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 latent heat of fusion of ice = $3.4 \times 10^5 Jkg^{-1}$
- Speed of sound in air = $330ms^{-2}$
- Velocity of electromagnetic wave = $3.0 \times 10^8 ms^{-1}$
- Melting point of Naphthalene = 80^0C
- Specific heat capacity of Naphthalene = $2100 JKg^{-1}K^{-1}$
- Specific latent heat of fusion of Naphthalene = $170000 Jkg^{-1}$
- Specific heat capacity of Aluminium = $900 JKg^{-1}K^{-1}$

1. i) Define the term **viscosity.** **(01 mark)**
   ii) Differentiate between **streamline** and **turbulent flow.** **(02 marks)**

   b) A steal ball of diameter 0.5cm and density 7,800kgm^{-3} is dropped centrally in a tall cylinder containing engine oil of density 980kgm^{-3}.
   i) Describe the motion of the steel ball. **(03 marks**
   ii) Calculate the viscous drag on the ball. **(04 marks**
   iii) What change will occur in the motion of the ball if the oil was replaced by another liquid of lower density? **(04 marks)**

   c) Using the same axes, draw a sketch graph of velocity against time of the motion of the ball in b (i) and b (ii) above**. (02 marks)**

2. a). What is meant by **pressure**? **(01 mark)**

   b) With the aid of a diagram, explain how a force pump works. **(06 marks)**

   c) Explain the observation "racing bicycles need very high air pressure inside the tyres"

   (03 marks)

   d) Calculate pressure exerted on the ground by a box of mass 10kg when corresponding area of contact is 2m$^{2.}$ **(02 marks)**

   e) Derive a formula for pressure in liquids relating height, h, density, ρ, and acceleration due to gravity, g. **(04 marks)**

3. a). Distinguish between **latent heat of fusion** and **latent heat of vaporization**. **(02 marks)**

   b) With the aid of a labeled diagram, describe an experiment to determine the specific latent heat of fusion using electrical method. **(05 marks)**

   c). 0.5kg of naphthalene contained in an aluminum can of mass **0.4kg** is melted in a water bath and raised to a temperature of **100ºC.** Calculate the total heat given out when the can and its contents are allowed to cool to room temperature, **20ºC.** Neglect losses by evaporation during the heating process and give your answer to the nearest kilojoule**. (04 marks)**

   d). State what is meant by the **kinetic theory of matter**, and employ the theory to explain **cooling by evaporation**. **(04 marks)**

   e) Convert -**200 ^{0} c** to **kelvin**. **(01 mark)**

4. a) Define **refraction** as applied to light. **(04 marks)**
   b) State the **laws of refraction** of light**. (02 marks)**

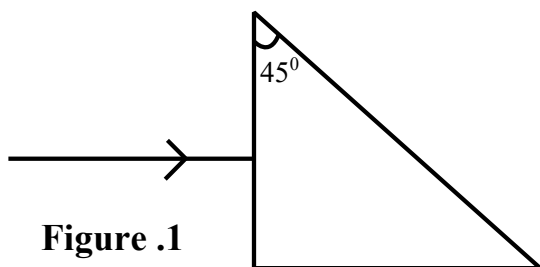c) The **figure 1** below shows the monochromatic light incident on a right-angled glass prism.

Figure .1

Copy and complete the paths of monochromatic light. **(02 marks)**

d) Describe an experiment to determine the refractive index of the material of a glass block using the real and apparent depth method. **(05 marks)**

e) With the aid of a ray diagram, state the condition under which a concave mirror can be used as a shaving mirror **(03 marks)**

f) Describe any one defect of the eye and state how it can be corrected. **(03 marks)**

