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: 2023**

Instructions

1. This paper consists of sections A, B and C with a total of **ten (10)** questions.
2. Answer **all** questions in the spaces provided.
3. All writing must be in **blue** or **black** ink **except** drawings which must be in pencil.
4. Communication devices and any unauthorized materials are **not** allowed in the assessment room.
5. Write your **Assessment Number** at the top right corner of every page.
6. 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 from the given alternatives and write its letter in the box provided.

(i) A student has an urgent message to send to his/her parents far from school. Which means can be the best?

A Landline and mobile phone
B Microphone and telephone
C Megaphone and Mobile phone
D Megaphone and Microphone

(ii) What is the usefulness of laboratory rules when carrying out experiments in the Physics laboratory?

A Making students enjoy science
B Helping students conduct experiment freely
C Ensuring safety in the laboratory
D Enhancing communication with other technicians

(iii) Why does a piece of steel sink in water but a steel ship floats?

A The density of the steel ship is less than the density of water
B Steel is denser than the steel ship
C Steel ship has the same density to that of steel
D The average density of the steel ship is less than the density of water

(iv) Which of the following is a set of effects of forces exerted when you are riding a bicycle?

A Compressional, viscosity and stretching
B Torsional, attraction and couple
C Frictional, couple and pulling
D Attraction, friction and restoring

(v) A hydrometer is an instrument for measuring the density or relative density of a liquid. What are you supposed to do in order to increase its sensitivity?

A Increasing the size of the large bulb
B Making the stem narrower
C Reducing the lead shots in the weighted bulb
D Increasing the length of the stem

(vi) How can you make a rough measure of the size of a molecule?

A By measuring the height to which water rises in a narrow capillary tube
B By finding the speed with which Brownian vapour spreads in air
C By observing Brownian motion of smoke particles
D By measuring the area of the cycle in which a small drop spreads in water

(vii) A boy wants to lift a bucket full of water using a handle of metal. Which form of a handle should he use to lift the bucket comfortably?

A Thick handle
B Thin handle
C Long handle
D Sharp handle

(viii) Which of the following is a set of natural sources of light?

A Sun, Star and Fluorescence light
B Sun, Star and Lightning
C Star, Candle and Bioluminescence fly
D Star, Lightning and Wood fire

(ix) Which statement is true about a ball falling freely from a height of 10 m?

A Its potential energy increases but kinetic energy decreases
B Its potential energy is equal to the kinetic energy
C Its potential energy is zero and kinetic energy is maximum
D Its potential energy decreases and kinetic energy increases

(x) Which method is preferred to use if a student wishes to charge an uncharged body by using a positively charged body in order to make it acquire positive charge?

A Friction
B Contact
C Induction
D Heating

2. Match the uses of instruments in **List A** with a correct name of the instrument in **List B** by writing a letter of the correct response below the item number in the table provided.

List A	List B
(i) An instrument used to measure density of the liquid.	A Density bottle
(ii) An instrument used to determine the volume of irregular substance.	B Hydrometer
(iii) An instrument used to transfer specific volume of liquid from one container to another.	C Eureka can
(iv) An instrument used to determine the volume of displaced water.	D Pipette
(v) An instrument used to determine the density of insoluble granules.	E Measuring cylinder
	F Burette
	G Test tube

Answers

List A	(i)	(ii)	(iii)	(iv)	(v)
List B					

SECTION B (70 Marks)

Answer **all** questions in this section.

3. (a) Describe three ways in which magnets can be destroyed. **(6 marks)**

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(b) Using vivid examples, identify four applications of magnets in our daily life. **(4 marks)**

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4. (a) What is the function of the constriction in a clinical thermometer? **(2.5 marks)**

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(b) Explain the principle on which a liquid-in-glass thermometer works. **(2.5 marks)**

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(c) At what temperature do Fahrenheit and Celsius scale give the same reading? **(5 marks)**

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5. (a) (i) Suppose you find a man along the road pushing a motor cycle and it accelerated, but the same man pushed a car and failed to move it. Why the man failed to push the car? Briefly explain. **(2.5 marks)**

