535/3
PHYSICS
PRACTICAL
Paper 3
July/Aug. 2023
2 ¼ hours

HOIMA DIOCESE EXAMINATIONS BOARD

UCE Mock Examination, 2023

PHYSICS PRACTICAL

Paper 3

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

Answer question **1** *and* **one** *other question.*

Any additional question(s) answered will **not** *be marked.*

For each question, candidates are required to select suitable apparatus from the apparatus provided.

You are **not** *be allowed to start working with the apparatus for the* **first quarter** *of an hour.*

Use **blue** *or* **black ink** *for all parts of the questions. Any work done in pencil will* **not** *be marked.*

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.

Where possible, candidates should put their observations and calculations in a suitable table drawn up in advance.

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

Graph papers are provided.

Mathematical tables and silent non-programmable calculators may be used.

1. In this experiment, you will determine a physical property, η, of the bottle and its content provided. *(30 marks)*

(a) Break/cut the long piece of thread provided into three pieces of about equal length.

(b) Measure 100 *ml* of water and pour it into the mineral water bottle provided and close the bottle.

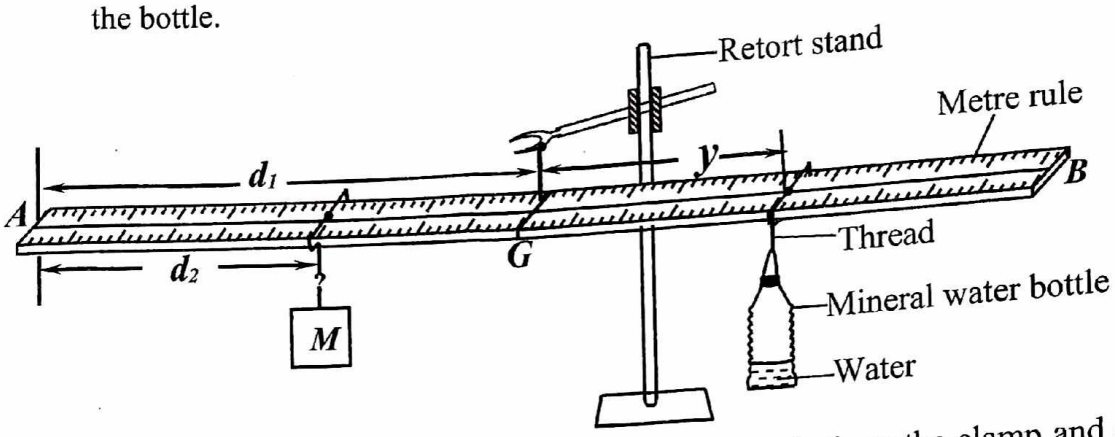

Fig. 1

(c) Using the first piece of thread, suspend the metre rule from the clamp and adjust the metre rule until it balances horizontally. Mark the balance point, ***G***.

(d) Read and record distance, d_1, from end ***A*** of the metre rule.

(e) Using the second piece of thread, suspend the bottle and its content at the 35.0 cm mark from end ***B*** of the metre rule. Read and record distance, y.

(f) Using the third piece of thread, suspend a mass, $M = 40$ g from the left-hand side of ***G*** and adjust the position of ***M*** until the metre rule balances horizontally again as shown in **Figure 1**.

(g) Read and record distance, d_2.

(h) Determine the distance, $x = (d_1 - d_2)$.

(i) Repeat procedures (f) to (h) for $M = 60$, 80, 100, 120 and 140 g.

(j) Plot a graph of ***M*** **(along the vertical axis)** against x^{-1} **(along the horizontal axis)**.

(k) Determine the slope, ***S***, of the graph.

(l) Determine the physical property, η, of the bottle and its content from the expression

$$S = y\eta.$$

(m) Suggest what the physical property, η, stands for.

(n) State the possible sources of errors in this experiment.

(o) State the precautions you undertook to ensure accuracy of your results.

DISMANTLE THE APPARATUS WITHOUT BREAKING OR TEARING.

