*Student's Assessment Number*_____

THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
FORM TWO NATIONAL ASSESSMENT

031 **PHYSICS**

Time: 2:30 Hours **Year: 2025**

Instructions

1. This paper consists of sections A, B and C with a total of **ten (10)** questions.
2. Answer **all** the questions.
3. All answers must be written in the spaces provided.
4. All writing must be in **blue** or **black** ink, **except** drawings which must be in pencil.
5. Communication devices and any unauthorised materials are **not** allowed in the assessment room.
6. Write your **Assessment Number** at the top right corner of every page.
7. Where necessary the following constants may be used:
   (i) Acceleration due to gravity, $g = 10\ m/s^2$.
   (ii) $\pi = 3.14$.

QUESTION NUMBER	FOR ASSESSOR'S USE ONLY	
	SCORE	ASSESSOR'S INITIALS
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		
CHECKER'S INITIALS		

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SECTION A (15 Marks)

Answer **all** questions in this section.

1. For each of the items (i) – (x), choose the correct answer among the given alternatives and write its letter in the box provided. **(10 marks)**

(i) Why is it important to study Physics in real life situations?

1. It is useful for career development
2. It is used to clarify the existence of historical sites
3. It explains physical properties of matter
4. It is applied in the manufacturing and designing of the electronic devices
5. It helps in experimental discoveries

A 1, 2, 3 and 4
B 2, 3, 4 and 5
C 1, 3, 4 and 5
D 1, 2, 4 and 5

(ii) Figure 1 is a warning symbol used in the laboratory. What does the symbol represent?

Figure 1

A The substance is corrosive
B The substance catches fire easily
C The substance oxidizes the air and speeds up burning
D The substance produces radiations

(iii) Which one is a renewable energy whose source is heat from the earth's interior?

A Wind energy
B Solar energy
C Geothermal energy
D Water energy

(iv) Imagine two groups of equal number of people are pulling a rope by their bare hands, each group is trying to overcome the opponent's force. What kind of force does each group exert on the rope?

A Tension force
B Normal force
C Frictional force
D Stretching force

(v) What does a clinical thermometer measure?

A Ice point of a solid
B Steam point of a liquid
C Temperature of a human body
D Room temperature

(vi) Why is hot soup tastier than cold soup?

A It has higher surface tension
B It has lower surface tension
C It has higher capillary action
D It has lower capillary action

(vii) Which set represents ferromagnetic materials?

A Aluminium, cobalt and nickel
B Chromium, cobalt and steel
C Steel, nickel and aluminium
D Cobalt, nickel and steel

(viii) A student was given a plane mirror and observed that its reflecting surface was so smooth that an image of the object that emits the light was very clear. Which type of reflection was a result of such observation?

A Diffuse reflection
B Reflection of light
C Regular reflection
D Selective absorption

(ix) After coming late to school, a student ran into the classroom and closed the door to hide from the teacher. What type of force did the student use to close the door?

A Normal force
B Turning force
C Compressional force
D Stretching force

(x) If you want to detect the presence of electric charge in an object, which electrical device would you use?

A Electrophorus
B Galvanometer
C Voltmeter
D Electroscope

2. Match each of the physical quantities in **List A** with its corresponding units in **List B** by writing a letter of the correct answer below an item number in the table provided. **(5 marks)**

List A		List B	
(i)	Temperature	A	Ampere
(ii)	Electric current	B	Kilogram
(iii)	Displacement	C	Kelvin
(iv)	Momentum	D	Meter
(v)	Mass	E	Meter per second square
		F	Kilogram meter per second
		G	Mole

Answers

Item Number	(i)	(ii)	(iii)	(iv)	(v)
Answer					

SECTION B (70 Marks)

Answer **all** questions in this section.

