WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

PHYSICS

Paper 2

2hours 15 minutes

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, g	=	$10ms^{-2}$
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	=	$3.36 \times 10^5 Jkg^{-1}$
Density of water	=	$1000kgm^{-3}$
Density of Mercury	=	$13,600kgm^{-3}$
Speed of sound in air	=	$340ms^{-1}$
Velocity of electromagnetic waves	=	$3 \times 10^8 ms^{-1}$

Turn Over

1. (a) Define the following as applied to motion;
   (i) **Uniform velocity.** (01 mark)
   (ii) **Length of the pendulum.** (01 mark)

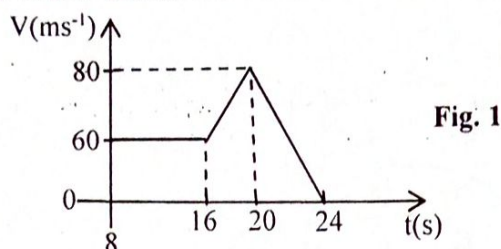   (b) Figure 1 below shows the variation of velocity with time of the car.

   Fig. 1

   (i) Describe the motion of the car. (03 marks)
   (ii) Calculate the distance covered between 16th and 24th second. (03 marks)

   (c) A body of known mass is acted upon by forces of; 3N, 8N and 4N as shown in figure 2(i).
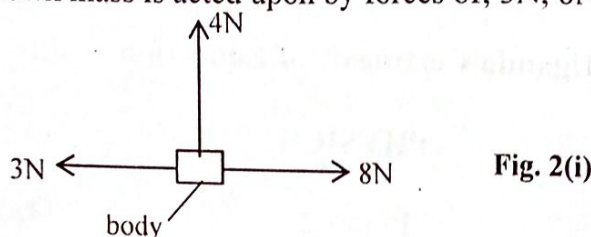

   Fig. 2(i)

   (i) Find the resultant force of the body. (03 marks)
   (ii) Explain what happens when a balloon filled with air is released in space as shown in figure 2(ii). (02 marks)
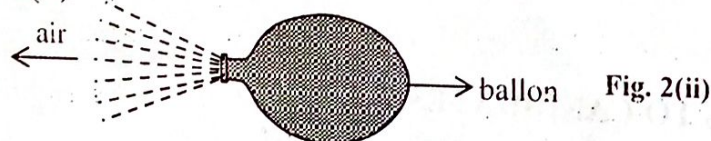

   Fig. 2(ii)

   (d) Explain how a person is able to draw a liquid from a glass using a straw. (03 marks)

2. (a) What is meant by the following?
   (i) **Mechanical advantage.** (01 mark)
   (ii) **Moment of force.** (01 mark)
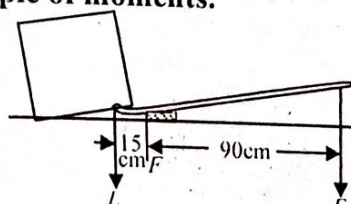
   (b) (i) State the **principle of moments.** (01 mark)

   Fig. 3

   (ii) Figure 3 shows a crow bar being balanced by the forces E.g the effort and L, the load and F being the fulcrum.
   Determine the Mechanical advantage of the crow bar. (03 marks)

   (c) (i) What is meant by **density of substance**? (01 mark)
   (ii) Calculate the mass of air in a room of floor dimensions 10m x 12m and height 4m. (Density of air 1.26kgm^{-3}). (03 marks)

   (d) (i) State **Archimede's principle.** (01 mark)
   (ii) Describe an experiment to verify Archimede's principle. (04 marks)
   (iii) Explain why water in the bottom of a floating boat cannot be siphoned over the side. (01 mark)

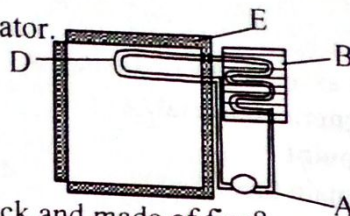3. (a) What is meant by;
   (i) **Convection.** (01 mark)
   (ii) **Fixed temperature points.** (01 mark)

(b) The diagram below shows a refrigerator.

Fig. 4

(i) Name the part A. (01 mark)
(ii) Explain why B is painted black and made of fins? (02 marks)
(iii) Explain why D is on the upper side in the refrigerator and not in the lower side. (02 marks)

(c) (i) Describe how the scale of a new thermometer can be calibrated. (03 marks)
(ii) State **two** advantages and **two** disadvantages of using mercury as a thermometric liquid. (03 marks)

(d) Explain how the green house effects leads to global warming. (03 marks)

4. (a) (i) State any **two** different types of sources of electrical energy. (01 mark)
(ii) Explain why birds standing on electricity transmission wires do not get electrocuted. (02 marks)

(b) (i) Define **potential difference (p.d)**. (01 mark)
(ii) Use the definition in (b) (i) above, to show that the power produced across a conductor is $P = IV$ where V is the p.d across conductor and I is the current in the conductor. (02 marks)
(iii) Explain the necessity of earthing some electrical appliance. (02 marks)

