

Physics I

010

03 Nov.2011 8.30am - 11.30 am

REPUBLIC OF RWANDA



RWANDA EDUCATION BOARD (REB)
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ORDINARY LEVEL NATIONAL EXAMINATIONS 2011

SUBJECT : PHYSICS I

DURATION : 3 HOURS

INSTRUCTIONS:

This paper consists of **three** sections **A**, **B** and **C**.

Attempt **all** questions in section **A**. **(55 marks)**

Answer **any Three** questions in section **B**. **(30 marks)**

Answer **only one** question in section **C**. **(15 marks)**

You may use a calculator and a mathematical instrument.

SECTION A. ATTEMPT ALL QUESTIONS IN THIS SECTION (55 marks)

- 1.(a) What is meant by the term resistivity? (2 marks)
(b) Write an equation for resistivity of a resistor. (1 marks)
- 2.State effects of electric current and give an example of each effect. (4 marks)
3. Draw a labelled diagram of a periscope and use light rays to explain how it functions. (4 marks)
4. What is the difference between a vector quantity and a scalar quantity. Give an example of each quantity. (4 marks)
5. (a) Sketch a distance – time graph showing
(i) a motion of a body moving with uniform velocity. (2 mark)
(ii) a body moving with non-uniform velocity. (2 mark)
(b) A car starts from rest and is accelerated uniformly at the rate of 3 m.s^{-2} for 8s. Find the distance travelled. (2 marks)
6. (a) Explain the term induced magnetism. (2 marks)
(b) Mention one method of demagnetising a magnet. (1 mark)
7. Why is a tall person more likely to fall down while climbing a mountain? (4 marks)
8. Identify the interchange of energy between potential energy and kinetic energy for a swinging pendulum bob. (3 marks)
9. (a) Friction is useful in our daily lives. Mention two examples to justify this statement. (2 marks)
(b) What causes friction and how can it be prevented? (2 marks)
10. What do you understand by each of the following terms:
(a) angular velocity. (1 mark)
(b) a period of swinging pendulum bob. (1 mark)
(c) frequency of a swing pendulum bob. (1 mark)
- 11.(a) State factors influencing pressure in a liquid at a point in a liquid in equilibrium. (2 marks)
(b) with the aid of a diagram show that water finds its own level. (2 marks)
12. (a) A load 600N is raised 0.3 m by a machine. If the effort applied is 200 N and it moves 1.0 m, find the efficiency of the machine. (2 marks)
(b). Why is the efficiency of a machine not a hundred percent. (2 marks)
13. Why does an iron left outside at night feel colder than a piece of dry wood? (4 marks)

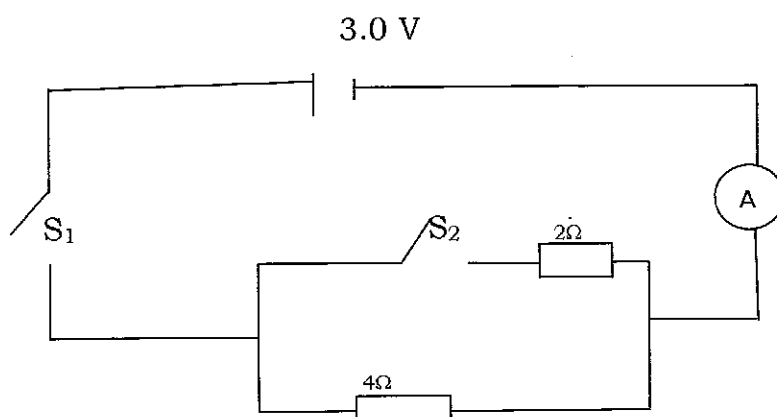
14. In the electric circuit below, what will be the reading of the ammeter if S_2 is:

(a) open and S_1 closed ?

(2 marks)

(b) closed and S_1 closed ?

(3marks)



SECTION B : ANSWER ONLY THREE QUESTIONS. (30marks)

15 (a) What is meant by the term real image as applied to optics .

(2 marks)

(b) Distinguish between a concave mirror and a convex mirror.
Give one application of each type of mirror.

(3 marks)

(c) An object is placed vertically at the centre of curvature of a concave mirror.

(i) Use rays and draw a diagram to show how the image of this object is formed.

(3 marks)

(ii) State the characteristics of this image.

(2 marks)

16. (a) What effect does increase in pressure have on the melting point of ice?

(2 marks)

(b) State two physical properties of water which change with temperature.

(2 marks)

(c) How much heat is needed to raise the temperature of a body with mass 4 kg by 8°C ? The specific heat capacity of the body is 300J/kgK .

(2 marks)

(d) Find the amount of heat required to melt 100g of lead initially at 25°C if the melting point of lead is 327°C . Specific heat capacity

of lead is 140J/kgK . Specific latent heat of fusion of lead is $2.7 \times 10^5 \text{ J/kg}$.

(4 marks)

- 17.(a) Describe how you would use a gold leaf electroscope to determine the sign of the charges on a given charged body. **(4 marks)**
(b) Explain how an insulator gets charged. **(2 marks)**
(c) Describe how a lightning conductor safeguards a tall building from being struck by lightning. **(4 marks)**
18. (a) What is inertia ? **(2 marks)**
(b) With aid of a diagram explain how you can demonstrate inertia effect. **(4 marks)**
(c) State Newton's second law of motion. **(1 mark)**
(d) A block of mass 5000 g is pulled from rest on a horizontal frictionless surface by a constant force F . If the block travels 8 m in 2 s , find
(i) acceleration. **(1.5 marks)**
(ii) force F . **(1.5 marks)**
19. (a) Differentiate between primary cells and secondary cells. **(2 marks)**
(b) What are the components of a simple direct current electric motor ? **(3 marks)**
(c) Explain the term back e.m.f (electromotive force) of battery? **(2 marks)**
(d) What is the difference between a practical d.c motor and a simple d.c motor ? **(3 marks)**

SECTION C: Answer one question in this section

(15 marks)

20. Describe how you can verify the law of refraction of light (SNELL'S LAW) using the following apparatus : rectangular glass block, optical pins, plane paper, drawing pins, a ruler and a protractor. Illustrate your methods with aid of a diagram and show how you come to the conclusion. **(15 marks)**
21. Describe how you can determine the density of an irregular stone using the following apparatus: Eureka can, water, a small irregular stone, a thread, beam balance, measuring cylinder and a beaker. State sources of errors and all precautions you take to avoid errors in your experiment. **(15 marks)**