LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

SEKHUKHUNE EAST EDUCATION DISTRICT(SEED)
-DISTRICT ON THE RISE

GENERAL EDUCATION AND TRAINING

GRADE 9

TECHNOLOGY

MID YEAR EXAMINATION

31 MAY 2024

MARKS: 100

DURATION: 1H30 MINUTES

INSTRUCTIONS

1. Answer all questions.
2. Write neatly and legibly.
3. Follow instructions promptly.
4. All the drawings should be in pencil, neat and fully labelled.
5. Coloured pencils may be used only for shading where such is required.

This question paper consists of 7 pages including cover page.

1.1 Choose the correct answer and write only the letter (A–D) next to the question number (1.1.1–1.1.5) in your ANSWER BOOK, for example 1.12 C.

1.1.1 A statement that describes how the designer intends to solve a problem is called… (1)

A Design brief

B Evaluate

C Communicate

D Make

1.1.2 When load acting on a structure is equally distributed, it is said to be… (1)

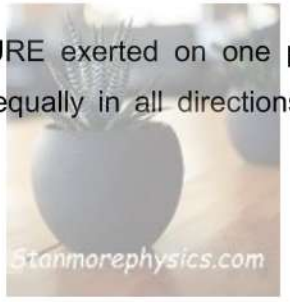
A Stable

B Bending

C Even

D Dynamic

1.1.3 ……states that PRESSURE exerted on one part of a HYDRAULIC SYSTEM will be transferred equally in all directions to other parts of the system without any loss. (1)



A Pascal's law/principle

B Pressure

C Closed system

D Hydraulic system

1.1.4 Hydraulics jack uses …… to operate. (1)

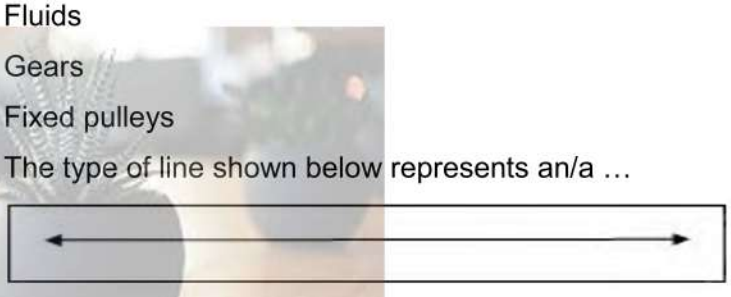
A Compressed gas

B Fluids

C Gears

D Fixed pulleys

1.1.5 The type of line shown below represents an/a … (1)



A Hidden detail line

B Construction line

C Dimension line

D Outline

1.2 State whether the following are **hydraulics or pneumatics system**

1.2.1 System that uses compressed gas (1)

1.2.2 Accuracy of the system is not high (1)

1.2.3 Generally operates in a closed system (1)

1.2.4 Construction equipment's (1)

1.2.5 It is usually light in terms weight (1)

1.3 Match the statements in column A with the correct answer in column B, for example 1.10 K (5)

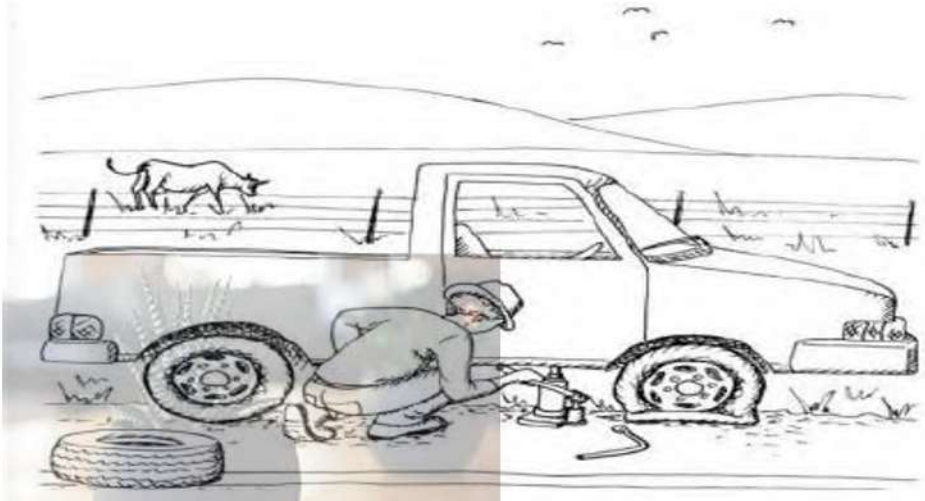
Column A	Column B
1.3.1. The metals deteriorate when they are exposed to moisture.	A. Corrosion B. Pneumatic
1.3.2. Torsion in structures can also be…..	C. Master cylinder
1.3.3. In a hydraulic system the output cylinder is also known as	D. Labour E. Twisting
1.3.4. Systems that uses compressed gases are known as	F. Slave cylinder
1.3.5. When doing a budget for a construction company one of the costs to be considered is.	G. Static force. H. Dynamic force

(15

Question 2

2.1 <u>Read the scenario given and answer the questions below</u>

sipho had a flat tyre and needed to lift the acr up to the wheel off and fit another wheel. Since a car was heavy for him to lift with his hands, he needed a device that provided a mechanical advantage.