(c) Draw circuit diagrams to show;
(i) Voltmeter reading emf of a cell. (01 mark)
(ii) Voltmeter reading terminal p.d of a cell. (01 mark)

(d) On the same axis, sketch a graph of current against potential difference (p.d) for;
(i) a torch bulb. (01 mark)
(ii) a carbon resistor. (01 mark)

(e) (i) Describe the faults of a simple primary cell. (02 marks)
(ii) What special precaution are taken in caring for a lead acid battery? (02 marks)

5. (a) (i) What is meant by the term light? (01 mark)
(ii) Describe an experiment to show that light travels in a straight line. (04 marks)

(b) Distinguish between primary and secondary colours giving an example in each case. (03 marks)

(c) (i) An object 2cm high is placed 5cm from optical center of the converging lens of fold length 10cm. By scale drawing, determine the position and size of the image formed. (04 marks)
(ii) State **two** uses of a converging lens. (01 mark)

(d) (i) What is **total internal reflection**? (01 mark)
(ii) Explain how sky radio waves travel from a transmitting station to a receiver. (02 marks)

6. (a) Draw a diagram to show how plane progressive wave are refracted as they travel from deep water to shallow water. (02 marks)

(b) (i) Distinguish between a **transverse** and a **longitudinal wave.** (02 marks)
(ii) The distance between 11 successive crests of a wave is 33m. Find the speed of the wave, if time taken to make one complete cycle is 0.01 second. (03 marks)

(c) (i) Describe an experiment to show that sound cannot travel through a vacuum. (04 marks)
(ii) State **two** applications of Ultrasonic sounds. (01 mark)

(d) A student standing between two high walls and 500m from the nearest wall shouted. He heard the first echo after 3s and second echo 2s later. Determine,
(i) the speed of sound in air. (02 marks)
(ii) The distance between walls. (02 marks)

Turn Over

7. (a) Define the terms as applied to magnetism:
   (i) **Paramagnetic material.** (01 mark)
   (ii) **Neutral point** (01 mark)
   (b) (i) Using domain theory, explain why the strength of a magnet cannot be increased beyond a certain point. (02 marks)
   (ii) Explain how magnetic keepers function to prevent stored bar magnets from self-demagnetization. (02 marks)
   (c) Describe the function of the following parts of a moving coil galvanometer.
   (i) The soft iron cylinder. (01 mark)
   (ii) The return spring. (01 mark)
   (d) (i) Predict the direction of force when current flows out of the plane between the poles of magnets in figure 5 below. (02 marks)

Fig. 5
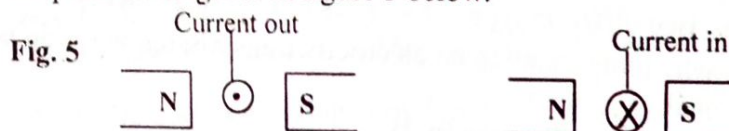
   (ii) Describe how the efficiency of a D.C motor may be increased. (02 marks)
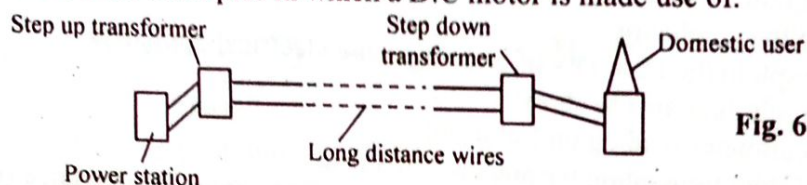   (iii) State **four** examples in which a D.C motor is made use of. (02 marks)

Fig. 6

   (e) Study the diagram in figure 6 above and describe how transformers are used to transmit electric power from the hydroelectric power dam to a domestic house. (02 marks)

8. Define the following terms as applied to radio activity;
   (a) (i) **Activity.** (01 mark)
   (ii) **Half-life.** (01 mark)
   (b) Below is the graph of activity against time for a radioactive sample.
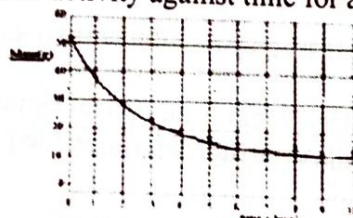

Fig. 7

   Use the graph to;
   (i) Find the half-life of the sample of the material. (01 mark)
   (ii) Determine how much of the original sample of the material will have decayed in 9.6 days. (02 marks)
   (c) Fig. 8 shows a technician locating the position of the leak of an underground water pipe which has cracked.
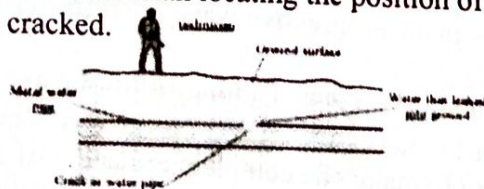

Fig. 8

   State and explain, the type of radiation that must be emitted by the isotope introduced into water supply for the leak to be detected. (02 marks)
   (d) (i) What are **x-rays**? (01 mark)
   (ii) Describe how X-rays are produced in an X-ray tube. (04 marks)
   (iii) Give **two** uses of X-rays. (02 marks)
   (e) Give **two** precautions taken while handling radioactive substances. (02 marks)

END