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: 2020**

Instructions

1. This paper consists of sections A, B and C with a total of **ten (10)** questions.
2. Answer **all** questions.
3. Section A carries **thirty (30)** marks, section B **fifty (50)** marks and section C carries **twenty (20)** marks.
4. All answers must be written in the spaces provided.
5. All writing must be in blue or black ink **except** drawings which must be in pencil.
6. All communication devices, calculators and any unauthorised materials are **not** allowed in the assessment room.
7. Write your **Assessment Number** at the top right hand corner of every page.
8. 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 $1000 kg/m^3$

FOR ASSESSORS' USE ONLY		
QUESTION NUMBER	**SCORE**	**ASSESSOR'S INITIALS**
1		
2		
3		
4		
5		
6		
7		
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) Physics is the study which deals with matter. What does it relate to?

A Power B Energy
C Force D Work

(ii) What does someone pay for if he/she buys sugar from the shop?

A Mass B Density
C Volume D Weight

(iii) What is a 20,000 g mass equal to?

A 2 tonnes. B 2 kg. C 2000 kg. D 20 kg.

(iv) Which one will need much force to pull or push than the other between 10 kg of stone and 10 kg of cotton?

A 10 kg of stone will need much force than 10 kg of cotton.
B 10 kg of cotton will need much force than 10 kg of stone.
C Same force will be needed in both.
D 10 kg of stone is heavier than 10 kg of cotton.

(v) Relative density of a substance is 2.5. What is its density?

A Equal to the density of water.
B Greater than the density of water.
C Equal to the volume of water displaced.
D Less than the density of water.

(vi) Why does a body float in a fluid?

A Because its density is greater than the density of the fluid displaced.
B Because its density is less than the density of fluid.
C Because the weight of the fluid displaced is equal to its weight.
D Because the weight of the fluid displaced is less than its weight.

(vii) Which of the following forces can cause the mosquito larva to float on water?

A Surface tension. B Adhesive forces.
C Friction forces. D Cohesive forces.

(viii) Which phenomenon explains the assertion that the narrower the tube the further the water rise?

A Capillarity B Diffusion
C Osmosis D Brownian movement

(ix) Which pair of the following parameters affects pressure at any point in a liquid at rest?

A Density and volume B Depth and area
C Area and volume D Depth and density

(x) What is the SI unit for power?

A Joule per metre B Metre per second
C Metre per second^2 D Joule per second

(xi) What will be the number of images formed when two plane mirrors are set perpendicular to each other?

A 4 B 3 C 5 D 2

(xii) Which device is used for detecting small electric charges?

A Proof plane B Capacitor
C Electrophorus D Gold leaf electroscope

(xiii) What is the equivalent resistance of two resistors of 4 Ω and 6 Ω connected in parallel?

A 0.66 Ω B 10 Ω C 2.4 Ω D 1.5 Ω

(xiv) What is the name of the region surrounding a magnet in which the magnetic force is exerted?

A Magnetic field B Magnetic shielding
C Magnetic pole D Magnetic domain

(xv) The moment of a force about a point is 1120 Nm. If the magnitude of the force is 5600 N, what is the perpendicular distance between the point and the line of action of the force?

A 5 m B 6720 m C 0.2 m D 4480 m

(xvi) Which of the following groups of machines represents the first class levers?

A Wheel barrow and bottle openers
B Fishing rod and sugar tongs
C Crowbar and claw hammer
D Nutcracker and pair of scissors

(xvii) Which of the following will be a suitable graph to represent the motion for a body moving in a straight line with a uniform acceleration?

A Distance against time graph. B Acceleration against time graph.
C Velocity against time graph. D Displacement against time graph.

(xviii) What force is required to give a mass of 40 kg an acceleration of 0.2 m/s^2

A 200 N B 0.005 N C 8 N D 20 N

(xix) Which of the following devices is used for measuring the upper fixed point of a thermometer scale?

A Hydrometer B Hypsometer
C Thermometer D Barometer

(xx) Which of the following is **not** one of the sources of sustainable energies?

A Water B Wind C Sun D Dry cell

2. Match each item in **List A** with a response in **List B** by writing its letter below the number of the corresponding item in the table provided.

LIST A	LIST B
(i) The energy which is associated with the volcanic areas.	A Wind energy.
(ii) The energy due to afforestation and deforestation.	B Solar energy.
(iii) Natural resources that are used in the production of electricity without damaging the environment.	C Hydroelectric energy.
(iv) The energy generated by means of large propeller on tall tower.	D Wood energy.
(v) The energy produced by the Sun.	E Tidal energy.
	F Geothermal energy.
	G Sustainable energy sources.

ANSWERS

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

3. Complete each of the following statements by writing the correct answer in the spaces provided:

   (i) A complete measurement is called _____

   (ii) Efficiency of a machine is always less than 100% due to _____

   (iii) The linear momentum of a body of mass 5 kg moving with a velocity of 2 m/s is _____

   (iv) A region of total shadow on a screen is _____

   (v) The shape of the surface of water in a clean glass tube is _____

SECTION B (50 Marks)

Answer **all** questions in this section.

4. (a) Write down the second and third equations of motion in a straight line.

   _____

   _____

   (b) Explain the following terms as they are applied in motion in a straight line:

   (i) Velocity.

