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

MATIGO MOCK EXAMINATIONS BOARD

Uganda Certificate of Education

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.*

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

For each question, candidates will be required to select apparatus from the equipment provided.

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

Candidates are reminded to record their observation as soon as they are made.

Where possible, candidates should put their observations and calculations in a suitable table drawn up in advance.
All your work must be in ***blue*** *or* ***black*** *ink. Any work done in pencil will not be marked*

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

Mathematical tables and squared papers are provided.

Slide rulers or scientific non- programmable calculators may be used

1. In this experiment, you will determine the density, P of the material of the metre rule provided. (30 marks)

(a) Balance the metre rule provided on a knife edge and record the distance x, of the balance point from A and B.

(b) Suspend a 50g mass at the 10cm mark and balance the system again on the knife edge as shown in **figure 1(a).**

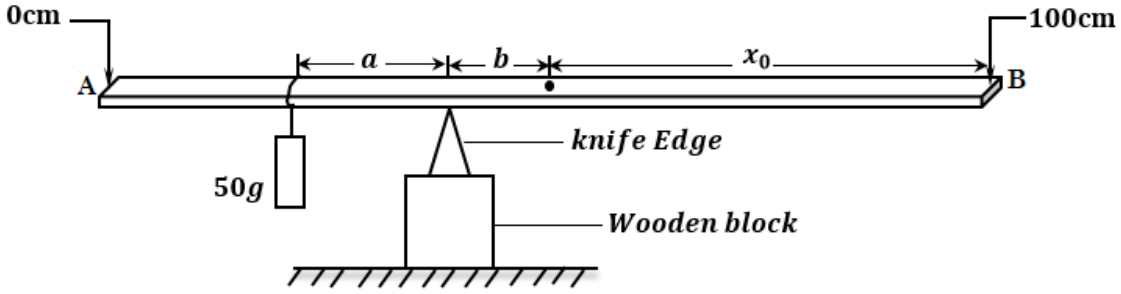


Figure 1(a)

(c) Measure the lengths a and b.

(d) Calculate, m, from $m = 50\frac{a}{b}$.

(e) Pour water into the measuring cylinder up to about the $75ml$ mark.

(f) Read the volume V_0, of the water in the measuring cylinder.

(g) Dismantle the set up in **figure 1(a).**

(h) Clamp the metre rule vertically.

(i) Lower end, A, of the metre rule into the water in the measuring cylinder up to the mark $x = 2$cm *as* shown in **figure 1(b)**

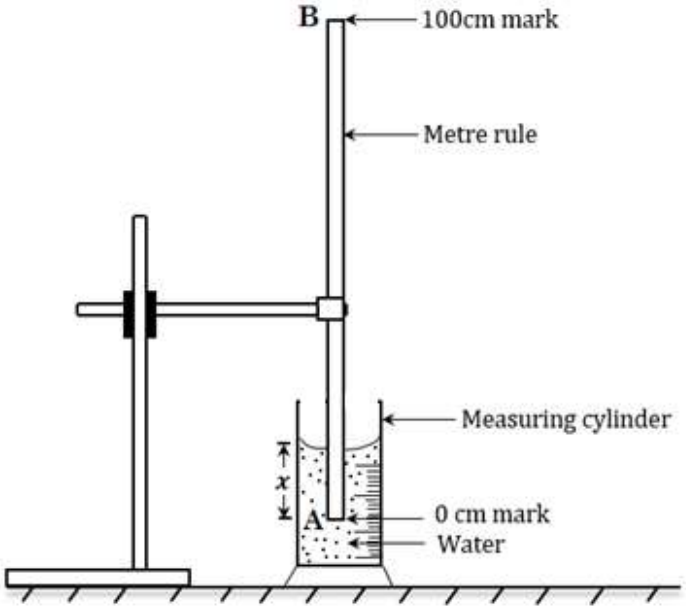


Figure 1(b)

(j) Read and record the volume,V of the water and submerged part of the metre rule.

(k) Repeat procedures (i) and (i) for values of x = 4, 6, 6, 10 and 12cm.

(l) Record your results in a suitable table including values of $(V - V_0)$.

