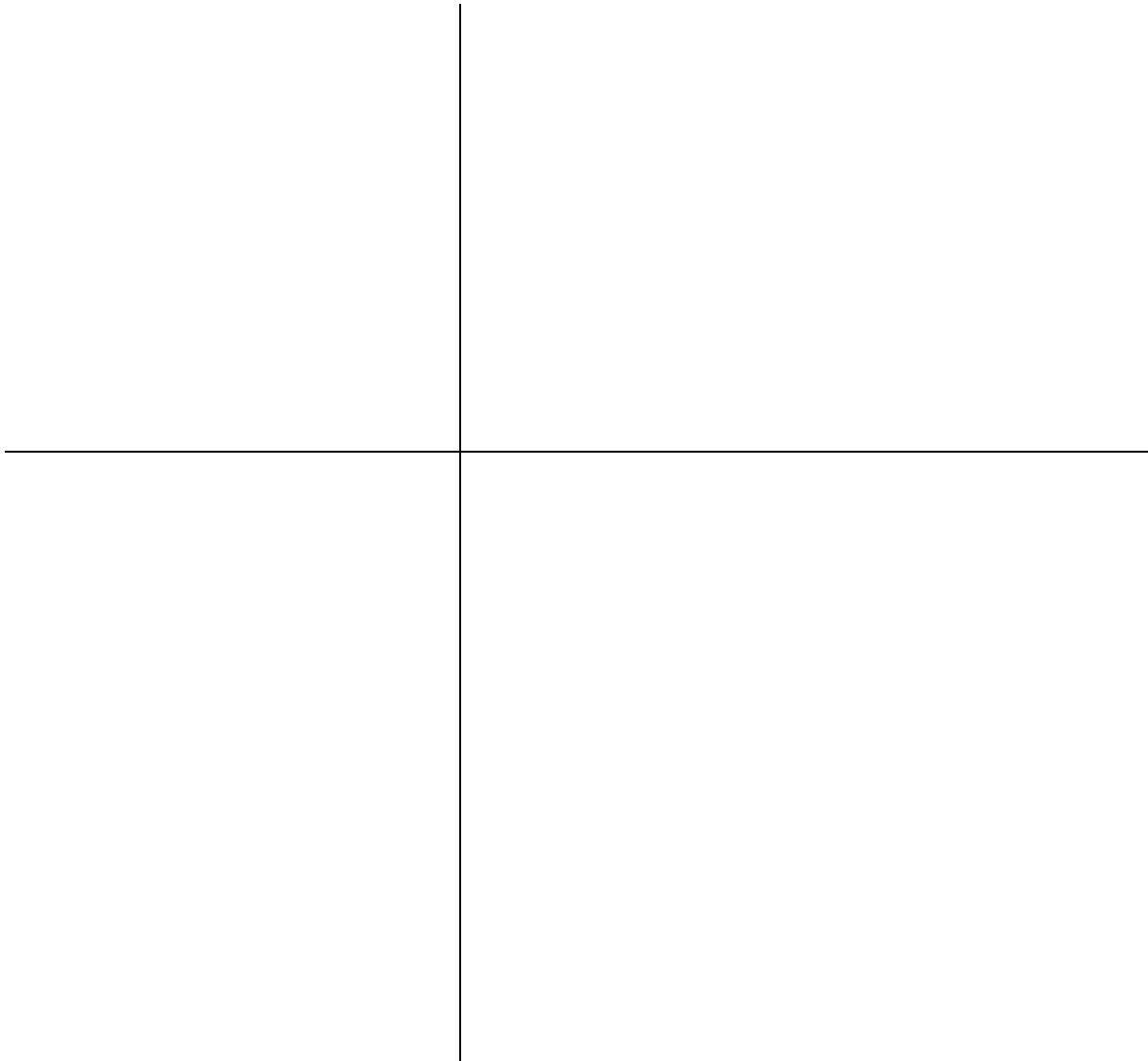
6.3 Draw a working drawing of the same idea generated above in first angle orthographic projection. Draw this working drawing in the space below to an appropriate scale using correct views, line types and dimensions according to the conventions and apply the knowledge and skills that you have learnt so far. Also draw a projection symbol representing the system of projection you used. All construction lines and projections must be shown.

(10)

Assessment Criteria

	Possible marks	Marks obtained
Front view	3	
Top view	3	
Left view	2	
45° line	1	

Projection symbol	1	
TOTAL	10	

Orthographic projection**[40]**

Projection symbol

GRAND TOTAL: 100 MARKS