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(ii) An object in a state of rest or moving with uniform motion has no forces acting on it. Argue against this statement. **(2.5 marks)**

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(b) A car with a mass of 350 kg moving from Kondoa to Babati at a speed of 120 km/hr overtakes a bus with a mass of 1000 kg moving with a speed of 40 km/hr. Determine their momentum. **(2.5 marks)**

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(c) A boy of mass 50 kg was pushed by a constant force of 20 N for 3 seconds. Determine the acceleration acquired by the body. **(2.5 marks)**

6. John started moving the car from rest and the car accelerated uniformly at the rate of 4 m/s^2 for 5 s and maintained a constant velocity for 20 s. Afterwards he applied the brakes and the car retarded uniformly to rest in 3 s. Calculate the total distance covered by the car. **(10 marks)**

7. (a) Why is an inclined plane regarded as a simple machine? **(3 marks)**

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(b) The wheel and axle with an efficiency of 85 % is used to raise a load of 6000 N. If the radius of the wheel is 50 cm while that of the axle is 15 cm, calculate:

(i) The velocity ratio of the wheel and axle. **(3 marks)**

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(ii) The mechanical advantage of the wheel and axle. **(4 marks)**

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8. (a) Why does a body rotate when a certain force is applied on it? **(3 marks)**

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(b) Figure 1 shows a uniform metre rule of weight 2 N which is pivoted at 40 cm mark. If a force of 4 N acts at the end of the metre rule, calculate the value of force X required to keep the rule in equilibrium. **(7 marks)**

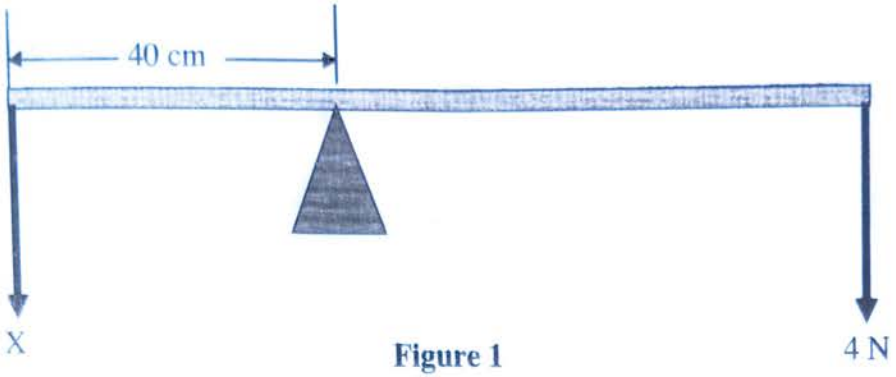

Figure 1

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9. (a) Compare natural gas and geothermal energy sources by considering the following:

(i) Environmental safety **(2 marks)**

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(ii) Sustainability **(2 marks)**

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(b) Using two points, state why solar cars are better than petrol cars. **(3 marks)**

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(c) Give three disadvantages of hydroelectric power. **(3 marks)**

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SECTION C (15 Marks)

Answer question **ten (10)**.

10. (a) Explain how an ammeter and a voltmeter are connected in a circuit. **(6 marks)**

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(b) In the circuit shown in Figure 2, the battery and an ammeter have negligible internal resistance. Determine the ammeter reading. **(9 marks)**

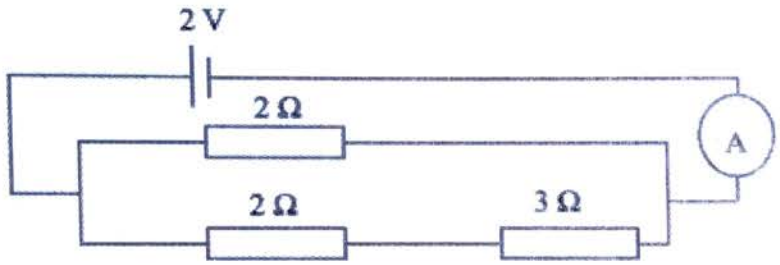

Figure 2

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