MINISTRY OF EDUCATION	**SUBJECT: PHYSICS THEORY**
KARONGI DISTRICT	**MARKS: 100**
CLASS: SENIOR ONE	**DURATION: 3hours**
COMPREHENSIVE ASSESSMENT OF PHYSICS SECOND TERM 2023-2024	

Instructions:

- **This paper consists of Two section A and B**
- **Attempt ALL Questions of Section A (70 marks)**
- **Attempt Three Questions of Section B (30marks)**

SECTION A: Attempt all questions of this section (70 marks)

Q1. State **(3marks)**

a) Any two branches of physics.
b) Two career opportunities open for you as a physicist.
c) Any two laboratory safety rules and regulations.

Q2. List down a) any three examples of contact force **(1.5mark)**

b) any four effects of force **(2marks)**

Q3. A) The following are applications of Newton's third laws of motion. Which one is Not?**(1mark)**

i) Charged bodies show two equal but opposite forces.
ii) A balloon will always move in the opposite direction when the air inside it is released.
iii) When running or walking, a person exerts a force on the ground and the ground does so.
iv) The force between two bodies varies with the distance between them.

B) According to the Newton's first law of motion, the inertia of a body of a body is a measure of what if the following?

(1mark)

i) Force
ii) Mass
iii) Acceleration
iv) Volume

C) The force exerted on a mass of 500g under constant acceleration of 25m/s^2 is: **(1mark)**

i) 12500N ii) 125N iii) 12.5N iv) 50N

D) There is the earth's gravitational force of attraction on you when you are standing on the ground. True or False? **(1mark)**

Q4.Define the term

a) Velocity and state its S.I. unit. **(2marks)**
b) Acceleration due to gravity **(2marks)**

Q5. Complete the following passages using terms from the following: **efficiency of the machine, simple machine, effort, compound machine.**

The ratio of the energy output to the energy input of a machine result into (i)…….. A machine that is made by more than one simple machine working together to perform a particular task with ease is called (ii)…….. The mechanical advantage is the number of times the load is greater than the (iii)…… cutting potatoes with a knife is one of the applications of (iv) …….. **(4marks)**

Q6. A) What is the kinetic theory of Matter**? (2marks)**

B) List any four physical properties of solids. **(2marks)**

Q7. Mention.

a) Any four forms of energy. **(2marks)**

b) Any two renewable source of energy used in Rwanda. **(2marks)**

Q8. A) What is the law of conservation of energy? **(1marks)**

b) Discuss two environmental effects of the use of energy resources. **(1marks)**

c) Table below shows how energy is converted from form A to form B and the devices concerned. Complete the table**. (2marks)**

Device	Form A	Form B
Loudspeaker	----------	sound
----------	Chemical	electrical
Microphone	----------	electrical
Bulb	electrical	----------

Q9. A) Contrast fundamental from derived physical quantities. **(2marks)**

b) Which instrument would you use to measure each of the following quantities? **(2 marks)**

(i) The mass of a stone.

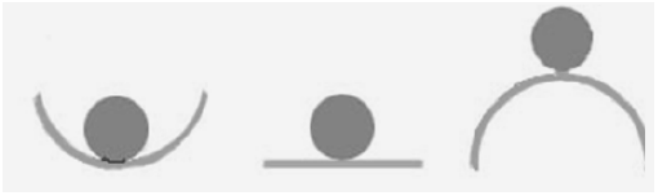
(ii) Small volume of water like 50ml.

Q10. A) Define the term Centre of gravity **(1mark)**

b) Match the term with corresponding proper meaning. **(1.5marks)**

Term	Description
1. Stable equilibrium	A. Centre of gravity remains at the same vertical position even when the object is displaced.
2. Neutral equilibrium	B. When displaced slightly, it continues to fall up to the lowest possible position in order to lower its Centre of gravity.
3. Unstable equilibrium	C. The centre of gravity is at the lowest possible position.

c) The figure below shows a marble in three types of equilibrium. State the type of equilibrium in each case. **(3marks)**



i ii iii

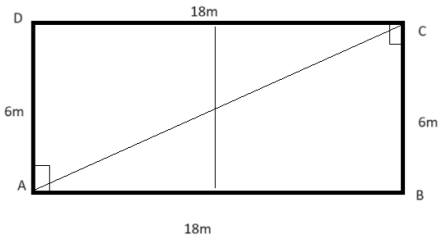
Q11. . a) State one similarity between particles of a liquid and that of a gas. (2marks)

b) state and explain one applications of physical properties of solids and liquids in daily life**.(2marks)**

c) Explain why the density of gas molecules is less than that of a solid and liquid.**(2marks)**

Q12. A) Differentiate distance from displacement. **(2marks)**

b) Suppose a football volleyball field is 18m long and 6m wide. What is the distance and displacement in moving from corner A to the opposite corner C in the other semi field as shown below? **(2marks)**



c) A racing cyclist starts from rest and accelerates uniformly to a velocity of 20 m/s in 4 s. What is the acceleration of the cyclist? **(2marks)**

