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: 2021**

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. Section A carries **thirty (30)** marks, section B **fifty (50)** marks and section C carries **twenty (20)** marks.
4. All writing must be in blue or black ink **except** drawings which must be in pencil.
5. All communication devices, calculators and any unauthorized 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) Density of water = $1\ g/cm^3$ or $1000\ kg/m^3$.

QUESTION NUMBER	FOR ASSESSORS' USE ONLY	
	SCORE	ASSESSORS' INITIALS
1		
2		
3		
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5		
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8		
9		
10		
TOTAL		
CHECKER'S INITIALS		

SECTION A (30 Marks)

Answer **all** questions in this section.

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

(i) What is the name given to the people who study and work professionally in the field which relates matter and energy?

A Scientists B Gastronomists
C Physicists D Geophysicists

(ii) Which of the following experiments is the process of assigning numbers in measurement?

A Qualitative experiment B Quantitative experiment
C Scientific experiment D Physics experiment

(iii) What is the implication of the statement that when a body floats, its apparent weight is zero?

A The weight of a floating body is less than the upthrust acting on it.
B The weight of a floating body is less than the weight of the fluid displaced.
C The weight of a floating body is equals to the weight of the fluid displaced.
D The weight of a floating body is greater than the upthrust acting on it.

(iv) Why particles in a solid state are closely packed?

A Because they have weak force of attraction.
B Because they have very weak force of attraction.
C Because they have moderate force of attraction.
D Because they have very strong force of attraction.

(v) Why do beans seem to swell up when soaked in water for overnight?

A Due to diffusion action B Due to capillary action
C Due to adhesive force D Due to osmosis process

(vi) Which statement correctly explains the term power?

A Rate of doing work measured in watts.
B Rate of doing work measured in watts per second.
C The product of energy and time measured in joule-seconds.
D Energy divide by time measured in joules.

(vii) Which of the following materials was the earliest natural magnet to be discovered?

A A bar magnet B Marble stone
C Lodestone D An electromagnet

(viii) What differentiates a single moving pulley from a single fixed pulley?
A In single movable pulley, load is double the effort.
B In single fixed pulley, load is double the effort.
C In single movable pulley, effort is the same as load.
D In single fixed pulley, effort is double the load.

(ix) Which quantity describes the temperature at which pure ice melts at standard atmospheric pressure?
A Vapour pressure
B Ice point
C Latent heat of fusion
D Melting point

(x) What criterion supports the argument that potential and kinetic energies are similar?
A Both produce heat.
B Both are forms of mechanical energy.
C One is the substitute of the other.
D Both are forms of electrical energy.

(xi) Why do the racing cars designed in such a way that their centres of gravities are lowered?
A To increase the centre of gravity.
B To decrease the stability.
C To lower the stability.
D To increase the stability.

(xii) What happens when the body moves with a constant speed?
A Its acceleration is zero.
B Its acceleration increases.
C Its acceleration decreases.
D Its deceleration increases.

(xiii) Which class of levers do wheel barrows, nut-crackers and bottle openers belong?
A Third class
B Second class
C First class
D Fourth class

(xiv) How would the formation of image in the plane mirror be described?
A Same size as object, virtual and upright.
B Larger, real, and upside down.
C Smaller, virtual and upright.
D Larger, virtual and upright.

(xv) What parameter (s) affects the magnitude of the energy of a moving body?
A The speed of moving body.
B The mass of moving body.
C The speed and mass of the moving body.
D The force of gravity.

(xvi) The following observations are **correct** on the concept of structure and properties of matter **except**

A A drop of water on clean glass spreads over the surface of glass.
B Water wets glass but mercury does not.
C A pond skater is capable of walking on the surface of water.
D Water falls inside the tube but mercury rises when poured in the same tube.

(xvii) Why the weight of a body is greater at the poles than at the equator?

A Because the earth is not perfectly spherical.
B Because weight is not constant.
C Because weight is measured by spring balance.
D Because gravity is greater at the poles.

