535/2
PHYSICS
Paper 2
Nov, 2020
2¼ Hours

ST. MARYS' KITENDE

Uganda Certificate of Education

RESOURCEFUL MOCK EXAMINATION 2020

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 ms^{-2}*
- *Speed of sound in air = 340 ms^{-1}*
- *Specific heat capacity of ice = 2,100 Jkg^{-1} K^{-1}*
- *Specific latent heat of ice = 3.36 x 10^5 Jkg^{-1}*
- *Specific heat capacity of water = 4.2 X 10^3 Jkg^{-1} K^{-1}*

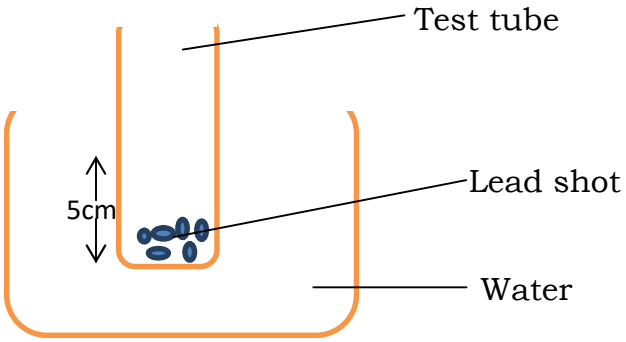
1.a) State;

i) Archimedes Principle (1mark)

ii) Law of Floatation (1mark)

b) Briefly explain the Buoyance of sub marine in the sea water. (4marks)

c) A test tube of mass 5g, length 10cm and a uniform cross sectional area 2cm^2 is partly filled with lea shot and floats vertically in water with 5cm of its length submerged as shown in the figure below.



Calculate;

i) the volume of water displaced. (2marks)

ii) the combined mass of the test tube and lead shot. (3marks)

iii) the mass of the lead shot. (2marks)

d) Explain why a spinning ball takes a curved path in air. (3marks)

2. a) Define the following terms;

i) centre of gravity. (1mark)

ii) Moment of a force (1mark)

b) Describe a simple experiment to locate the Centre of Gravity of an irregular laminar of a metal using a straight edge. (3marks)

c) A uniform wooden lath 100cm long and a mass 95g is balanced on a knife edge when a 5g mass is hung 10cm from one end. How far is the knife edge from the centre of gravity of the lath? (4marks)

d) i) Explain what happens to a plastic bottle when the air inside it is gradually removed. (3marks)

ii) Why is it dangerous to stay longer deep in the waters for a long period of time? (4marks)

3. a) Distinguish between specific heat capacity and specific latent heat of fusion. (2marks)

b) i) Describe an experiment to determine specific heat capacity of a liquid by method of mixtures. (3marks)

ii) A copper solid of mass 200g at 60^0C is quickly transferred into water of mass 300g at 25^0 contained in a beaker. The mixture is stirred well until a final maximum temperature θ is attained. Find the value of θ in ^{0}C. (4marks)

c) With the aid of a well labeled diagram, briefly explain the application of bimetallic strip in fire alarms. (4marks)

d) Give two thermometric properties. (1mark)

4. a) i) State the law of magnetism. (1mark)

ii) Describe how a steel bar and be magnetized electrically. (4marks)

b) i) Draw the magnetic field pattern due to a circular coil. (2marks)

ii) With the aid of a well labeled diagram, describe the operation of a magnetic relay. (5marks)

iii) Give two applications of a magnetic relay. (1mark)

c) A galvanometer has a resistance of 20Ω and gives a full scale deflection for a current of 0.20A. Find the value of the resistor which must be connected parallel with the galvanometer for it to read up to 1.0A? (3marks)

5. a) i) State the Law of electrostatics. (1mark)
ii) Describe how a lightning conductor safeguards building from lightning. (5marks)
b) i) Sketch an electric field pattern for an isolated positive charge. (2marks)
ii) Draw a well labeled diagram of a dry cell and state the functions of the main parts. (4marks)

c) A cell of e.m.f of 12V, internal resistance 1Ω is connected in series to a 3Ω resistor. Find; i) the current which flows through the circuit. (2marks)
ii) the potential difference across the 3Ω resistor. (2marks)

6. a) Define the term luminous source of light and give two examples of luminous sources of light. (2marks)

b) State what happens to brightness and size of the image formed in a pin hole camera if;
i) the object is moved away from the pinhole of this camera. (2marks)
ii) pinhole is enlarged. (2marks)

c) Describe an experiment to verify that the angle of incidence of light is equal to the angle of reflection of light by use of a plane mirror, soft board, optical pins, plain sheet of paper and geometry set. (5marks)

d) An object 1.5cm high stands upright on the axis of a converging lens of focal length 4.0cm. If the object is 3.0cm from the lens, use graphical construction to determine; i) the position of the image
ii) the height of the image
iii) nature of the image (5marks)

7. a) i) Distinguish between transverse waves and longitudinal waves. (2marks)
ii) Derive the relationship between velocity of a wave, its frequency and its wavelength. (3marks)

b) The time keeper of a 110m race stands near the finishing tape and starts his stop watch on hearing the bang from the starting pistol.
i) When should he have started his stop watch? (1mark)
ii) Give a reason for your answer to (b)i above . (2marks)
iii) Calculate the error in his timing assuming he makes no further errors. (3marks)

c) i) Describe an experiment to determine the wave length of sound waves by use of a resonance tube. (4marks)
ii) List two applications of ultrasonics. (1mark)

8. a) i) Define the term cathode rays. (1mark)
ii) Give three uses of radioactivity. (3marks)

b) With the aid of a well labeled diagram of a cathode ray tube, describe the production of cathode rays. (4marks)

c) Give two uses of a C.R.O. (2marks)

d) i) How many neutrons are released by the following nuclear reaction? (2marks)

$$^{235}_{92}U + {}^{1}_{0}n \longrightarrow {}^{148}_{57}La + {}^{85}_{z}X + neutrons$$

ii) What is the value of z? (1mark)

e) Give three differences between alpha particles and gamma rays. (3marks)

END