(m) Plot a graph of $(V - V_0)$ (along the vertical axis) against x (along horizontal axis)

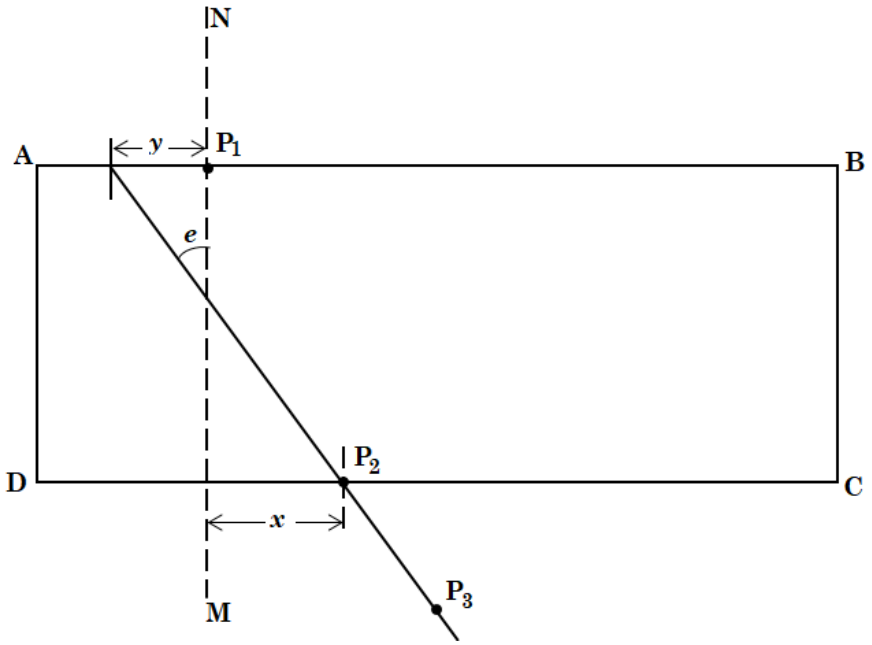
(n) Find the slope, S of the graph.

(o) Calculate, ρ from $\rho = \frac{m}{100\,S}$

(p) State **two assumptions** made in the experiment.

2. In this experiment you will determine the width, W of a glass block.

(30 marks)



(a) Fix a white sheet of paper on a soft board.

(b) Place the rectangular glass block in the middle of the sheet of paper.

(c) Trace the outline **ABCD** of the block

(d) Draw a normal NM about 3cm from A.

(e) Fix pin P_1 very close to AB as shown in **figure 2,**

(f) Place the glass block in its outline and stick pin P_2 along CD at a distance x = 1.5cm from the normal NM.

(g) Looking through the block from side CD, trace the ray of light using P_2 and P_3.

(h) Remove the block and draw the line through the pin holes.

(i) Measure the $angle, e$ and $length, y$

(j) Repeat procedures (f) to (i) for values of x = 2.0, 2.5 ,3.0 ,3.5 and 5.0cm.

(k) Record your results in a suitable table. Including values of $(x + y)$ and **tan e**

(l) Plot a graph of $tan\ e$ against $(x + y)$

(m) Determine the slope, S of the graph.

(n) Calculate the width,W of the glass block from the expression, $SW = 1$

(o) State one precaution to ensure accuracy.

3. In this experiment, you will determine the length of the wire, W (AB) provided for which the power transfer is maximum. (30 marks)

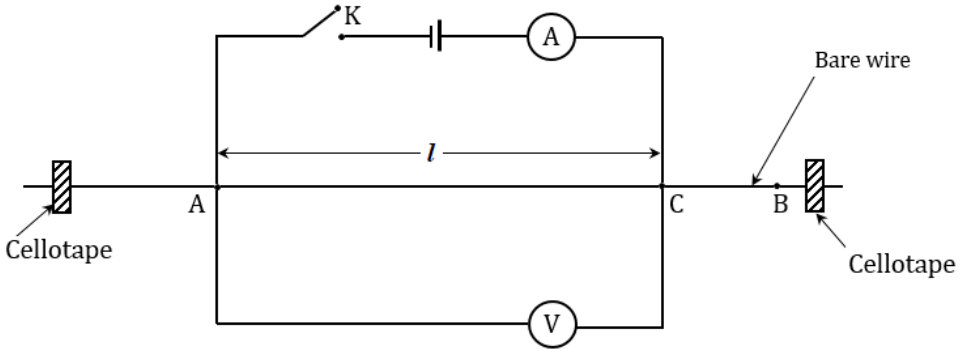


Figure 3

(a) Connect the circuit as shown in fig 3.

(b) Adjust the position of the crocodile clips such that the length $l = 20.0cm$

(c) Close switch, K

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

(e) Open switch, K

(f) Repeat procedures (b) to (c) for values $of\ l = 80.0\ , 60.0, 50.0, 40.0$ and $30.0cm$.

(g) Enter your results in a suitable table.

(h) Plot a graph VI (along the vertical axis) against l (along the horizontal axis)

From the graph:

(i) Find the value of $l = l_0$ corresponding to a point on the curve where the slope is 0

(ii) Determine the value of VI =P_o when $l = l_0$

(j) Calculate the resistance, R of the wire, W from the expression.

$$P_0R = \frac{3}{8}$$

(k) State any **one** assumption made in the experiment.

END