**535/2**

**PHYSICS**

**Paper 2**

**Jul / Aug 2016**

**2 ¼ Hours**

**MUKONO EXAMINATIONS COUNCIL**

**Uganda Certificate of Education**

**PHYSICS**

Paper 2

**2 Hours 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* = 10ms-2.

*Specific heat capacity of water* = 4,200 Jkg-1K-1.

*Specific heat capacity of copper* = 400 Jkg-1K-1.

*Specific latent heat of fusion of water* = 340,000 Jkg-1.

*Speed of sound in air* = 320 ms-1.

*Velocity of electromagnetic waves* = 3.0 x 108 ms-1.

*Density of mercury* = 13,600 kgm-3

1. (a) Define moment of a force and state its SI unit***. (2marks)***

(b) Describe a simple experiment to determine the mass of a uniform meter rule using one

known mass and a knife edge only.  ***(6marks)***

(c) A uniform pole XY of length 2m and weight 50N is supported at the ends X and Y as

shown in the diagram below.

R1=400N R2=150N

X Y

50cm

F

(i) Calculate the value of F which will keep the pole in equilibrium as shown in the diagram.

***(3marks)***

(ii) State two applications of the principle of moments. ***(2marks)***

(d) Explain what happens to the weight of a body as it is moved from the geographic pole to the

equator.  ***(3marks)***

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

(i) Temperature***? (1mark)***

(ii) Lower fixed point of a thermometer***? (1mark)***

(b) Briefly describe an experiment to determine the lower fixed point of a thermometer.

***(4marks)***

(c) State two advantages and two disadvantages of using mercury as a thermometric liquid.

***(2marks)***

(d) Explain how the boiling point of a liquid depends on altitude. ***(2marks)***

(e) A copper block of mass 100g is heated to a temperature200°c and then transferred to a

copper calorimeter of mass 300g containing 400cm3 of water at 25°c.

(i) Calculate the maximum temperature attained by the water in the calorimeter. ***(3marks)***

(ii) Sketch the graph to show the variation of temperature with time. ***(1mark)***

(iii) Explain one application of heat capacity.  ***(2marks)***

3.(a)(i) What is sound? ***(1mark)***

(ii) Describe with the aid of a diagram an experiment to determine the speed of sound in air

using resonance method. ***(5marks)***

(b)(i) Distinguish between nodes and *antinodes.* ***(2marks)***

(ii) Sketch a diagram of stationary waves corresponding to fundamental note and first

overtone in closed pipe. ***(3marks)***

(iii) What is an open pipe? ***(2marks)***

(c) A progressive wave travels a distance of 31.5m in 20 seconds. If the distance travelled is

equivalent to the distance between 10 consecutive crests, calculate the;

(i) Wave length of the wave. ***(1mark)***

(ii) Period of the wave. ***(1mark)***

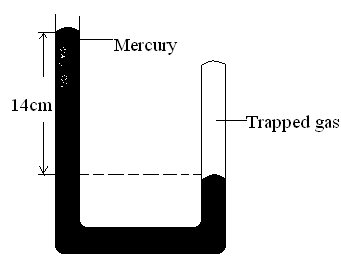
(d) What is **reverberation?  *(1mark)***

4. (a) (i) Define **pressure** and state its SI unit.  ***(2marks)***

(ii) Explain why the balloon in a room will burst when the temperature of the room

increases. ***(3marks)***

(b)



A gas is trapped by mercury in a J-tube at atmospheric pressure of 760mmHg as shown in the diagram above. Calculate the pressure exerted by the trapped gas in Nm-2. ***(2marks)***

(c) Describe with the aid of a labelled diagram, how a force pump works. ***(5marks)***

(d) (i) State the law of conservation of energy. ***(1mark)***

(ii) A stone of mass 0.2kg is thrown vertically upwards attaining maximum potential energy

of 16 J. Calculate its initial velocity. ***(3marks)***

5(a) using a labelled diagram, explain the dispersion of white light by a glass prism. (5marks)

(b)(i) What is a primary colour?  ***(1mark)***

(ii) Name two primary colours.  ***(2marks)***

(c) Explain the appearance of a flag with red, yellow and black stripes in white light.

***(3marks)***

(d) (i) An object of height 0.5cm is placed 2cm in front of a convex lens of focal length 3cm.

By graphical method determine the position and height of the image. ***(3marks)***

(ii) State two applications of convex lenses. ***(2marks)***

6. (a) Differentiate between thermionic emission and photoelectric emission. ***(4marks)***

(b) Define the terms: (i) mass number. ***(1mark)***

(ii) Atomic number. ***(1mark)***

(c) A radioactive nuclide of Iodine, , decays by emission of two types of radiation and

turns into Xenon, .

(i) Write a balanced equation to represent this nuclear reaction. ***(2marks)***

(ii) Name the possible radiations emitted during the transformation. ***(1mark)***

(iii) Determine the half-life of Iodine if 800kg of it reduced to 12.5kg after 48days.

***(3marks)***

(d) With the aid of a labelled diagram, describe the working of a cathode ray oscilloscope.

***(4marks)***

7. (a) What is meant by (i) electromotive force of a cell ? ***(1mark)***

(ii) Potential difference across a resistor in a circuit? ***(1mark)***

(b) Resistors of 8Ω, 6Ω and 3Ω are connected as shown in figure 1 across a battery of emf 2V

and of negligible internal resistance.

8Ω E = 2V

***Figure 1.***

3Ω

6Ω

Calculate the current through the 8Ω resistor. ***(4marks)***

(c) With the aid of a circuit diagram, describe how four semi-conductor diodes may be used for

full wave rectification. ***(5marks)***

(d) Distinguish between Primary cells and Secondary cells stating one example of each.

***(2marks)***

(e) State any three disadvantages of an alternating current over a direct current in power

transmission.  ***(3marks)***

8. (a) With the aid of a labeled diagram describe the working of an alternating current

generator. ***(5marks)***

(b)(i) Sketch the shape of the voltage-time graph produced by the **spinning coil** in (a) above.

***(2marks)***

(ii) State two ways by which the generated voltage can be increased. ***(2marks)***

(c)(i) Describe the mode of operation of a step up transformer. ***(2marks)***

(ii) State **two** causes of energy losses in a transformer and how they can be minimized.

***(2marks)***

(d) A transformer with 1200 turns on the primary coil and 500 turns on the secondary coil is

designed to step down voltage from 240v. If the current in the primary and secondary coil

is 3A and 5A respectively, calculate the efficiency of the transformer. ***(3marks)***

***End -***