

535/2  
PHYSICS  
PAPER 2  
 $2\frac{1}{4}$  Hours



**MATIGO MOCK EXAMINATIONS**  
**UGANDA CERTIFICATE OF EDUCATION**  
**PHYSICS**  
**PAPER 2**  
**TIME: 2 HOURS 15 MINUTES**

**INSTRUCTIONS TO CANDIDATES:**

Answer any five questions.

These values of physical quantities may be useful to you.

- Acceleration due to gravity =  $10\text{ms}^{-2}$
- Specific heat capacity of water =  $4200\text{Jkg}^{-1}\text{K}^{-1}$
- Specific latent heat vapourisation of water =  $3.36 \times 10^5\text{Jkg}^{-1}$

1. (a) Define

- (i) Momentum (1mark)
- (ii) Inertia of a body (1mark)

(b) Explain why a passenger in a fast moving car jerks forwards when brakes are applied (4marks)

(c) Describe a simple experiment to locate the centre of gravity of an irregular piece of cardboard. (6marks)

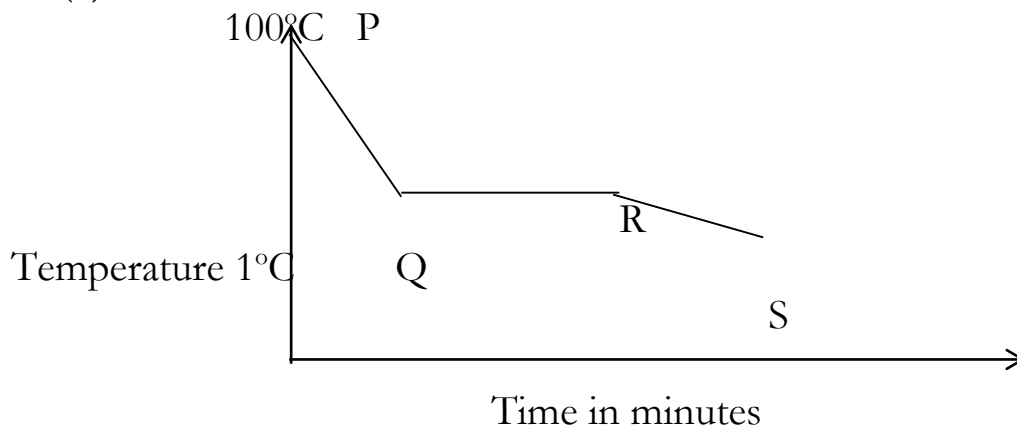
(d) A 5 – tonne truck initially moving at a velocity of  $20\text{ms}^{-1}$  accelerates to  $50\text{ms}^{-1}$  in 3 seconds. Calculate the force on the truck that caused the velocity change. (4marks)

2. (a) Explain the following terms as applied to a thin converging lens.
- (i) principal focus
  - (ii) focal length
  - (iii) power. (3 marks)
- (b) With the aid of a diagram, explain briefly how a pure spectrum may be produced.
- (c) (i) What are primary colours? List them (2 marks)
- (ii) Explain the appearance of a white cloth with blue stripes in a yellow light (3 marks)
- (d) Light of the same wavelength is incident from air on glass of refractive index 1.50. If the angle of incidence is  $60^\circ$ , find the angle of refraction (2 marks)
3. (a) (i) Define the terms strut and tie (2 marks)
- (ii) Explain why the lower part of the second floor of a building is made of reinforced concrete while the upper part is not reinforced. (3 marks)
- (b) (i) State Archimedes' principle and the law of floatation (2 marks)
- (ii) when a metal is completely immersed in a liquid P, its apparent weight is 20N. When it is immersed in another liquid Q, the apparent weight is 16N. If the density of Q is  $\frac{9}{8}$  times that of A. Calculate the mass of the metal (4 marks)
- (c) (i) What is meant by the terms surface tension and diffusion (2 marks)
- (ii) State three ways by which surface tension can be reduced (3 marks)

4. (a) Define the term specific latent heat of fusion

(2 marks)

(b)



The figure above shows a cooling curve for a substance which is in liquid form at 100°C.

(i) In what states is the substance over the regions PQ, QR and RS of the curve?

(3 marks)

(ii) Use the kinetic theory of matter to explain the difference between the states of the substance over the regions PQ and RS

(2 marks)

(c) (i) What is meant by a saturated vapour and boiling point?

