532/2

PHYSICS

June 2016

2 ¼ hours

UGANDA CERTIFICATE OF EDUCATION

MOCK1 EXAMINATIONS S 2016

PHYSICS

Paper 2

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

Attempt any 5 questions

These values os physical quantities may be useful to you.

Acceleration due to gravity, g = 10 ms-2

Specific heat capacity of water = 4,200 J kg-1 K-1

Specific heat capacity of copper = 400 J kg-1 K-1

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1.(a) State Hooke’s law of elasticity. (1 mark)

(b) Describe an experiment to demonstrate Hooke’s law. (5 marks)

(c) A spring of natural length 8.0 x 10**-2** m extends by 2.5 x 10**-2** mm when a

weight of 10 N is suspended on it.

(i) Find the spring constant. (2 marks)

(ii) Determine the extension when a weight of 15 N is suspended on the spring.

(1 mark)

(d) (i) Define moment of a force. (1 mark)

(ii) The diagram in Fig.1 shows a uniform bar AB of length 1.2 m and weight

10 N under the action of some forces.

Find the minimum force, F, needed to keep the bar in a horizontal position.

(3 marks)

F

A B

0.8 m 0.4 m

15N

Fig. 1

(e) (i) Define capillarity. (1 mark)

(ii) Explain how capillary rise occurs in a narrow tube. (2 marks)

2. (a) (i) State the laws of refraction of light. (2 marks)

(ii) Give two applications of total internal reflection. (2 marks)

(b) Describe an experiment to determine the refractive index of the material of a

rectangular glass block. (6 marks)

(c) A ray of light incident on glass from air is refracted through 32o . If the

refractive index of glass is 1.50, find the angle of incidence. (3 marks)

(d) With the aid of a diagram, explain why a swimming pool appears shallower

than its actual depth. (3 marks)

**P.T.O.**

3. (a) A drop of oil of volume 6.0 x 10**-3** cm**3** forms a patch of diameter 3.5 cm on a

water surface.

(i) Calculate the diameter of a molecule of the oil. (3 marks)

(ii) State the **two** assumptions made. (1 mark)

(b) (i) State Archimede’s principle. (1 mark)

(ii) A block of metal of mass 0.25 kg floats in mercury whose density is

1.36 x 10**4** kgm**-3**. Find the volume of the metal block which lies below the

surface of the mercury. (3 marks)

(c) (i) Explain why a metallic tin with an air-tight lid floats on the surface of water.

(3 marks)

(ii) Give **one** example where the principle in (c) (i) is used. (1 mark)

(d) In a Brownian motion experiment, smoke was introduced into an illuminated

glass cell and observed under a microscope.

Explain what is observed. (3 marks)

4. (a) Describe an experiment to charge a gold leaf electroscope negatively by

induction. (4 marks)

(b) A positively charged sewing needle is fixed in a cork and placed in a dark room.

A candle flame is placed infront of the sharp end of the pin

Explain why the flame is blown away. (4 marks)

(c) A battery of e.m.f. 12V is connected to resistors of resistances 4 Ω , 10 Ω and

15 Ω as shown in Fig. 2.

12V

4Ω 10Ω

Fig. 2.

Determine the voltmeter reading. (5 marks) **P.T.O.**

(d) (i) State Ohm’s law. (1 mark)

(ii) A light industry uses 20 kW of electrical energy to run its machines. How

much does the industry pay for operating the machines for 8 hours if one

unit of electrical energy costs 650 shillings? (2 marks)

5. (a) State any **two** differences between sound waves and light waves. (2 marks)

(b) (i) Describe a simple experiment to determine the velocity of sound in air.

(4 marks)

(ii) Explain why the speed of sound is higher in solids than in air. (3 marks)

(c) Two people P and Q stand in a straight line at distances of 330 m and 660 m

respectively from a high wall. Find the time interval taken for P to hear the first

and second sounds when Q makes a loud sound. (3 marks)

(d) (i) What is a stationary wave? (3 marks)

(ii) Name **one** musical instrument which produces stationary waves. (1 mark)

6. (a) (i) Draw a labeled diagram of a cathode ray oscilloscope. (4 marks)

(ii) State the function of each part. (4 marks)

(iii) Explain how the bright spot is formed on the screen. (3 marks)

(b) A radioactive substance produces alpha particles, beta particles and gamma rays simultaneously which are directed midway between two parallel horizontal electrical plates which are oppositely charged.

(i) Draw a diagram to show the path of the radiations between the plates.

(3 marks)

(ii) What happens when the radioactive substance is completely covered with an ordinary sheet of paper? (1 mark)

(c) Give any **one** precaution taken by people who handle radioactive substances.

(1 mark)

7. (a) (i) Give any **two** characteristics which a liquid used in a liquid-in-glass

thermometer should have. (2 marks)

(ii) Describe how the lower fixed point on a mercury-in-glass thermometer can

be determined. (4 marks)

**P.T.O.**

(b) Explain this observation: A piece of thick glass removed from hot water and

dipped into cold water will crack. (5 marks)

(c) (i) Define specific heat capacity. (1 mark)

(ii) A piece of copper of mass 4 x 10**-2** kg at 200**o** C is quickly transferred into a

copper calorimeter of mass 6 x 10**-2** kg containing 5 x 10**-2** kg of water at

25**o**C . Determine the final temperature of the mixture. (4 marks)

8. (a) (i) Define the term **line of force** as applied to magnetic fields. (1 mark)

(ii) Sketch the magnetic field between two south poles of a magnet placed

close to each other. (2 marks)

(b) Explain, using the domain theory of magnetism, how magnetization is lost by

heating a steel magnet. (3 marks)

(c) State **two** factors that affect the strength of an electromagnet. (1 mark)

(d) (i) With the aid of a labeled diagram, describe how a transformer works.

(6 marks)

(ii) A transformer with 400 turns in the secondary circuit and 20 turns in the

primary circuit has a p.d. of 240 V in the primary circuit. What is the p.d.

in the secondary circuit? (3 marks)

**END**