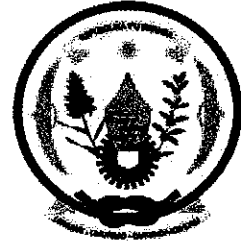


Physics I

011

01/11/ 2013 08.30am - 11.30am

REPUBLIC OF RWANDA



RWANDA EDUCATION BOARD

ORDINARY LEVEL NATIONAL EXAMINATIONS 2013

SUBJECT: PHYSICS I

DURATION: 3 HOURS

INSTRUCTIONS :

1. Do not open this question paper until you are told to do so.
2. This paper has **THREE** sections **A**, **B** and **C**:

SECTION A : This section is compulsory (55 marks)

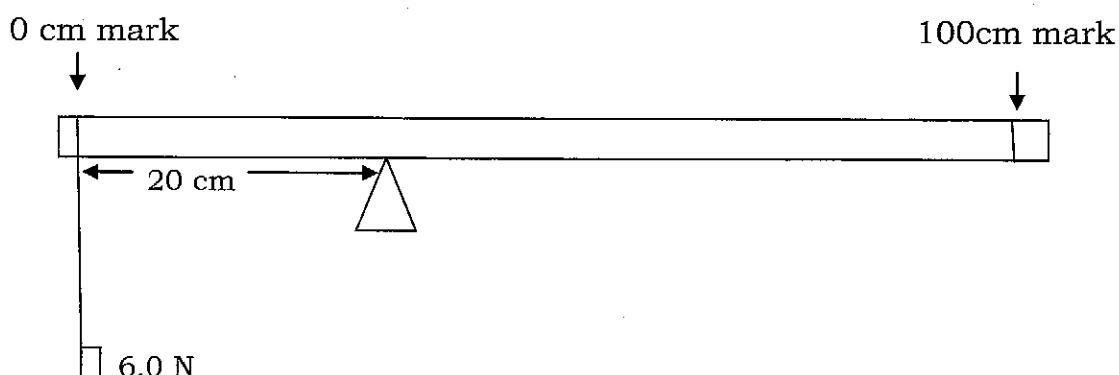
SECTION B : Attempt any **three** questions (30 marks)

SECTION C : Attempt **Only one** question. (15 marks)

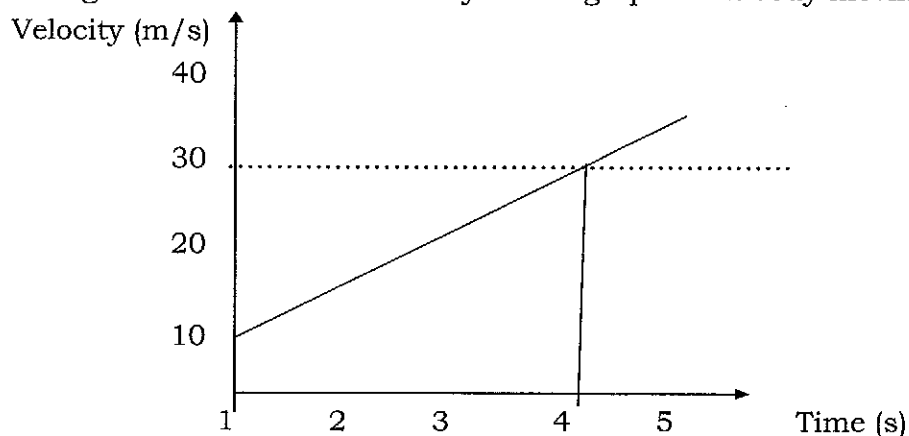
3. Calculators may be used.
4. Use only blue pen and pencil.

SECTION A : ATTEMPT ALL QUESTIONS (55 marks)

1. a) What is the instrument used to measure the density of milk called? **(1mark)**
 b) The density of salt is 2.16 g/cm^3 . What is the volume of 216 g of salt? **(2marks)**
2. The diagram below shows a uniform metre rule balanced horizontally when a force of 6.0 N is hang at 0 cm mark. Calculate the weight of the metre rule. **(3 marks)**

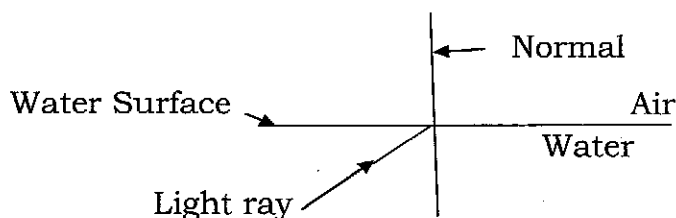


3. The figure below shows a velocity – time graph for a body moving with uniform cceleration.



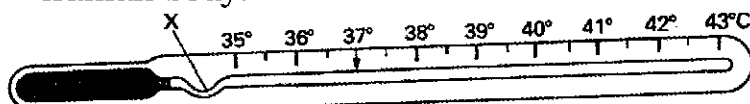
From the above graph:

- a) What is the initial velocity? **(1mark)**
- b) What is the distance moved in 5 seconds? **(2marks)**
4. The mass of a rectangular block of dimensions 5 m x 1 m x 2m is 50kg. What is the minimum pressure that it can exert? Given that 1kg exerts a force of 10N. **(3marks)**
5. a) Copy the diagram below and complete it to show the path of the ray of light travelling from water to air. Angle of incidence is greater than critical angle. **(2marks)**



- b) Why does the ray of light take the path you have shown ? **(1mark)**
6. a) What is a neutral point in a magnetic field ? **(2marks)**
 b) State any two methods of making a magnet in a laboratory. **(2marks)**
7. a) What is meant by specific latent heat of vaporization? **(1mark)**
 b) State two factors which affect the boiling point of water. **(2marks)**
 c) What is the heat needed to change 0.8 kg of water at 100°C to steam? **(2marks)**
 Specific latent heat of vaporization of water = $2.26 \times 10^6 \text{ J/kg}$.

