535/2
PHYSICS
Paper 2
July/ August 2022

2hours 15minutes

KAMSSA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education
PHYSICS

Paper 2

2hours 15minutes

INSTRUCTIONS TO CANDIDATES

- Answer **any five** questions.
- Any additional question(s) answered will **not** be marked.
- Mathematical tables and silent non programmable calculators may be used.
- These values of physical quantities may be useful to you.
- Acceleration due to gravity = $10ms^{-2}$
- Specific heat capacity of water = $4200JKg^{-1}K^{-1}$
- Specific heat capacity of copper = $400Jkg^{-1}K^{-1}$
- Specific latent heat of fusion of ice = $3.4 \times 105Jkg^{-1}$
- Speed of sound in air = $330ms^{-2}$
- Velocity of electromagnetic wave = $3.0 \times 108ms^{-1}$

 Turn Over

1. (a)(i)State the **three** states of matter. **(01 ½ marks)**

(ii)Describe an experiment to determine the size of oil molecule. **(04 marks)**

(b)(i)Distinguish between **adhesion** and **cohesion** **(02 marks)**

(ii)Explain briefly how you can prove that the surface of a liquid behaves like a stretched skin. **(03 marks)**

(c) An oil drop of volume $0.01cm^3$ is allowed to fall on some clean water dish and it spreads to form a circular water dish of radius 14cm.

(i)Estimate the maximum value of the diameter of an oil molecule. **(03 ½ marks)**

(ii) State **two** assumptions made in your calculations. **(02 marks)**

2(a).Define the following terms

(i)**Critical angle**. **(01mark)**

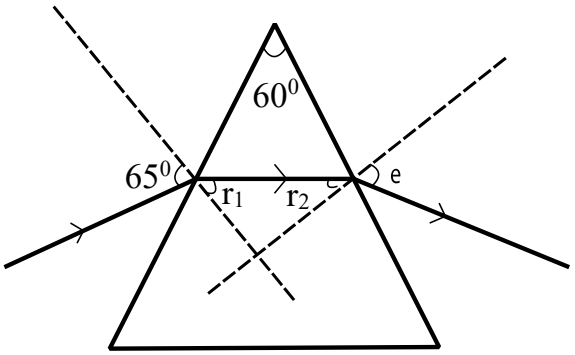
(ii)**Total internal reflection**. **(01mark)**

(b)(i)What is meant by **refractive index** of a material? **(01mark)**

(ii)Describe an experiment to measure refractive index of water. **(05marks)**

(c)The diagram bellow shows a ray of yellow light incident at an angle of 65° on one side of an equilateral triangular prism of refractive index 1.52

(ii)State and explain what would be observed if the ray above were of white light. **(04marks)**



3. (a) State the difference between **light** and **sound waves**. **(02 marks)**

(b)(i) State **two** applications of ultrasonic light. **(02 marks)**

(ii)The distance between two successive antinodes on a wave is 3.0cm and between the source and reflector is 24.0cm. Find the number of loops? **(02marks)**

(c)(i) Find the length if the air column of the frequency of the fourth harmonic of a closed pipe is 280Hz and speed of sound in air is $330ms^{-1}$. **(03marks)**

(ii)Describe how to measure the velocity of sound in air by resonance tube. **(05marks)**

(d) Draw a diagram to show diffraction of waves through a wide opening**.** **(02 marks)**

4 (a) (i)Describe how **a step down transformer** works. **(04 marks)**

(ii) state **two** energy losses in a transformer. **(02 marks)**

(b) The set up below is used to study magnetic properties of steel.