2.1.1 What device will Sipho need to lift the car (1)

2.1.2 Will the device do the job? Explain your answer (3)

2.1.3 What should the device be made of? (1)

2.1.4 Explain aesthetics in terms of your device (2)

2.1.5 Explain ergonomics according to your device (2)

2.1.6 Draw a system diagram which describes the way the device works (4)

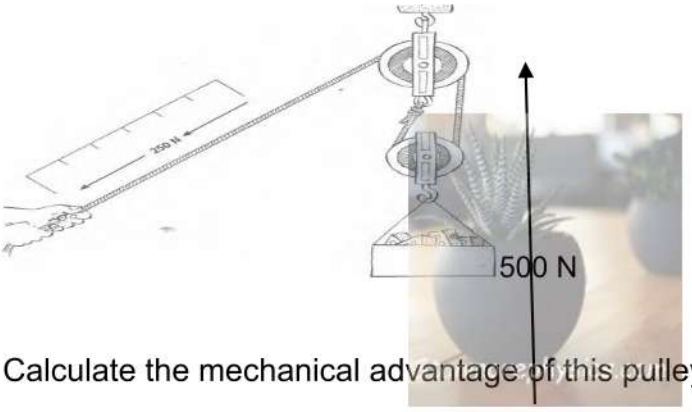
2.2

2.1.1 What is a compound pulley? (2)

2.1.2 Mention any wo types of pulley system (2)

2.1.3 In what way does a pulley system make work easier (1)

2.3 The following diagram shows a person using a compound pulley system to lift the bricks.



2.3.1 Calculate the mechanical advantage of this pulley system. (3)

Formula: $mechanical\ advantage = \frac{load}{effort}$

Question 3

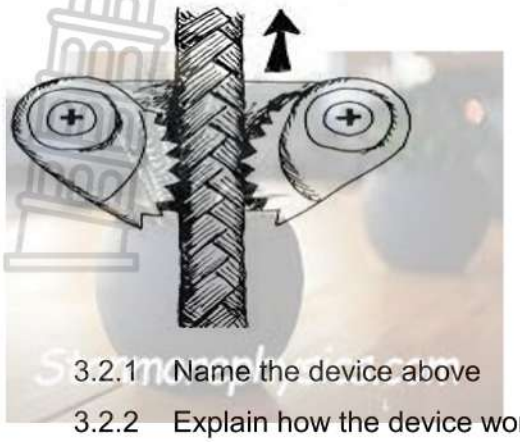
3.1 Study the diagram below

3.1.1 Explain what is happening (1)

3.1.2 Suggest a way in which you can improve the design (2)

3.1.3 Draw your solution of the above design (4)

3.2 Study the picture below and answer the following questions



3.2.1 Name the device above (1)

3.2.2 Explain how the device works (3)

3.3 Give an example of where each of the following components are used in real life

3.3.1 Ratchet and pawl (1)

3.4 What is the function of a disc brake? (2)

3.5 Most bicycles use rim brakes, where a braking force is applied to the rim of the wheel. Give any two advantages of using rim brakes in bicycles (4)

[Question 4]

4.1 **Scenario**

People from rural areas sometimes risk drowning each time they cross the river to the city. In some areas the rivers have dangerous crocodiles which also attack the people crossing. There are times when the villagers cross in groups and help each other.

4.1.1 Identify the problem in the scenario above. (2)

4.1.2 Write down the design brief (what is it that needs to be design?, for who? And for what purpose?) (3)

Write down two specifications and one constrain (3)

4.2 Different forces act on different structures all the time,briefly explain the following types of forces.

4.2.1 Tension (2)

4.2.2 Bending (2)

4.2.3 shearing (2)

4.2.4 Compression (2)

4.2.5 Torsion (2)

4.3 Gear A and B are shown in the figure below. Gear A is driven

4.3.1 Use the formula given above to calculate the gear ratio in the above gear train. (3)

4.3.2 Is the system increasing or decreasing the speed? Give a reason for your Answer. (2)

4.3.3 If the driver gear rotates clockwise how would the driven gear rotate? (2)

4.3.4 Explain how you would make gear A and gear B to rotate in the same Direction. (2)

4.3.5 Give THREE examples of common machines that use gears. (3)

4.3.6 Name TWO different types of gears (2)

Question 5

Read the following paragraph and answer the questions that follow.

5.1

The amaNgwane people, who live in the foothills of the Drakensberg Mountains, designed and built a very successful, but simple dwelling. This was in response to the need to build housing, using local materials. Flexible poles were set in a circle and then bent over and fastened towards the centre. These formed the upright framework. Other thin poles were woven in-between to complete and strengthen the frame.

This was an ideal shape, as a domed shape is very strong with the compressive forces being distributed over the whole frame. In this way they could withstand the strong winds that blow in this area. By using natural materials they were very environmentally friendly.

The frame was then covered with bundles of grass. This provided a good insulating layer so the dwellings were warm in winter and cool in summer.

5.1.1	What type of structure is described?	(2
5.1.2	Give TWO natural materials that were used by the amaNgwane people for building these dwellings.	(2)
5.1.3	What was the ADVANTAGE of using natural materials?	(2)
5.1.4	How was the structure strengthened against the forces that could act upon it?	(2)
5.1.5	Give the MAIN purpose of using grass to cover the framework.	(2)

TOTAL MARKS 100