2. In this experiment, you will determine an optical property, ψ, of the material of the block provided. *(30 marks*

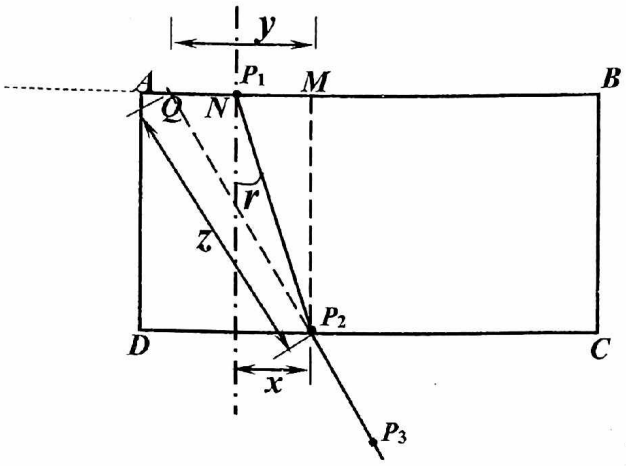

Fig. 2

(a) Fix the plain white sheet of paper on a soft board using drawing pins or pieces c masking tape.

(b) Place the glass block on the plain paper with the broad face topmost.

(c) Trace the outline ***ABCD*** of the glass block and remove it.

(d) At point ***N***, draw a normal to the face ***AB***, 2.0 cm from ***A***.

(e) Fix pin P_1 vertically at ***N***. Replace the block on its outline.

(f) Fix pin P_2 vertically on ***DC*** for distance $x = 1.5$ cm.

(g) While looking through the glass block through side ***DC***, fix pin P_3 such that it appea to be in line with the image of P_1 and pin P_2.

(h) Remove the block and the pins.

(i) Connect ***N*** to pin mark of P_2. Measure and record angle, ***r***.

(j) Draw a normal at P_2 to meet ***AB*** at ***M***.

(k) Draw a line through pin marks of P_2 and P_3 and extend it to meet ***AB*** at ***Q*** as shown i **Figure 2**.

(l) Measure and record $QM = y$ and $P_2Q = z$.

(m) Repeat procedure (f) to (l) for values of $x = 2.0, 2.5, 3.0, 3.5$ and 4.0 cm.

(n) Plot a graph of $z \sin r$ **(along the vertical axis)** against y **(along the horizontal axis**

(o) Find slope, ***S***, of your graph.

(p) Calculate the optical property of the block, ψ, from the expression $1 = \psi S$.

(q) Suggest what the optical property of the block, ψ, stands for.

(r) State the possible sources of error in this experiment.

(s) State the precautions you undertook to ensure accuracy of your results.

HAND IN YOUR TRACING TOGETHER WITH YOUR SCRIPT

3. In this experiment, you will determine the constant, Φ, of the resistance wire provided. *(30 marks)*

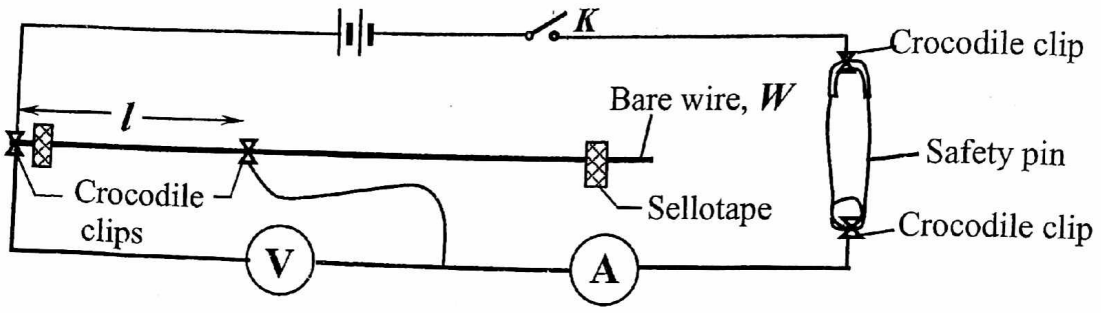

Fig. 3

(a) Connect the circuit as shown in **Figure 3**.

(b) Adjust the distance, l, such that l = 0.200 m.

(c) Close the switch, K.

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

(e) Open the switch, K.

(f) Repeat the procedures (b) to (e) for values of l = 0.300, 0.400, 0.500, 0.600 and 0.700 m.

(g) Record your results in a suitable table.

(h) Plot a graph of $\frac{V}{I}$ **(along the vertical axis)** against l **(along the horizontal axis)**

(i) Find the slope, Φ, of your graph.

(j) State the possible sources of errors in this experiment.

(k) State the remedies to the sources of errors you undertook to ensure accuracy of your results.

DISCONNECT THE CIRCUIT WITHOUT BREAKING OR TEARING.

END