

535/2
PHYSICS
PAPER 2
July/August 2017
2¹/₄hours



WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

PHYSICS

Paper 2

2hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

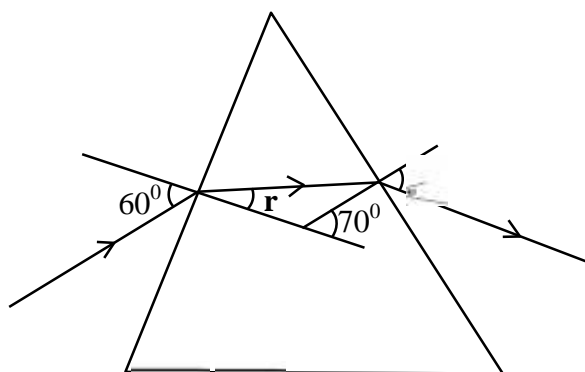
- Answer any **five** questions.
- Any additional question(s) answered will **not** be marked.
- Mathematical tables and silent non- programmable calculators may be used.

Assume where necessary:

<i>Acceleration due to gravity, g</i>	=	10ms^{-2}
<i>Specific heat capacity of water</i>	=	$4200\text{Jkg}^{-1}\text{k}^{-1}$
<i>Specific heat capacity of copper</i>	=	$400\text{Jkg}^{-1}\text{k}^{-1}$
<i>Specific latent heat of fusion of ice</i>	=	$3.36 \times 10^5\text{Jkg}^{-1}$
<i>Density of water</i>	=	1000Kgm^{-3}
<i>Density of Mercury</i>	=	$13,600\text{Kgm}^{-3}$
<i>Speed of sound in air</i>	=	340ms^{-1}

1. (a) (i) State the **principle of conservation of linear momentum**. (01 mark)
 (ii) A bullet of mass 100g is fired with a velocity of 700ms^{-1} using a gun of mass 5.0kg. Calculate the recoil velocity of the gun. (03 marks)
- (b) Explain why a loaded truck stops over a longer distance than an empty truck when the brakes are applied. (03 marks)
- (c) (i) State the conditions necessary for a body to rest in mechanical equilibrium. (02 marks)
 (ii) A uniform meter rule is pivoted at the 40cm mark and carries a weight of 20.0N at the 10.0cm mark. If it is balanced horizontally by a weight of 10.0N placed at the 80.0cm mark, calculate the weight of the meter rule. (04 marks)
- (d) (i) Define the terms **couple** and **torque** as applied to forces. (02 marks)
 (ii) State **two** applications of couples of force. (01 mark)
2. (a) (i) Define the term **atmospheric pressure**. (01 mark)
 (ii) Describe an experiment to measure the pressure of a liquid using a manometer. (05 marks)
- (b) (i) State the factors that affect pressure in liquids. (02 marks)
 (ii) A cow can easily walk on soft mud but a goat cannot. Explain. (03 marks)
- (c) A glass tube is held vertically in a trough of water of density 1000kgm^{-3} , the water rises to a height of 15cm above the water surface. Calculate the pressure exerted on the water by the water column. (02 marks)
- (d) Explain why it is easier to lift a jerrican full of water with in the liquid than in air. (03 marks)
3. (a) (i) What is meant by total **internal reflection**? (01 mark)
 (ii) State the conditions for total internal reflection to occur. (02 marks)