(ii) Explain why the boiling point of a liquid depends on altitude.

(2 marks)

(d) A copper container of heat capacity  $60 \text{ J kg}^{-1}$  contains 0.5kg of water at 20°C. Dry steam is passed into the water until the temperature of the container and water reaches 50°C. Calculate the mass of steam condensed.

(5 marks)

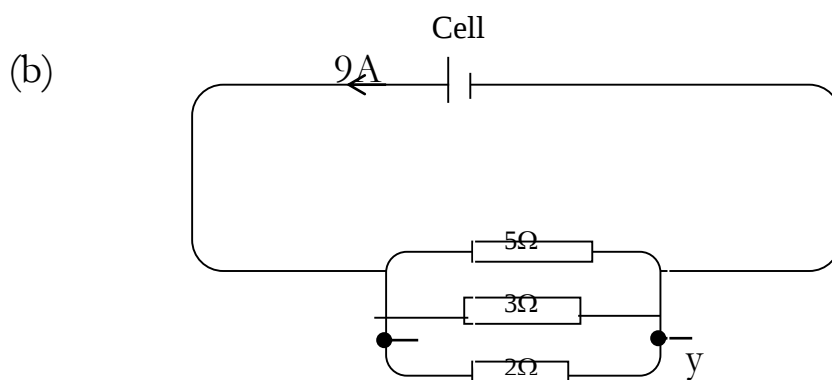
5. (a) Sketch the current versus p.d variation for a

(i) metal wire

(1mark)

(ii) semi-conductor diode

(2marks)



The figure above shows a battery of negligible internal resistance connected to a system of resistors.

Calculate:

- (i) e.m.f of the battery (3marks)
- (ii) the current through the  $3\Omega$  resistor (3mark)
- (iii) power dissipated in the  $3\Omega$  resistor (4marks)
- (iv) Describe the energy changes which occur from the time an electric bulb is switched on. (3marks)

6. (a) What is meant by the terms

- (i) isotopes (1mark)
- (ii) atomic number? (1mark)

(b) (i) Name and state the nature of the emissions from radioactive nuclides. (5marks)

(ii) What effect does each of the emission have on the parent nuclide. (3mark)

(c) A radioactive sample has a half-life of  $3 \times 10^3$  years.

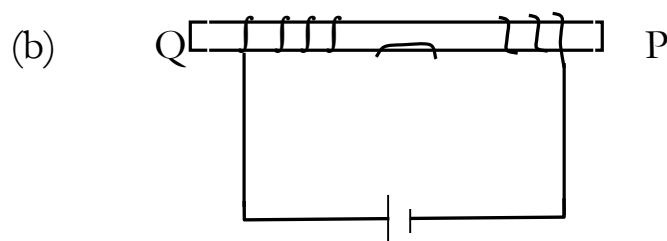
(i) What does the statement: half-life of  $3 \times 10^3$  years mean? (1mark)

(ii) How long does it take for three-quarters of the sample to decay? (3marks)

(d) Give two uses of radioactivity. (2marks)

7. (a) (i) Describe an experiment to distinguish between soft and hard magnetic materials. (5marks)

(ii) State one instance in which each of these materials is used (2marks)

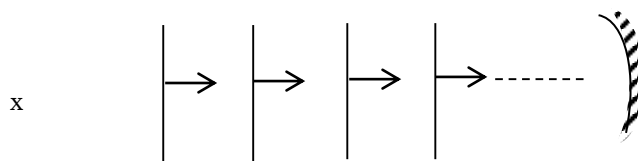


The figure above shows how a magnetic material can be magnetised by the electrical method.

- (i) Indicate the direction of current in the coil (1mark)
  - (ii) Name the polarities P and Q (2mark)
- (c) Describe how you can determine the polarity of a magnet. (3marks)

8. (a) List three differences between sound waves and radio waves (3marks)

(b) The figure below shows waves propagating towards a concave reflector.



Concave reflector

- (i) Draw a diagram to show how the waves will be reflected. (3marks)
  - (ii) If the velocity of the waves is  $320\text{ms}^{-1}$  and the distance between two successive crests is 10cm, find the period of the waves. (4marks)
- (c) Describe a simple echo method of determining the speed of sound in air. (6marks)

END