

535/1
PHYSICS
Paper 2
JUNE 2022

$2\frac{1}{4}$ hours



(MEPSA) RESOURCEFUL ASSESSMENT 2022

Uganda certificate of education

MOCK EXAMINATIONS

PHYSICS

Paper 2

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES

Attempt **any five** questions.

These values of physical quantities may be useful to you.

Acceleration due to gravity, g $= 10 \text{ ms}^{-2}$

Speed of sound in air $= 340 \text{ ms}^{-1}$

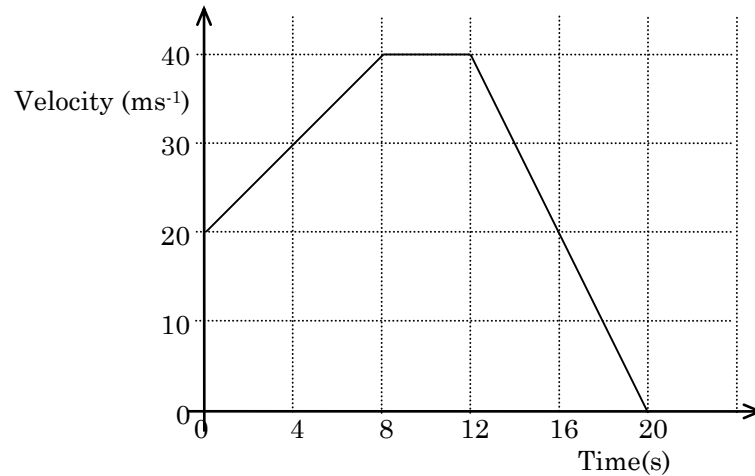
Specific heat capacity of ice $= 2,100 \text{ Jkg}^{-1} \text{ K}^{-1}$

Specific latent heat of ice $= 3.36 \times 10^5 \text{ Jkg}^{-1}$

Specific heat capacity of water $= 4.2 \times 10^3 \text{ Jkg}^{-1} \text{ K}^{-1}$

Turn Over

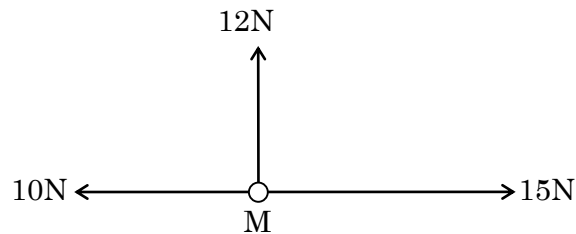
1. (a) (i) Distinguish between scalar and vector quantities. (02mrks)
(ii) Give one example of a vector and one example of a scalar quantity. (01mrk)
- (b)



The graph represents a velocity – time graph of a body in motion.

- (i) Describe the motion of the body (04mrks)
(ii) Calculate the total distance travelled. (03mrks)

(c)



Forces of 10N, 12N and 15N act on a body of mass of M of mass 4kg, initially at rest. Find the magnitude of the acceleration with which the body moves. (06mrks)

2. (a)(i) State the factors which determine the pressure acting on the surface of a solid. (02mrks)
(ii) Explain why it is easy to cut meat using the sharp end of the knife than the blunt end. (03mrks)
- (b) A hole of area $2.0 \times 10^{-4} \text{ m}^2$ at the bottom of a tank 2.0 m deep is closed with a cork. Determine the force on the cork when the tank is filled with water. (04mrks)
- (c) Define the following terms as applied to machines:
(i) velocity ratio. (01mrk)
(ii) efficiency. (01mrk)
- (d) In a hydraulic jack, the effort piston has an area of $2.83 \times 10^{-3} \text{ m}^2$ while the load piston is of area $4.52 \times 10^{-2} \text{ m}^2$. If an effort of 80N is applied,
(i) Determine the load raised. (03mrks)

- (ii) Explain why gases are not used in the transmission of pressure in machines (02mrks)

3. (a) Define the following as used in waves;