(xviii) Which of the following devices work by the help of atmospheric pressure?

A Flushing tanks and Hydraulic press.
B Lift pumps and Hydrometers.
C Bicycle pumps and Syringes.
D Lactometers and Thermometers.

(xix) What is the function of a capacitor in electronic devices?

A Detect charges on materials.
B Produce electrostatic charges through induction.
C Store electric charges.
D Produce electrostatic charges through rubbing.

(xx) The amount of current flowing in the circuit is 4.0 Amperes. If a potential difference is 48 V, what is its resistance?

A 12V B 12 Ω
C 12A D 24 Ω

2. Match the descriptions of the magnetic terms in **List A** with the correct magnetic terms in **List B** by writing a letter of the correct response below the corresponding item number in the table provided.

List A	List B
(i) Keep magnet away from the source of heat.	A Magnetic field
(ii) The substance which cannot be magnetized or attracted by magnet.	B Magnetic induction
(iii) The point in which the magnetic field is zero.	C Storage of magnet
(iv) The region around magnet which can attract magnetic materials.	D Storage of point charge
(v) The arrangement of magnetic dipoles in groups.	E Neutral point
	F Magnetic domain
	G Non-magnetic material

Answers

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

3. Complete each of the following statements by writing the correct answer in the space provided.
   (i) Quantities like length, mass, amount of current and time in Physics are known as.....
   (ii) The velocity ratio of a block and tackle pulley system which contains 3 fixed and 2 movable pulleys is.....
   (iii) If a force of 12 N acts on a body of 1.2 kg, the acceleration of a body will be.....
   (iv) The instrument used to detect and identify the presence of electric charges on an object is known as.....
   (v) During respiration, oxygen enters into blood stream by the process known as.....

SECTION B (50 Marks)

Answer **all** questions in this section.

4. (a) Briefly, explain the following terms:

(i) Joule.....

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(ii) Energy .....

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(iii) Watt... .....

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(b) State the principle of conservation of energy.....

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(c) A bus of 10,000 kg is travelling from Musoma to Mwanza with a speed of 25 m/s. Calculate its kinetic energy.

5. (a) Apply the Newton's first law of motion to explain why an object pulled along the ground with constant velocity has zero net force but the force exerted on it is not zero.

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(b) State the principle of the conservation of linear momentum.

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(c) A ball of mass 0.15 kg moving at a speed of 20 m/s increases the speed to 80 m/s in 0.5 second. What is the average force applied.

6. (a) Why efficiency of a pulley system is always less than 100%? Give two reasons.

(i) .....

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(ii) .....

