PHYSICS I

08:30AM-11:30AM

S_1ALL

2nd TERM

REPUBLIC OF RWANDA

KAYONZA DISTRICT

ORDINARY LEVEL DISTRICT ASSESSMENT, 2023-2024

SUBJECT: PHYSICS I

Class: S_1ALL

DURATION: 3HOURS

Instructions:

- This exam consists of three sections,
  - ✓ **Section A:** Answer all questions of Section A
  - ✓ **Section B:** Answer only three questions for your choice.
  - ✓ **Section C:** Compulsory (on graph paper or square paper if possible)

- Non programmable Calculators may be used.

SECTION A **55marks**

1. a. What is science? (**1mark)**

b. Define the term Physics. **(1mark)**

c. define prefixes **(1mark)**

2.Abody has mass and weight. Which of the two quantities:

a. Is a vector? **(1mark)**

b. Is measured in newton? **(1mark)**

c. Remains the same at any place? **(1mark)**

3.copy and fill in the missing (**1.5marks)**

a. …… may be defined as any observable property or process in nature with which a number may be associated.

b. …… are those quantities that are not defined in terms of other quantities.

c. Quantities which are defined in terms of the fundamental quantities via a system of equations are called ……..

4.a.i)12Gigametre=……m ii) $13\mu g = \cdots \ldots \ldots kg$ iii)92.4Khz=… .hz (**1.5 marks)**

b. Write out the following numbers in full with the correct number of zeros: (**1mark)**

8.69× 10^4kg

9.1× $10^{-3}kg$

c. A sea vessel carries 2 megatons of cargo. What is this mass in kg? (**1mark)**

d. Write the following numbers in powers of 10 notations: (**1mark)**

(i)328.65

(ii) 0.0068

5.Name two instruments which can be used to measure, accurately the diameter of a small metal sphere **(1mark)**

6.the mass of a body is 0.026 kg and its densiy is 1.3 kg/m^3. Calculate the volume of the body.Express the answer in standard form. **(2marks**)

7. a)What is the difference between speed and velocity? (**2marks)**

b) The initial speed of a car is 20km/h. After 30 minutes the speed of the car is 50km/h, calculate the acceleration. (**2marks)**

8. Define the following terms: (i)matter (ii) an element (iii) a compound (**3marks)**

9. Differentiate between intensive and extensive properties of matter and give two examples of each. (**3marks)**

10). A machine whose velocity ratio is 8 is used to lift a load of 300 N. The effort required is 60 N.

(a) What is the mechanical advantage of the machine (**2marks)**

(b) Calculate the efficiency of the machine **(2marks)**

11.a) List down four sources of heat energy in Rwanda. (**2marks)**

b) Which energy changes will occur when we exert a force to lift a weight? (**1mark)**

c) Give an example where energy from the sun is converted to electrical energy. (**1mark)**

12. a) State the difference between mass and weight. (**2marks)**

b) The weight of a body on the moon is less than the weight of a body on the earth. Why? (**2marks)**

C) Calculate the weight of a body whose mass is 80kg. (10N/kg) (**2marks)**

13. a) What is force? **(1mark)**

b) Name any 2 types of forces. (**2marks)**

c) State three newton's laws of motion. (**6marks)**

14. A tall person is more likely to fall climbing a mountain than a short person. Why is this possible? (**1mark)**

15.a) Name states of equilibrium. **(3marks)**

b)State how a body can be made more stable. **(3marks)**

SECTION B /30marks

16.a. Identify the difference between distance and Displacement of a moving body. **(2marks)**

b. A man walks 4km away from his home and then returns to his home.

Determine: i. The displacement and distance of this movement. **(2marks)**

ii. The average speed if the whole journey takes 2hours. **(3marks)**

c. Compare renewable and non-renewable energy sources **(3marks)**

17.a) What is the difference between potential energy and kinetic energy? **(1mark)**

b) An orange fruit of mass 0.1kg falls from its tree 3m high to the ground.

i. State the energy changes which occur as the orange falls to the ground. (**1mark)**

ii. Calculate the potential energy possessed by the orange before it falls. (**2marks)**

Take g=10N/Kg

iii. Calculate the kinetic energy of the orange as it hits the ground. (**2marks)**

c) How much work is transferred when a load of 5000N is lifted through a distance of 300 m? **(2marks)**

d) What is the power of a person weighing 600N who runs up stairs in 2s.

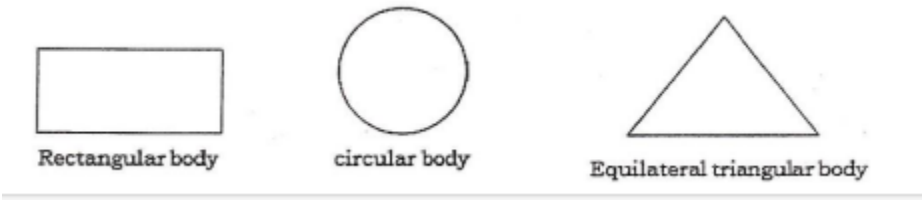
The stairs are made of 10 steps each 15 cm high. **(2marks)**

18. a) Differentiate center of gravity from center of mass **(2marks)**

(b) A thin sheet of cardboard is cut to the shape below. Describe with a diagram an experiment to find its center of mass. **(3.5marks)**



C) Copy and label with a dot the centre of mass of each of the three objects. **(4.5marks)**



19)A block and tackle pulley system has a velocity ratio of 4. If its efficiency is 75%. Find the

(a) Mechanical advantage. **(2marks)**

(b) Load that can be lifted with an effort of 500 N. **(3marks)**

(c) Work done if the load is lifted through a vertical distance of 4.0 m. **(3marks)**

(d) Average rate of working if the work is done in 2 minutes. **(2marks)**

20. a. State Newton's law of gravitation. **(2marks)**

b. A communication satellite of mass 300 kg orbits (go round) the earth at a height 35 000 m. Given that mass of earth = 5.97×10^{24} kg, radius of earth = 6.4×10^{6} m and G = 6.67×10^{-11} Nm2 /kg^2, find

(i) How far the satellite is from the centre of the earth? **(3marks)**

(ii) The earth's force of attraction onto the satellite. **(3marks)**

C)Calculate the acceleration produced by a force of 20 N on an object of mass 300 kg. **(2marks)**

SECTION C /15marks

21. This question is compulsory and must be answered on the graph paper. The table below shows the motion of moving body.

(a) Use the above data and plot a graph of velocity on Y-axis against time on X-axis. (**7.5 marks)**

Time(s)	0	1	2	3	4	5	6	7	8
Velocity(m/s)	0	5	10	15	15	15	15	30	0

b) From your graph, Determine:

i. The acceleration for the first 3 s **(2marks)**

ii The time where acceleration is constant. **(1.5marks)**

iii. The deceleration **(2marks)**

iv. The distance moved by the body during the first 3s. **(2marks)**