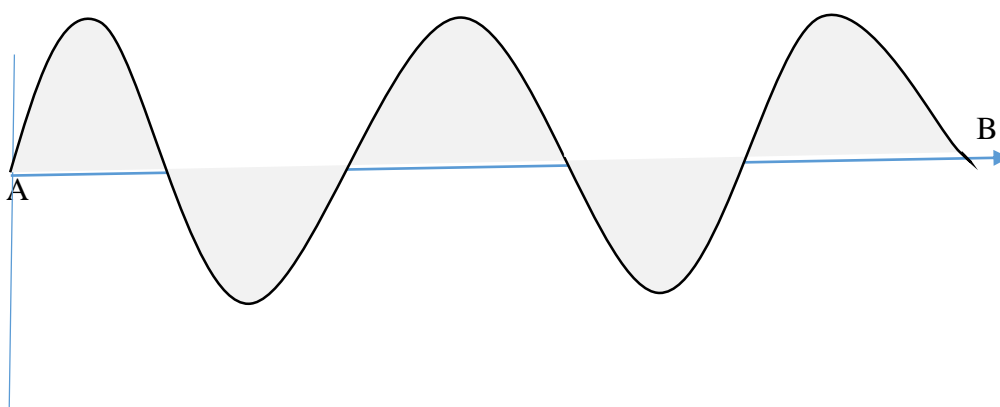
- (i) wave length (01mrk)
 (ii) Amplitude (01mrk)
 (iii) Period (01mrk)

(b) (i) Derive the relationship between velocity V , frequency f and the wave length λ . (03mrks)

(ii) With the aid of a diagram describe how circular waves are reflected from a straight barrier. (02mrks)

(c) Describe an experiment to verify that sound does not travel through a vacuum. (04mrks)

(d) The diagram below shows a transverse wave moving from point A to B in 10s.



- (i) How many oscillations are in the wave form above? (01mk)
 (ii) If the speed of the wave is 20ms^{-1} , find the wave length of the wave. (03mrks)

4. (a). State the laws of reflection of light. (02mrks)

(b) (i). Distinguish between regular and diffuse reflection. (02mrks)

(ii) Give two applications of total internal reflection (02mrks)

(c). Describe a simple experiment to determine the refractive index of a glass block. (05mrks)

(d) An object of height 4cm is placed perpendicularly on the principal axis at a distance of 45cm from a converging lens of focal length 15cm. By graphical scale drawing, determine;

- (i) the position of the image.
 (ii) the magnification. (05mrks)

5. (a) Define heat, fundamental interval and thermometric property. (03mrks)

(b)(i) State any four thermometric properties. (02mrks)

(ii) Convert the following 167K to $^{\circ}\text{C}$ and 143°C to kelvin. (02mrks)

(c) When marking the fixed points on a thermometer, it is observed that at 0°C the mercury thread is of length 1cm and 6cm at 100°C from the bulb. What temperature would correspond to a length of 4cm above the bulb (02mrks)

(d) Explain what is meant by Convection and Sea breeze (04mrks)

- (e) Draw a well labelled vacuum flask and state how it's able to minimize heat losses. (03mrks)
6. (a) (i) Distinguish between soft and hard magnetic materials, and give one example of each (04mrks)
- (ii) State the law of magnetism (01mrk)
- (b) (i) What is meant by the term magnetization (01mrk)
- (ii) Describe with the aid of a diagram the electrical method of magnetization (05mrks)
- (c) (i) What is meant by the terms angle of dip and angle of variation (02mrks)
- (ii) State the ways of locating magnetic field of a bar magnet (01mrk)
- (iii) Sketch Magnetic field pattern for two bar magnets with North poles facing each other (02mrks)
- 7.a) Distinguish between specific heat capacity and specific latent heat of fusion. (02marks)
- b) i) Describe an experiment to determine specific heat capacity of a liquid by method of mixtures. (03marks)
- ii) A copper solid of mass 200g at 60°C is quickly transferred into water of mass 300g at 25°C contained in a beaker. The mixture is stirred well until a final maximum temperature θ is attained. Find the value of θ in °C. (04marks)
- c) With the aid of a well labeled diagram, briefly explain the application of bimetallic strip in fire alarms. (04marks)
- d) Give two thermometric properties. (01mark)
8. a) i) Define the term cathode rays. (01mark)
- ii) Give three uses of radioactivity. (03marks)
- b) With the aid of a well labeled diagram of a cathode ray tube, describe the production of cathode rays. (04marks)
- c) Give two uses of a C.R.O. (02marks)
- d) i) How many neutrons are released by the following nuclear reaction? (2marks)
- $${}_{92}^{235}\text{U} + {}_0^1\text{n} \longrightarrow {}_{57}^{148}\text{La} + {}_{z}^{85}\text{X} + \text{neutrons}$$
- ii) What is the value of z? (01mark)
- e) Give three differences between alpha particles and gamma rays. (03marks)

END