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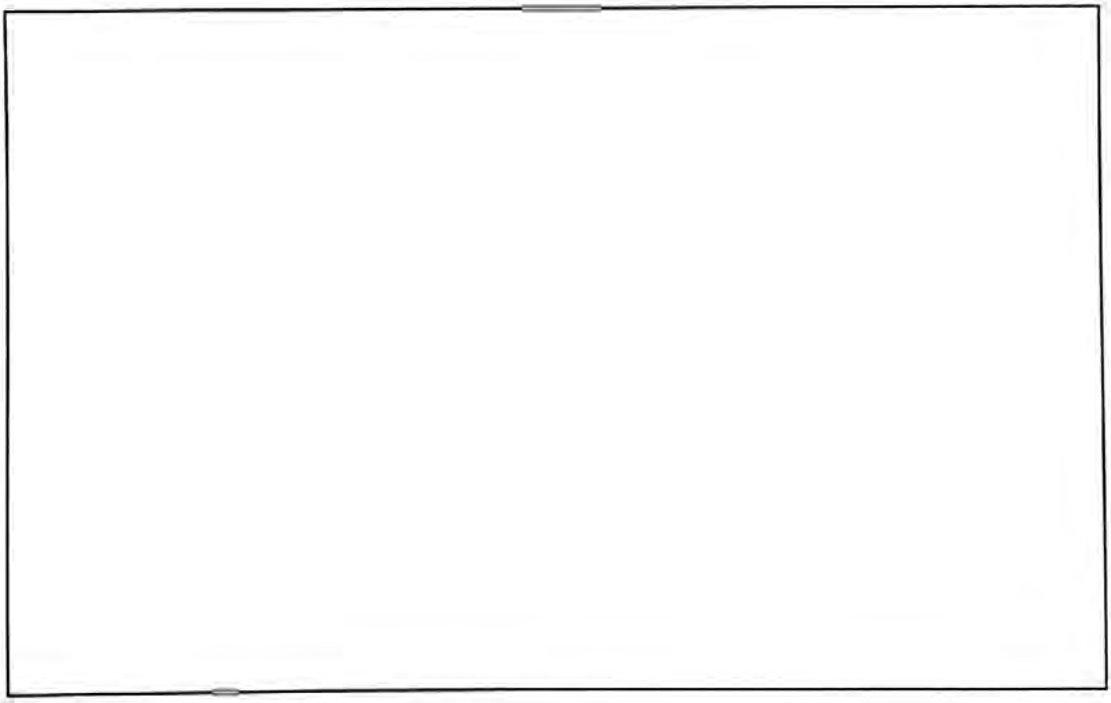
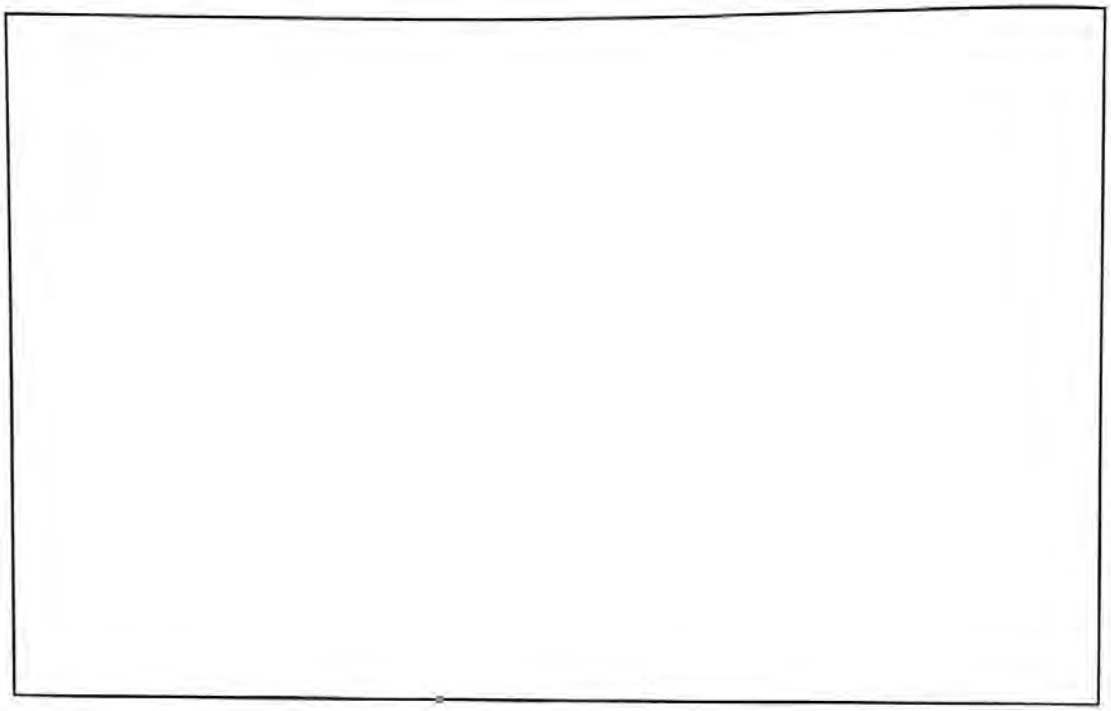
(b) Draw diagrams of lever system to show:

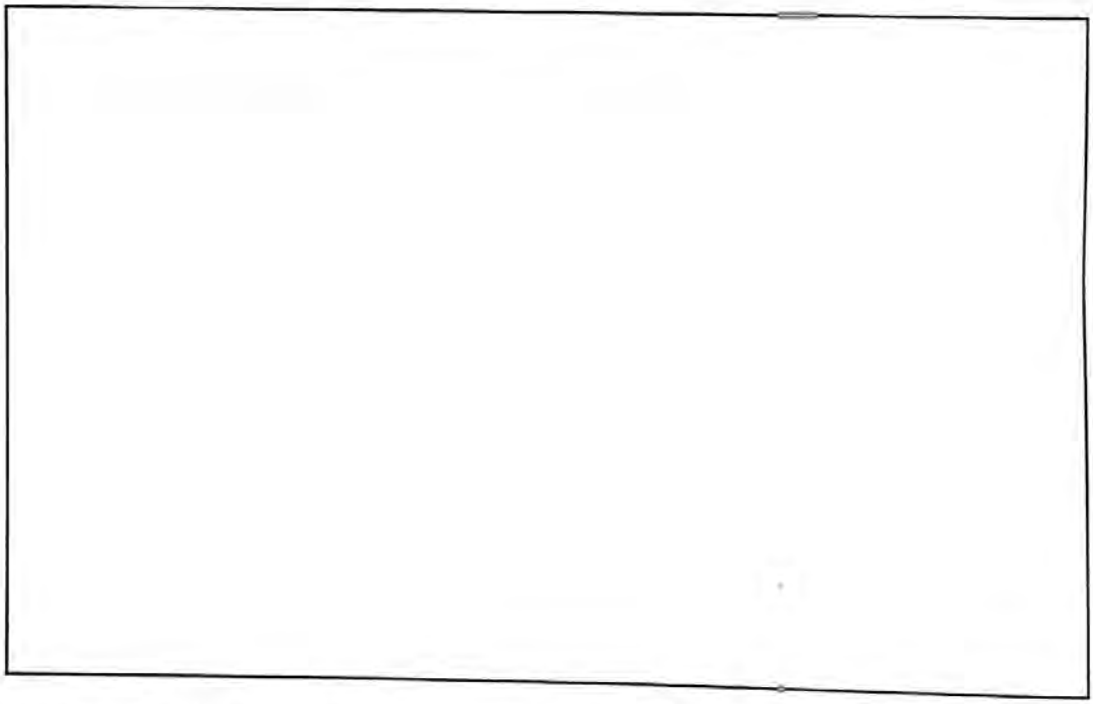
(i) First class lever.



(ii) Second class lever.



(iii) Third class lever



7. (a) How does static equilibrium differ from dynamic equilibrium?

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(b) Why mechanics prefer to use a spanner of longer stem than spanner of shorter stem to tight or loosen a nut on a bolt?

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(c) The moment of a force about a point is 12,000 Nm. If the magnitude of the force is 6,000 N, find the perpendicular distance between the point and the line of action of the force.

8. (a) Use the concept of pressure to explain why buildings are constructed with wide foundations.

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(b) Mention two experiments which show the evidence that atmospheric pressure exists.

(i) .....

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(ii) .....

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(c) A woman of mass 64 kg is standing on sand soil with high heel shoes of area 2 cm^2;

(i) Find the pressure exerted by the woman on the ground.

(ii) Why does her heel sink into the ground?

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SECTION C (20 Marks)

Answer **all** questions in this section.

9. (a) Write down three equations of uniform acceleration of motion and explain the meaning of each symbol used in the equation.

(b) The football **P** of mass 0.5 kg was kicked by a goalkeeper at 12 m/s and collides with another football **Q** of mass 0.45 kg which was at rest. After the collision both balls move off together at 10 m/s. Calculate:

(i) The momentum of ball P before collision

(ii) The momentum of ball P after collision

10. (a) State any two important requirements for a complete circuit.

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(b) Distinguish between resistance and resistors.

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(c) Draw a simple circuit to show two bulbs in series connected to a battery of two cells.