5. .a) Define the following terms as applied to wave motion.
   i) **Frequency.** **(01 mark)**
   ii) **Wave length.** **(01mark)**

   b) State the factors which affect the frequency of vibrating string. **(03 marks)**

   c) **Figure 2** below shows the displancemt –time gragh of a wave travelling through water with a velocity of 2.5mms^{-1}
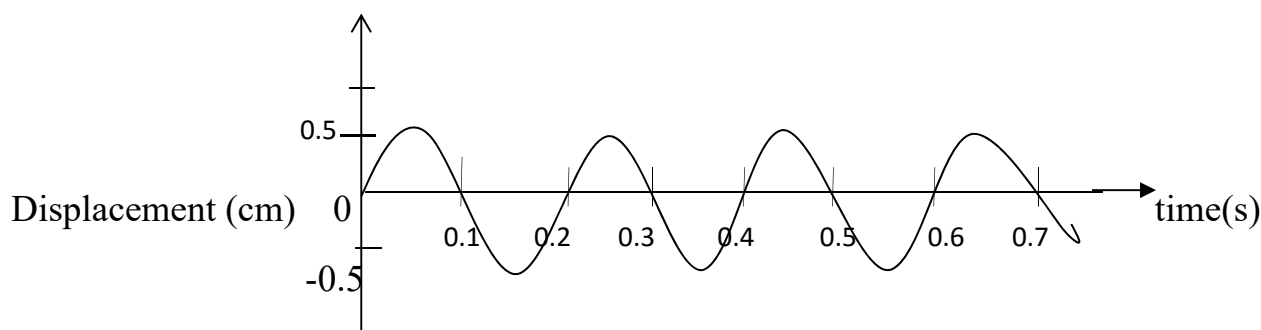

Fig 2

Find the; **(01mark)**

i. Amplitude
ii. Period **(01mark)**
iii. Wave length of the wave **(03marks)**

(d)i. Describe an experiment to determine the speed of sound in air using echo method **(03marks)**

(ii) An experimenter standing between two high walls produces sound by hitting two pieces

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of wood. If the first echo is heard after 3.5s and the second 2**s** later, find the distance between the walls **(03marks)**

6. a). Define the following terms.
   (i) **Electromotive force.**
   (ii) **Volt.** **(02marks)**

   (b)An electric lamp is rated 12**V**, 24**W**.
   (i)Explain what is meant by the above statement. **(01mark)**
   (ii) How much current does the lamp draw when connected across a 12**V** supply. **(02marks)**

   (c) With the aid of labeled diagram, describe how a **loud speaker** works. **(06marks)**

   (d) State **three** advantages of an alternating current over direct current in power transmission. **(03marks)**

   (e) List **two** ways in which the life of an accumulator can be prolonged. **(02marks)**

7. a) Distinguish between **angle of inclination** and **angle of declination.** **(02marks)**

   b) Explain why the magnetic field lines of the earth moves from south to north. **(03marks)**
   ii) Sketch the magnetic field pattern around a bar magnet with its South Pole pointing north in the earth's field. **(02 marks)**

   c.i) Describe the operation of a **moving coil galvanometer**. **(05 marks)**
   ii) State **two** ways by which the sensitivity of a moving coil galvanometer can be increased. **(02 marks)**

   d) **Three** resistors of 2 Ω, 3 Ω and 4Ω are connected in the circuit to give minimum resistance. Find the minimum resistance**. (02 marks)**

8. a) What are **X-rays?** **(01 mark)**

   b) i) Draw a labeled diagram to show the essential features of an x-ray tube. **(03 marks)**
   ii) Explain how x- rays are produced? **(03 marks)**
   iii) Give **two** similarities between **x- rays** and **gamma rays**. **(02 marks)**

   c) A radioactive nuclide $^{235}_{92}A$ decays by emission of two alpha particles. The resulting nuclide emits three beta particles resulting into a nuclide, **Y** which emits gamma rays. Determine the **mass number** and **atomic number** of the resulting nuclide. **(03 marks)**

   d) Define the following,
   i) **Nuclear fission**
   ii) **Nuclear fusion.** **(02 marks)**
    e) Give **two** uses of nuclear energy. **(2 marks)**
END