   _____

   _____

   _____

   _____

(ii) Retardation.

_____
_____
_____
_____

(c) A stone is thrown vertically upwards with an initial velocity of 50 m/s.
(i) Calculate the time that the stone will take to return back to the thrower.

(ii) What will be the maximum height reached?

5. (a) Which kind of energy is stored in objects like springs as a result of reversible deformation?

_____

(b) Why there is no work done on the books when carried horizontally?

_____
_____
_____

(c) A ball of 0.2 kg is dropped from a height of 20 m. On impact with the ground, it loses 30 J of energy. Calculate the height it reaches on the rebound.

6. (a) Why is it easier to cut a bar of soap using a thin piece of wire than a thick one?

_____
_____
_____
_____
_____
_____
_____

(b) State four applications of atmospheric pressure.

(i) _____
(ii) _____
(iii) _____
(iv) _____

(c) A car of mass 8000 kg has one of its tyres having an area of 50 cm^2 in contact with the ground. If this is four wheel drive vehicle, calculate the pressure exerted on the ground by the car.

7. (a) How does the centre of gravity of an extended body differ from the centre of mass of an object?

_____
_____
_____
_____
_____

(b) Why a person climbing up a mountain is observed to bend forward?

_____
_____
_____

(c) A moment of force of 320 Nm is formed when a force of 120 N is applied at right angle on the end of a spanner. How long is the spanner?

8. (a) State Newton's second law of motion.

_____
_____
_____

(b) Give two examples of the application of the Newton's third law of motion.

(i) _____
_____
_____
_____

(ii) _____
_____
_____
_____
_____

(c) A ball A of mass 100 g moving with a velocity of 5 m/s makes a "head-on" collision with a ball B of mass 500 g moving with a velocity of 1 m/s in the opposite direction. If A and B stick together after the collision;

(i) Calculate their common velocity V.

(ii) Identify the type of collision _____

SECTION C (20 Marks)

Answer **all** questions in this section.

9. (a) Explain how the inclined plane makes it easier to move a load from a lower to a higher position.

_____
_____
_____
_____
_____

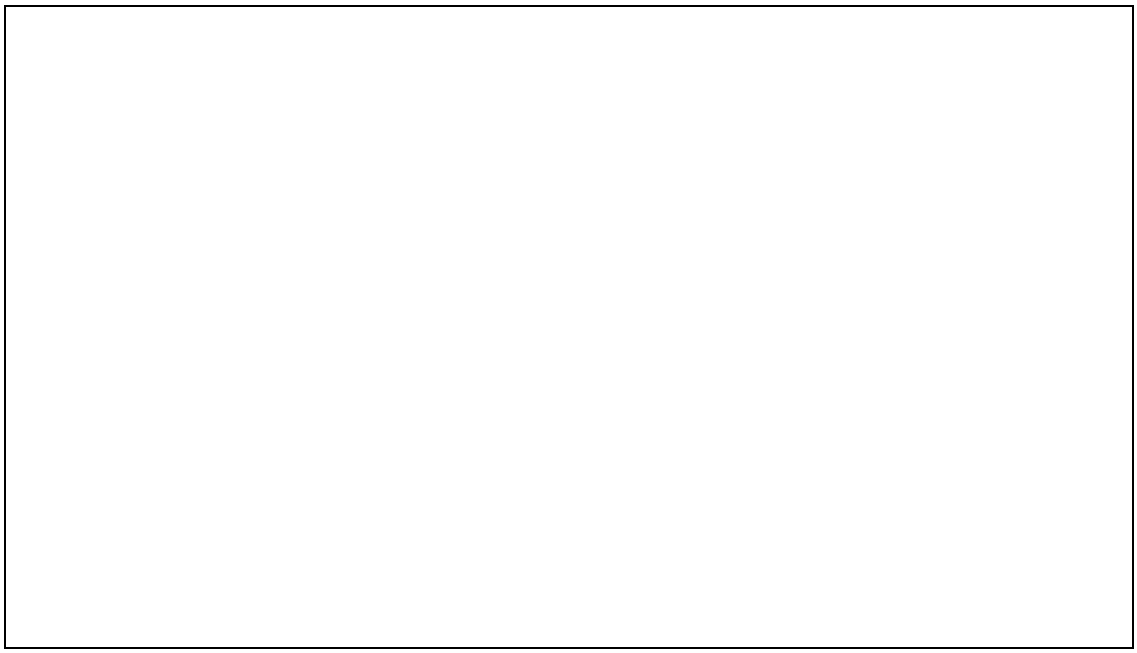
(b) Draw a diagram of combined pulley system with velocity ratio of 4.

(c) A pulley system is made up of 8 pulleys. An effort of 200 N is applied on the pulley system. If the pulley has an efficiency of 80%, find the:

(i) Mechanical advantage of pulley?

(ii) Maximum load that can be raised by the effort?

10. Three resistors of 2 Ω, 4 Ω and 6 Ω are connected in series to a battery of e.m.f 24 V and have negligible internal resistance.
    (a) Draw the circuit diagram including the battery, ammeter, switch and the three resistors.



    (b) Find the current flowing in the circuit drawn in 10(a) above.

    (c) Find the potential difference at the ends of each resistor in 10 (a).