535/2

PHYSICS

2014

Paper 2

NDEJJE DAY VOCATIONAL SECONDARY SCHOOL -BOMBO

UGANDA CERTIFICATE OF EDUCATION

PHYSICS

INTERNAL MOCK EXAMINATION 2015

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 = $4,200\ Jkg^{-1}K^{-1}$.

Specific heat capacity of copper = $400\ Jkg^{-1}K^{-1}$.

Specific latent heat of fusion of water = $340,000\ Jkg^{-1}$.

Speed of sound in air = $330\ ms^{-1}$.

Velocity of electromagnetic waves = $3.0 \times 10^{8}\ ms^{-1}$.

Density of mercury = $13,600\ kgm^{-3}$

1.(a) Explain what is meant by the term **"mutual induction**" as applied to transformers. (2 marks)

(b) (i)Describe the mode of operation of a step up transformer. (4 marks)

(ii) State any three causes of energy losses in a transformer and state how they can be minimized.

(3 marks)

(c) (i) 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 coil and secondary coil is 3A and 5A respectively, calculate the efficiency of the transformer.
(3 marks)

(ii) Name **one** domestic device which uses a transformer. (1 mark)

(d) An electric lamp is rated 240V, 30W. Calculate the current which this lamp draws when connected to a 240V power supply. (2 marks)

2.(a)Define the following as applied to radioactivity

(i)half life. (I mark)

(ii)Isotopes. (1 mark)

(b)State the changes that occur in the nucleus of a radioactive atom if it emits:

(i)**γ**-rays. (2 marks)

(ii)an α-particles. (2 marks)

(iii)β-particles. (2 marks)

(c)Compare the penetrating power of the emissions referred to in (b) above. (2 marks)

(d)In 168 seconds, the activity of a Radioisotope falls to one –eighth of its original value. What is its half- life? (3 marks)

(e) State three uses of radioactivity. (3 marks)

3. (a) Define the term "**specific heat capacity**" of a liquid. (1 mark)

(b)With the aid of a suitable diagram describe a simple experiment to determine the specific latent heat of fusion of ice. (6 marks)

(c) A 2 ½ litre electric kettle of mass 1.4 kg and heating element rated 1 kW is filled with water at room temperature. If the water took 10 minutes to reach boiling point of 100°c, what was the room temperature? (specific heat capacity of material of kettle is 400Jkg^{-1}K^{-1}). (4 marks)

(d) Explain the following observations:

(i) Water is preferred in cooling car engines to many other liquids. (2 marks)

(ii) The boiling point of water is higher at lower altitude. (2 marks)

(e) State one physical property which changes with temperature. (1 mark)

4. (a)(i)What is sound? (1mk)

(ii)Describe with the aid of a diagram an experiment to determine the speed of sound in air using resonance method. (5mks)

(b)(i)Distinguish between a *node* and *an antinode.* *(2mks)*

(ii)Sketch a diagram of stationary waves corresponding to fundamental note and first overtone in closed pipe . (3mks)

(ii)What is an open pipe? (1mk)

(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;

(i)The wave length of the wave. (1mk)

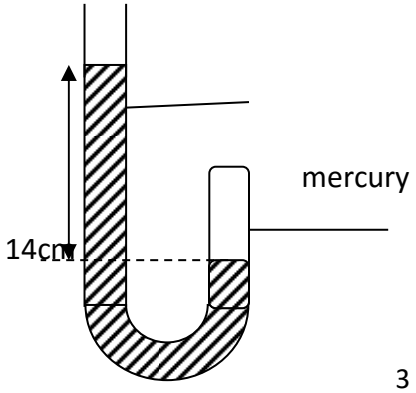
(ii)the period of the wave. (1mk)

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

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

(ii) Explain why the balloon in a room will burst when the temperature of the room increases. (3 marks)

(b)



Trapped gas

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}. (2 marks)

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

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

(ii) A stone of mass 0.2kg is thrown vertically upwards attaining maximum potential energy of 16 J. Calculate its initial velocity. (3 marks)

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

(ii)Give **two** examples of primary colours. (1 mark)

(b) With the aid of a diagram explain dispersion of white light by a glass prism. (6 marks)

(c) An object of height 1cm is placed vertically on the principal axis of a convex lens of focal length 10cm at a distance of 12.55 cm from the lens. By graphical method determine the position and height of the image formed. (4 marks)

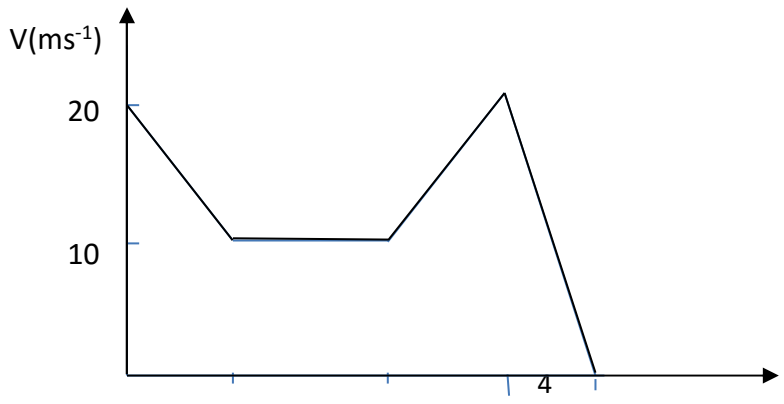
(d) State two applications of convex lenses. (2 marks)

(e) Describe the appearance of a blue pen in white light. (2 marks)

7.(a) Define the term velocity. (1 mark)

(b) With the aid of a labeled diagram, describe an experiment to determine the acceleration of a trolley using a ticker timer. (6 marks)

(c) The diagram shows a body in motion.

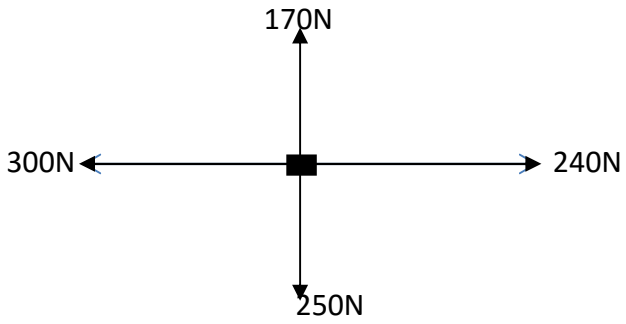


5 10 15 20 T(s)

(i) Describe the motion of the body. (3 marks)

(ii) Calculate the total distance travelled in the last 10 minutes. (2 marks)

(d) In the diagram below, determine the **resultant force**. (3 marks)



(e) Name **two** non-renewable sources of energy. (1 mark)

8. (a) Distinguish between ductile materials and an elastic materials, giving **one** example of ach. (2mks)

(b)Explain the fact that bicycle frames are made of hollow metal pipes other than solid metal bars. (4mks)

(c)(i) State **Hooke's** Law of elasticity. (1 mark)

(ii) Describe a simple experiment to verify Hooke's law. (4 marks)

(d)(i)What is **concrete**? (2 marks)

(ii) State three characteristics of concrete which make it a desirable building material. (3 marks)

END