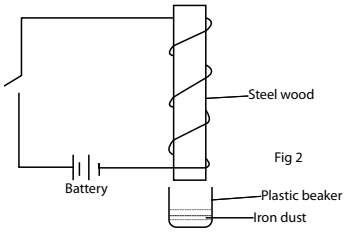


Fig 2

State what was observed when the switch is closed and then opened after sometime, hence explain the observation made. **(05 marks)**

(c) A milliammeter of resistance 20.0Ω, is used to measure a current of 2A . If its full scale deflection is 15mA. Calculate its resistance needed for the system to measure a current of 2A. **(04 marks)**

(d) State two uses of a gold leaf electroscope. **(01 mark)**

5. (a) Define the following terms.

i. Centre of gravity

ii. **Moment of a force**. **(02 marks)**

(b) Describe a simple experiment to locate the center of gravity of an irregular laminar of a metal using a straight edge. **(04 marks)**

(c) A uniform wooden lath 100cm long and a mass of 95g is balanced on a knife edge when a mass of 5g is hang 10cm from one end. How far from the Centre of gravity if the lath? **(04 marks)**

(e) (i) Explain what happens to a plastic bottle when the air inside it is gradually removed. **(03 marks)**

(ii) Why is it dangerous to stay longer deep in water for a long period of time. **(03 marks)**

6. (a)(i) Distinguish between the **lower** and **upper fixed point of temperature**. **(02 marks)**

(ii) Name **four** examples of thermometric properties. **(02 marks)**

(b) With the aid of s well labeled diagram, describe the operation of a fire alarm which uses a biometric strip. **(03 marks)**

(c) (i) State **Charles' law**. **(01 mark)**

(ii) A gas of volume $2cm^3$at 27^0c is cooled to -123^0c at constant pressure. What is its new volume? **(03 marks)**

(d)(i) What is meant by **heat capacity of a substance**? **(01 mark)**

(ii) Calculate the amount of heat needed to raise the temperature of a metal of mass 5kg through 10^0c if the specific heat capacity of the metal is $430JKg^{-1}k^{-1}$. **(02 marks)**

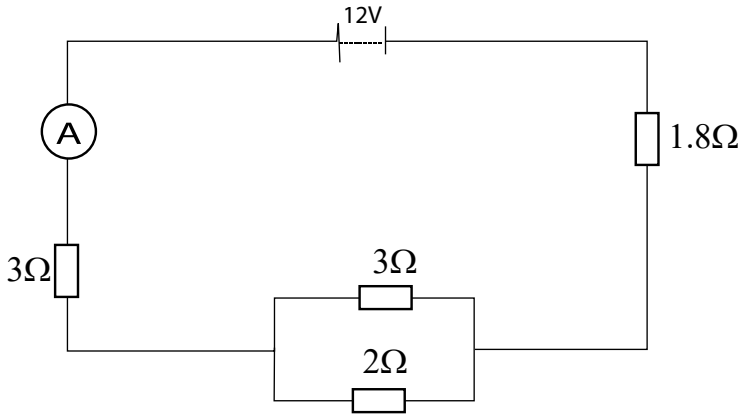
(iii) Give **two** reasons why water is used in cooling systems of a car engine. **(02 marks)**

7. (a)(i) Draw a diagram to show the structure of a simple cell. **(02 marks)**

(ii) Polarization is one of the defects of a simple cell. Explain how it is minimized. **(02marks)**

(b) Using a suitable circuit diagram, explain how a lead acid accumulator can be recharged when it runs down. **(04 marks)**

(c)



Four resistors of 3Ω, 3Ω, 2Ω, and 1.8Ω connected across a 12v battery of negligible internal resistance as shown in the figure 3 above. Determine;

i. The reading of the ammeter A. **(04 marks)**

ii. The pd across the parallel combination of resistors. **(02 marks)**

(d) State **faradays** and **lenz's laws** of electromagnetic induction. **(02 marks)**

8 . (a) What is meant by the terms:

i. isotopes

ii. Atomic number **(02 marks)**

(b)(i) Name and state the nature of the emissions from radioactive nuclides. **(05 marks)**

(ii) What effect does each of the emission have on the parent nuclide. **(03 marks)**

(c) A radioactive sample has a half life of $3x10^3$ years

(i) What does the statement; **half life of $3x10^3$ years mean**? **(01 marks)**

(ii) How long does it take for the **three quarters** of the sample to decay. **(03 marks)**

(d) Give **two** uses of radioactivity. **(02 marks)**

END