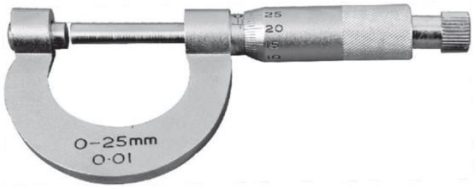
Q13 a) Differentiate heat from temperature. (**2marks**)
b) Convert these temperature into given scale **(3marks)**
i) 299 ^{o}C into Kelvin.
ii) 343 K into Celcius
iii) 98 ^{o}F into Celcius

Q14. A) explain one relationship and one difference between mass and weight of a body? **(2marks)**
b) A satellite has a mass of 200kg on earth surface.
i) Determine the weight of this satellite on the earth. Acceleration of gravity on the earth is 9.81 N/kg. **(2marks)**
ii) What will be its weight on the Mars where the acceleration of gravity is 38% of that of earth? **(2marks)**

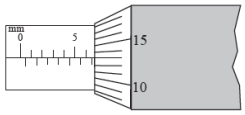
Q15 A) Define the term power and give its S.I. Unit. **(1marks)**
b) A machine is able to do 30 joules of work in 6.0 seconds. What is the power developed by the machine? (**2marks**)
c) A fork-lift truck raises a 400 kg box through a height of 2.3 m. The case is then moved horizontally by the truck at 3.0 m/s onto the loading platform of a lorry. g= 10N/kg
(i) How much P.E. is gained by the box? (**2marks**)
(ii) Calculate the K.E of the box while being moved horizontally. (**2marks**)
(iii) What happens to the K.E once the truck stops? **(2mark)**

SECTION B: ATTEMPT THREE QUESTIONS OF THIS SECTION (30marks)

Q16. a) i. Remember the S.I. Unit of length. **(1mark)**
ii. What is the name and use of the instrument shown on the picture below?**(2marks)**



iii. State the value of the readings shown by the above named instrument as shown on the picture below. **(2marks)**



b) A box of mass 50g and volume 25dm^3 is immersed in water.
i) Determine the density of the box in kg/m^3.**(3marks)**

ii) Will the box sink or float in water? Explain. Density of water is 1000kg/m^3**(2marks)**

Q17. The figure below represents the velocity-time graph of a body during a period of 30 s.Use your observation from the graph to answer the following questions.

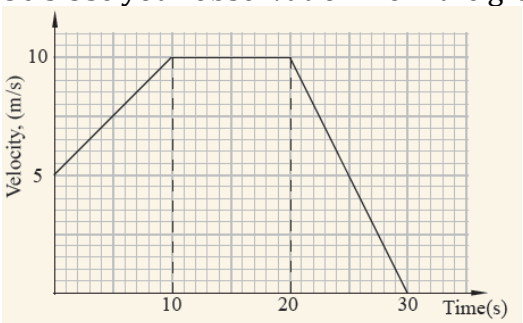


Fig. 2.41: Graph of velocity against time

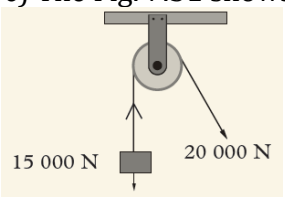
a) What is the initial and maximum velocity of the body?**(2marks)**
b) What is the type of motion of the body during the first 10 seconds?**(2marks)**
c) Find the deceleration of the body. **(2marks)**
d) Calculate the displacement of the body in 30 seconds. (**4marks)**

Q18. **.** a) Recall the Newton's universal laws of gravitation. **(2marks)**
b) Suggest any two applications of newton's universal law of gravitation. **(2marks)**
c) Two wardrobes of masses 1.6 × 10^2kg and 2.3 × 10^2kg exert an attraction force of 3.4 x 10^{-6} N between them. What is the distance separating them?
G=6.67x10^{-11} Nm^2/kg^2**(3marks)**
d) Predict what may happen if there gravitational force of attraction between earth and the moon decreases to a half of it. **(3marks)**

Q19. a) State two conditions to prove that a body is more stable. **(2mark)**
b) Explain why the passenger of a double-decker bus are not allowed to stand on the upper deck.**(2marks)**
c) what is the location of centre of gravity for regular lamina? **(1mark)**

d) Design an experiment and show steps on how to determine the centre of gravity of an irregular lamina. **(5marks)**

Q20. a) Name the two examples of simple machine. **(1mark)**
b) An effort of 250 N raises a load of 900 N through 5 m in a machine. If the effort moves through 25 m, find
(i) The useful work done in raising the load. **(2marks)**
(ii) The work done by the effort. **(2marks)**
(iii) The efficiency of the machine. **(2marks)**
c) The Fig. 7.31 shows a single fixed pulley. Calculate its:



i) Velocity ratio **(1mark)**
ii) Efficiency **(2marks)**

----------**TO YOUR BEST**----------