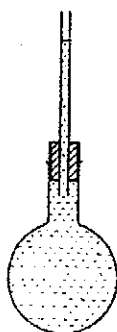
8. a) What is the difference between energy and power ? (2marks)
 b) What is the power of a water pump which can lift 100kg of water through a vertical height of 5m in 10s. Take $g = 10\text{m/s}^2$. (2marks)
 c) A ball is held 2m above the ground and then released. List the energy changes which occur. (1mark)
9. a) State two electrical charges. (2marks)
 b) A positively charged rod AB is suspended horizontally at its midpoint. One end of a positively charged rod is brought just below end A. State what happens to the end A of the rod AB? (1mark)
 c) A current of 3A flows for 5s, what charges passes ? (2marks)
10. Three cells are arranged in parallel and connected to a 2 ohms resistor.
 a) Draw a simple electric circuit to represent this arrangement. (2marks)
 b) If each cell has a potential of 1.5V, calculate the current in the circuit. (2marks)
 c) If one cell is removed from the circuit, is there any change in the current in the circuit? (1mark)
11. a) Name two types of curved mirrors. (2marks)
 b) State two uses of a convex mirror. (2marks)
12. A measuring cylinder is filled with a liquid.
 a) What does the pressure of the liquid at the bottom depend on ? (2marks)
 b) If the depth of the liquid is 0.3m and the pressure it exerts at the bottom is 3000 Pa, find the density of the liquid. $g = 10\text{m/s}^2$. (2marks)
13. Give an example to justify that air of the atmosphere exerts force. (4marks)
14. The diagram below shows a thermometer used to measure the temperature of human body.



- a) Name part X and state its function. (2marks)
 b) What happens when you place this thermometer under the tongue of a patient? (1mark)
 c) Why is the temperature range between 35°C – 43°C ? (1mark)

SECTION B : ATTEMPT ANY THREE QUESTIONS (30marks)

15. a) Name any two physical properties of matter which change with change of temperature. (2marks)
 b) Convert a temperature of 300 K to Celsius degrees, °C. (2marks)
 c) Explain what is meant by the term “unusual expansion of water”. (3marks)
 d) Liquids expand when heated. The diagram below shows a flask full of water fitted with glass tube.



- i. What happens when the flask is heated? (1mark)
- ii. What happens when you continue heating the water? (1mark)
- e) What effect does increase in pressure have on the melting point of ice? (1mark)
16. a) What are pulleys? (2marks)
- b) State two reasons why the efficiency of pulleys is always less than 100% (2marks)
- c) A pulley raises a load of sand of weight 300N using an effort of 60N.
What is the mechanical advantage of the system? (2marks)
- d) Efficiency of a machine is 80% and mechanical advantage is 4.
Find the velocity ratio. (2marks)
- e) A pulley raises a load 4cm when an effort used moves 12cm. What is the
velocity ratio? (2marks)
17. a) What is a lens? (2mark)
- b) State the properties of images formed in a converging lens when the
object is nearer the lens than the focal point. (3marks)
- c) Give any two applications of a converging lens. (2marks)
- d) What are the characteristics of the images in a diverging lens? (3marks)
18. a) State Ohms' Law. (2marks)
- b) What voltage is needed to drive a current of 2.5A through a resistance of 2? (2marks)
- c) A voltmeter is connected in parallel in an electric circuit and an ammeter
is connected in series in a circuit. Why? (4marks)
- d) i. What does the symbol below represent in an electric circuit?
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- ii. State the function of the symbol in d) i. (2marks)
19. a) Dry wood of weight 20N floats on water. What is the weight of the liquid
displaced by the wood? (1mark)
- b) State Archimedes' principle. (2marks)
- c) A body weighs 24 N in air and when wholly immersed in water it weighs 12N.
What is the relative density of the body? (2marks)
- d) A Ship is made of iron and some other materials but it does not sink
into water. Why? (3marks)
- e) A balloon filled with some amount of a light gas when released, rises into
air. At some point it stops rising and drifts sideways. Explain why the
balloon rises and then stops rising. (2marks)

SECTION C : ANSWER ONE QUESTION ONLY (15marks)

20. a) List eight basic laboratory rules which ensure safety of pupils and the
materials in the laboratory. (8marks)
- b) List any seven careers in which Physics is necessary. (7marks)
21. List five important ways in which science is useful in each of the cases below.
- a) Industries. (5marks)
- b) Work places (5marks)
- c) Our lives . (5marks)