535/2

PHYSICS

PAPER TWO

2 ¼ HOURS

KAYUNGA SECONDARY SCHOOLS HEAD TEACHERS AND PRINCIPALS ASSOCIATION (KASSHPA)

UGANDA CERTIFICATE OF EDUCATION

PHYSICS

PAPER TWO

2 HOURS 15 MINUTES

Instructions:

Attempt five (5) questions.

Where applicable, use:

Acceleration due to gravity,	**g**	**=**	**$10ms^{-2}$**
Density of water	**=**	**$1000\ kgm^{-3}$**	
Speed of light in vacuum,	**c**	**=**	**$3 \times 10^{8}ms^{-1}$**
Specific heat capacity of water,		**=**	**$4{,}200\ Jkg^{-1}K^{-1}$**
Specific latent heat of ice,		**=**	**$336{,}000Jkg^{-1}$**
Specific latent heat of steam,	**=**	**$2{,}260{,}000Jkg^{-1}$**	

1. (a) State what is meant by the terms:

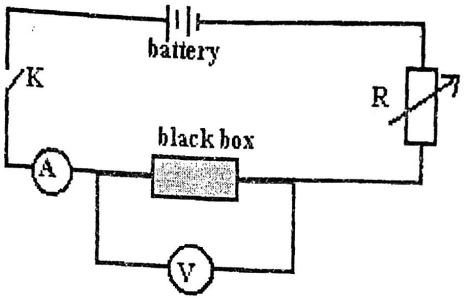
(i) Electromotive force of a cell.

(ii) A volt.

(b) (i) State Ohm's law

(ii) Derive an expression for effective resistance of three conduct resistance R_1, R_2 and R_3 connected in parallel,

(c) The results obtained by an S4 candidate in a physics practical for the shown below are as follows:



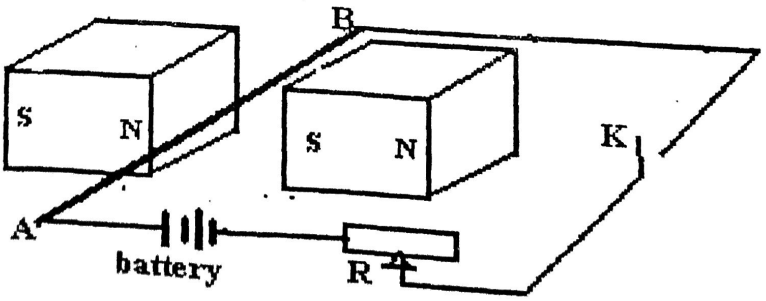
I(A)	0.0	1.0	2.0	3.0	4.0	5.0
V(V)	0.0	0.2	0.6	1.5	3.0	6.0

(i) Plot a graph of I against V.

(ii) Use the graph to describe the type of device connected in the black box

(iii) Use the graph to find resistance of the device when operating volt 2.0V. (3)

2. (a) A wire AB is placed in the space between poles of a magnet as shown diagram below.



(i) State what is observed on the wire AB when the switch is closed.

(ii) State what is observed on the wire AB when the poles of the magnet are reversed and the switch is closed? (1)

(iii) What is the difference in the observations above when current is increased? (1)

(b) Draw a labeled diagram of a moving coil galvanometer and describe how it works. (6)

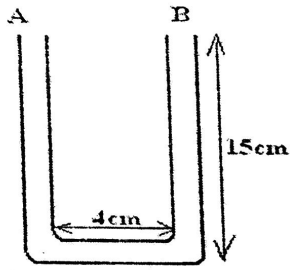
(c) Name three things that can be done to make the galvanometer sensitive. (3)

(d) A galvanometer has a coil of resistance 20Ω and gives a full scale deflection when a current of 0.05A passes through it. Describe how the galvanometer is modified to measure current up to 2A. (4)

(a) (i) Define pressure. (1)

(ii) Explain why knives cut better when they are sharpened. (3)

(b)



The open U-tube shown above has uniform cross-section of $2cm^2$. $40cm^3$ of water is put in the U-tube and then oil of density $0.8gcm^{-3}$ is added on side B until it fills side B.

Find the difference in levels of water in the U-tube. (4)

(c) (i) State Archimedes principle. (1)

(ii) Describe an experiment to verify Archimedes principle. (5)

(d) Explain why a ship made of steel floats in water yet steel is denser than water. (2)

4. (a) State the laws of friction. (2)

(b) (i) Distinguish between limiting static friction and dynamic friction. (2)

(ii) Describe an experiment to show that limiting static friction is greater than dynamic friction. (4)

(c) Distinguish between the following:

(i) A brittle and a ductile material. (2)

(ii) Tensile stress and tensile strain. (2)

(iii) Plastic and elastic deformation. (2)

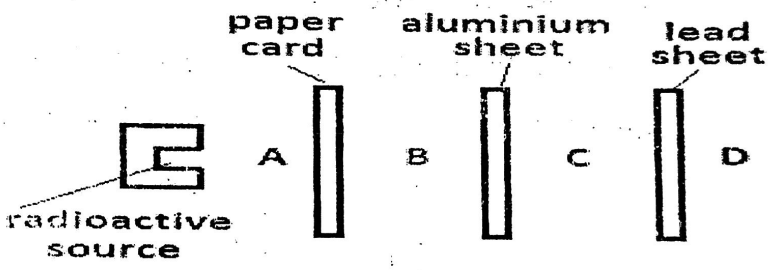
(d) Sketch the strain against stress graph for a copper wire that was stressed to breaking point and label features on the graph. (2)

5. (a) (i) Define the terms **radioactive decay** and **half life.** (2)

(ii) Distinguish between nuclear fusion and nuclear fission. (2)

(b) Name the three types of radioactive emission. (3)

(c) A radioactive source below produces all three types of radiation.



Name the radiations in regions A, B, C and D. (4)

(ii) Given that the activity of the source above decreases from 4800 counts per second to 300 counts per second in 40 minutes, calculate half life of the material. (3)

(iii) Find how much of 20g of the material will remain after 2 hours? (3)

6. (a) Use the kinetic theory of matter to distinguish between saturated and unsaturated vapours. (3)

(b) Describe an experiment using the method of mixtures to determine the specific latent heat of ice. (5)

(c) In the freezing compartment of a refrigerator 5kg of water at 25°C is turned to ice at 0°C. Calculate (i) The total energy lost by water. (4)

(ii) Explain why the freezer of the refrigerator should be placed at the top rather than the bottom of the refrigerator. (2)

(iii) Give two measures taken to ensure efficiency of the refrigerator. (2)

7. (a) (i) Define interference of waves. (1)

(ii) Describe an experiment to show interference of waves. (4)

(b) (i) What is meant by resonance? (1)

(ii) When using a tuning fork of frequency 680Hz, the shortest length of a resonance tube that produces resonance is 0.12m and the next resonance length is 0.37m. Calculate the velocity of sound in air. (3)

(c) (i) Give three differences between radio waves and sound waves. (3)

(ii) Describe how total internal reflection is used in broadcasting. (4)

8. (a) With the aid of ray diagrams,

(i) Describe principal focus of a diverging lens. (3)

(ii) Describe spherical aberration of a converging lens. (3)

(b) (i) Describe how you would determine the focal length of a converging mirror, if you were provided with a light bulb and a screen with a small hole in it. (4)

(ii) Explain why the method in b(i) above is unsuitable for measuring the focal length of a diverging lens. (2)

(c) (i) By means of a scale drawing show how a converging lens of focal length 6cm forms and image half as tall as the object of height 6cm. (3)

(ii) What is the object distance? (1)

END