535/3

PHYSICS

Paper 3

Jul/Aug 2013

2 ¼ hours

MOCK EXAMINATIONS 2012

Uganda Certificate of Education

PHYSICS

Paper 3

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

*Answer question **1** and **one** other question. You will not be allowed to start working with the apparatus for the first quarter of an hour.*

Marks are given mainly for a clear record of the observations actually made, for their suitability and accuracy and for the use made of them.

Candidates are reminded to record their observations as soon as they are made. Whenever possible, candidates should put their observations in a suitable table drawn in advance.

An account of the method of carrying out the experiment is not required.

Graph papers are provided.

Silent non-programmable calculators may be used.

1. **In this experiment you will determine the density of the material of the masses provided.**

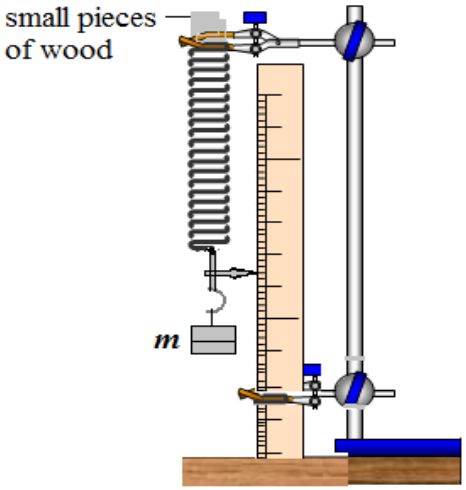

Fig.1

(a) Clamp the metre rule and the spring on a retort stand as shown figure 1.

(b) Read and record the initial position of the pointer, $p_{o.}$

(c) Suspend a mass m = 100 g on the free end of the spring.

(d) Read and record the pointer position, p_1.

(e) Calculate the extension e_1 in the spring from $e_1 = p_1 - p_o$.

(f) Carefully immerse the mass m in water in a beaker until it is completely covered with water.

(g) Read and record the pointer position p_2.

(h) Calculate the extension e_2 in the spring from $e_2 = p_2 - p_o$.

(i) Repeat procedures (c) to (h) for values of m = 200, 300, 400 and 500 g.

(j) Tabulate your results including values of $(e_1 - e_2)$.

(k) Plot a graph of e_1 against $(e_1 - e_2)$.

(l) Determine the slope s of the graph.

(m) Calculate the density of the material of the masses from $s = 0.001\rho$.

Turn Over

2. In this experiment, you will determine the refractive index, n, of the material of the glass block provided.

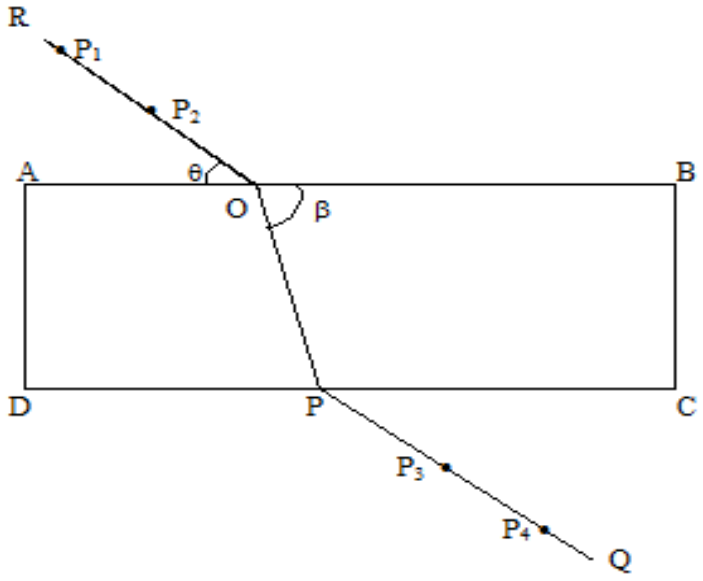

Fig. 2

(a) Fix the plain sheet of paper on a soft board using drawing pins.

(b) Place the glass block on the sheet of paper so that it rests on its broader face and trace its outline ABCD.

(c) Remove the glass block.

(d) At point, O about 2 cm from A, draw a line RO at an angle $\theta = 80^{o}$ to AB.

(e) Fix pins P_1 and P_2 along RO and then replace the glass block onto its outline.

(f) Looking through side DC, fix pins P_3 and P_4 such that they appear to be in a straight line with images of P_1 and P_2 seen in the glass block.

(g) Remove the pins and the glass block and draw a line through P_3 and P_4 to meet DC at P.

(h) Join P to O.

(i) Measure angleβ.

(j) Repeat procedures (d) to (i) for $\theta = 70, 60, 50, 40$ and 30^{o}

Turn Over

(k) Record your results in a suitable table including values of cosθ and cosβ

(l) Plot a graph of cosθ against cosβ

(m) Find slope ***n***, of the graph.

3. **In this experiment you will determine the internal resistance, *r*, of the dry cell provided**.

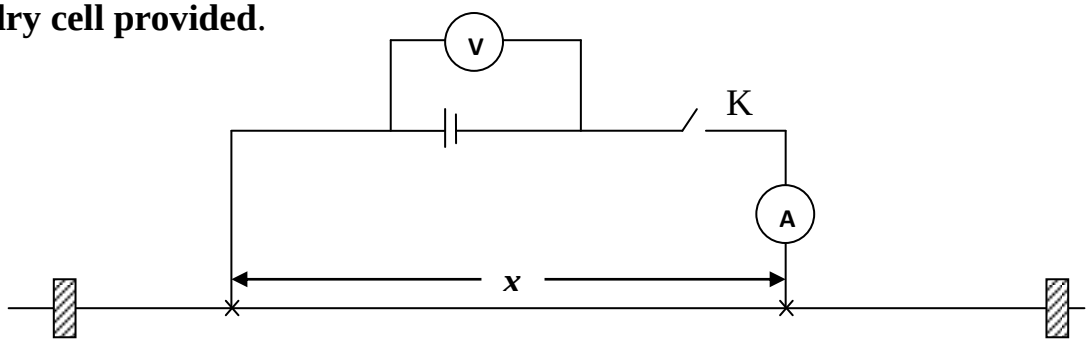

Fig. 3

(a) Fix the bare wire marked w on the table using cellotape.

(b) Connect the rest of the circuit as shown in figure 2.

(c) Measure a length *x*, equal to 30.0 cm.

(d) Close switch, K.

(e) Read and record the voltmeter reading, *V* and the ammeter reading, *I*.

(f) Open switch, K.

(g) Repeat procedures (c) to (f) for *x* = 40.0, 50.0, 60.0, 70.0 and 80.0 cm.

(h) Record all your results in a suitable table.

(i) Plot a graph of *V* against *I*.

(j) Find the slope, *S*, of your graph.

(k) Calculate, *r*, from

$$r = -S.$$

The End

REQUIREMENTS

Question 1

- 1 metre rule
- Five 100 g masses made of the same material
- 1 stand and two clamps
- 1 spring with a pointer
- 1 piece of thread about 20 cm long
- 1 beaker of water to accommodate all the masses when fully immersed

Question 2

- 4 optical pins
- 2 drawing of office pins
- 1 rectangular glass block
- 1 plain sheet of paper
- 1 soft board
- 1 complete mathematical set

Question 3

- 1 voltmeter (0 – 3V)
- 1 ammeter (0 – 1 A)
- 1 Fresh dry cell
- Constantan wire SWG-28 mounted on a metre rule and labeled ,W (about 1 m of the wire fixed on top of a table)
- About 6 pieces of connecting wires
- 1 switch