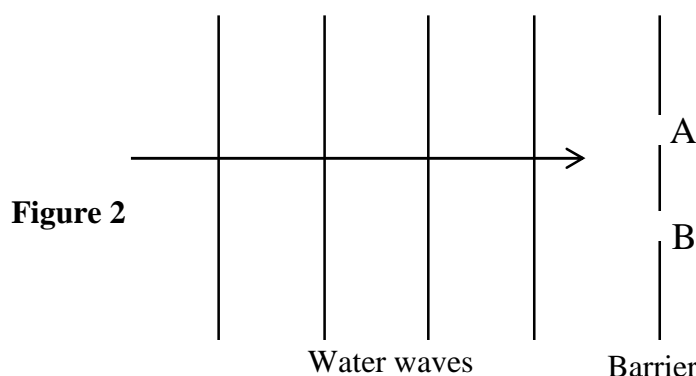
Figure 1



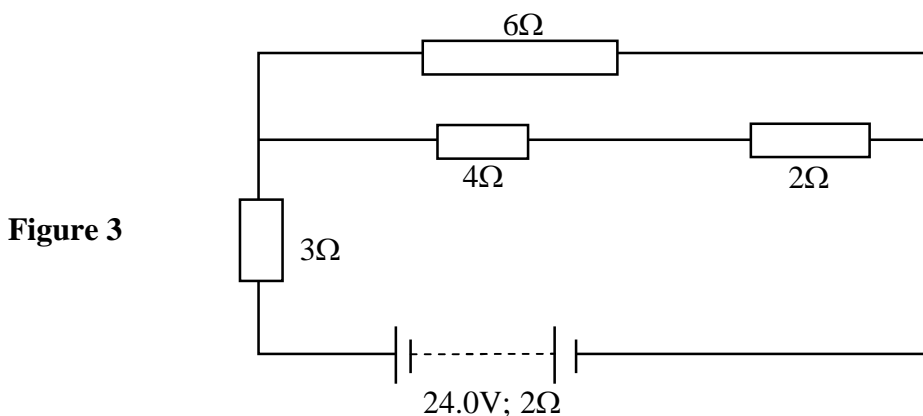
The diagram in fig.1 above shows a ray of blue light incident at an angle of 60° on one side of a triangular prism of refractive index of 1.52. Calculate the angles marked **r** and **e**. (04 marks)

- (c) Describe the mode of operation of a projector (04 marks)
- (d) (i) What are primary colours? (01 mark)
 (ii) State the colours that pass through a yellow filter when light is incident on it. (02 marks)
 (iii) Explain why a solar panel is tilted at an angle to the horizontal. (02 marks)

4. (a) (i) Distinguish between **interference** and **diffraction** of waves. (02 marks)
- (ii) Figure 2 below shows plane water waves incident onto a straight barrier with two narrow slits A and B.
Complete the path of the waves after the barrier. (02marks)



- (b) (i) Draw a complete electromagnetic spectrum in the order of increasing wave length. (03 marks)
- (ii) State **two** differences between sound and light waves. (02 marks)
- (c) A wave covers 20.0cm in 2.5 seconds. If this distance corresponds to the length between 6 consecutive crests, calculate the:
- (i) wavelength of the waves. (02 marks)
- (ii) frequency of the waves. (02 marks)
- (d) Explain why sound travels faster in solids than in air. (03 marks)
5. (a) (i) Distinguish between **Primary** and **Secondary** cells. (02 marks)
- (ii) Give one example of each type of cell mentioned in a (i) above. (01 mark)
- (iii) State the **law of electrostatics**. (01 mark)
- (b) (i) Draw a labeled diagram of a gold leaf electroscope. (02 marks)
- (ii) State **two** uses of a gold leaf electroscope. (02 marks)
- (c) An accumulator of e.m.f 24.0V and internal resistance 2.0Ω is connected to 3Ω , 4Ω , 2Ω and 6Ω resistors as shown in figure 3.



Calculate the;

- (i) current through the 3.0Ω resistor (04 marks)
- (ii) total power expended. (02 marks)
- (d) State any **two** precautions under taken in domestic house wiring. (02 marks)

6. (a) (i) What is meant by **magnetic field**? (01 mark)
(ii) Sketch the magnetic field pattern between two bar magnets placed on a horizontal surface with their North poles facing each other. (02 marks)
- (b) (i) What is an **electromagnet**? (01 mark)
(ii) With the aid of a labeled diagram, describe the structure and mode of operation of a step – down transformer. (05 marks)
- (c) A transformer is designed to produce an output of 240V when connected to a 40V supply. If the transformer has a efficiency of 75%, calculate the input current when the output is connected on a 240V, 100W lamp. (04 marks)
- (d) A galvanometer of resistance $40\ \Omega$ and full scale deflection 25mA is to be provided with a multiplier such that it can read up to 10.0V. Calculate the resistance of the multiplier. (03 marks)
7. (a) Distinguish between a **conductor** and an **insulator** of heat and give one example of each. (03 marks)
- (b) With aid of a labeled diagram, state the functions of the main parts of a vacuum flask. (06 marks)
- (c) 200cm^3 of water at 25°C is poured into a copper calorimeter of mass 250g. A piece of copper of mass $m\text{kg}$ at 70°C is dropped into the calorimeter and then stirred, giving a final temperature as 45°C . Calculate the mass (m) of the piece of copper. (05 marks)
- (d) State any **two** reasons why water is not used as a thermometric liquid. (02 marks)
8. (a) Differentiate between **thermionic emission** and **photo electric emission**. (02 marks)
- (b) Define the terms;
(i) **Activity**. (01 mark)
(ii) **Radioisotope**. (01 mark)
- (c) A radioactive nuclei ${}^{214}_{82}\text{X}$ decays to ${}^{214}_{83}\text{M}$ by emission of two types of radiations.
(i) Name the possible radiations emitted during the decay. (01 mark)
(ii) Write a balanced equation to represent this nuclear reaction. (02 marks)
(iii) Determine the half-life of the element X if its mass is 800g and it decays to 12.5g after 48days. (03 marks)
- (d) (i) With aid of a labeled diagram, describe the working of a cathode Ray Oscilloscope (C.R.O). (05 marks)
(ii) State **two** uses of the C.R.O (01 mark)

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