3. (a) Why a tractor with wide tyres cannot get stuck in muddy places as compared to a car with narrow tyres. **(2 marks)**

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(b) (i) List three factors on which the pressure of liquids depends. **(3 marks)**

- _____
- _____
- _____

(ii) Calculate the area of a surface of an object which exerts a pressure of 0.2 N/m^2 when the force acting on it is 2 N. **(5 marks)**

_____

4. (a) (i) When a body is totally immersed in a liquid, its weight becomes less than its weight in air. Why is the body weight decreases in a liquid?

(1 mark)

_____

(ii) If the density of object X was 1.4 g/cm^3, predict if it will float in water. Give one reason to justify your choice. **(4 marks)**

(b) The weight of a piece of aluminium in air is 42.0 N and 25.5 N when completely immersed in water. What is the relative density of aluminium? **(5 marks)**

6.

5. (a) State the Newton's third law of motion. **(3 marks)**

(b) A monkey has a mass of 45 kg, and it climbs on a rope which can stand a maximum tensional force of 550 N. If the monkey climbs up with an acceleration of 5.5 m/s^2, find the force that will make the rope to break?

(7 marks)

(a) Write three equations of uniformly accelerated motion. **(3 marks)**

(i) _____

(ii) _____

(iii) _____

_____

(b) A car started to move from rest and accelerated uniformly at the rate of 4 m/s^2 for 12 s. It then maintained a constant speed for 30 seconds, after applying the brakes, it decelerated uniformly to rest in 5 s. Calculate;

(i) The maximum speed reached. **(2 marks)**

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(ii) The total distance covered in metres. **(5 marks)**

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7. (a) With well labelled diagrams, differentiate a fixed from a movable pulley. Give two differences. **(5 marks)**

8.

(b) A pulley system has mechanical advantage of 4. An effort of 100 N is applied on the pulleys system. If the pulley system has an efficiency of 75%, determine the maximum load that will be raised by the effort applied. **(5 marks)**

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8. (a) Outline five forms of energy. **(2.5 marks)**

(i) _____

(ii) _____

(iii) _____

(iv) _____

(v) _____

(b) An object of mass 200 kg is lifted by a crane to the top of a building that is 12 m high in 10 s. Calculate the power of the crane. **(7.5 marks)**

9. (a) State systematically six steps involved in measuring the volume of an irregular object by using the Eureka can. **(3 marks)**

10.

(b) (i) What is the function of the micrometer screw gauge? **(2 marks)**

(ii) Draw a micrometer screw gauge and label its four parts. **(5 marks)**

SECTION C (15 Marks)

Answer question **ten (10)**.

10. (a) (i) State Ohm's law. **(1 mark)**

(ii) Outline the procedures of conducting an experiment to verify Ohm's law. Give at least five necessary procedures. **(5 marks)**

- _____
- _____
- _____
- _____
- _____

(b) Show that the total resistance of two resistors connected in parallel is given by $R_T = \frac{R_1 R_2}{R_1 + R_2}$ where R_1 and R_2 are the resistances of individual resistors. **(4 marks)**

(c) Consider the electric circuit in Figure 2.

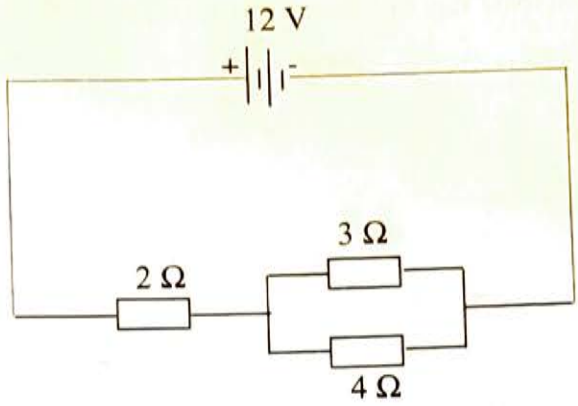

Figure 2

(i) Find the equivalent resistance. **(3 marks)**

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(ii) Determine the current flowing in the circuit. **(2 marks)**