535/3
PHYSICS
PAPER 3
July/Aug 2023
2 ¼hours

ITULA SECONDARY SCHOOL EXAMINATION COMMITTEE

Uganda Certificate of Education

MOCK EXAMINATION 2023

PHYSICS

PAPER 3

2 ¼hours

INSTRUCTIONS TO CANDIDATES:

Answer **questions 1** and **one** other question.
Any additional question answered will **not** be marked.
For each question candidates will be required to select suitable apparatus from the equipment provided.
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 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 in advance.
An account of the method of carrying out the experiment is not required.
Squared paper is provided if available.
Mathematical tables and silent non-programmable calculator may be used.

CamScanner

1. In this experiment, you will determine the position of centre of gravity of a plastic cup provide
(30 marks)

(a) Make two holes just below the top of the plastic cup provided. The two holes should lie on a diameter across the cup.

(b) Use sellotape to attach the 50g slotted mass half – way between the holes on the outside of the cup with the slot at the top.

(c) Pass a string through the holes and tie the knots on the outside of the cup.

(d) Suspend the cup from the rod of the clamp of a retort stand as shown in figure 1.

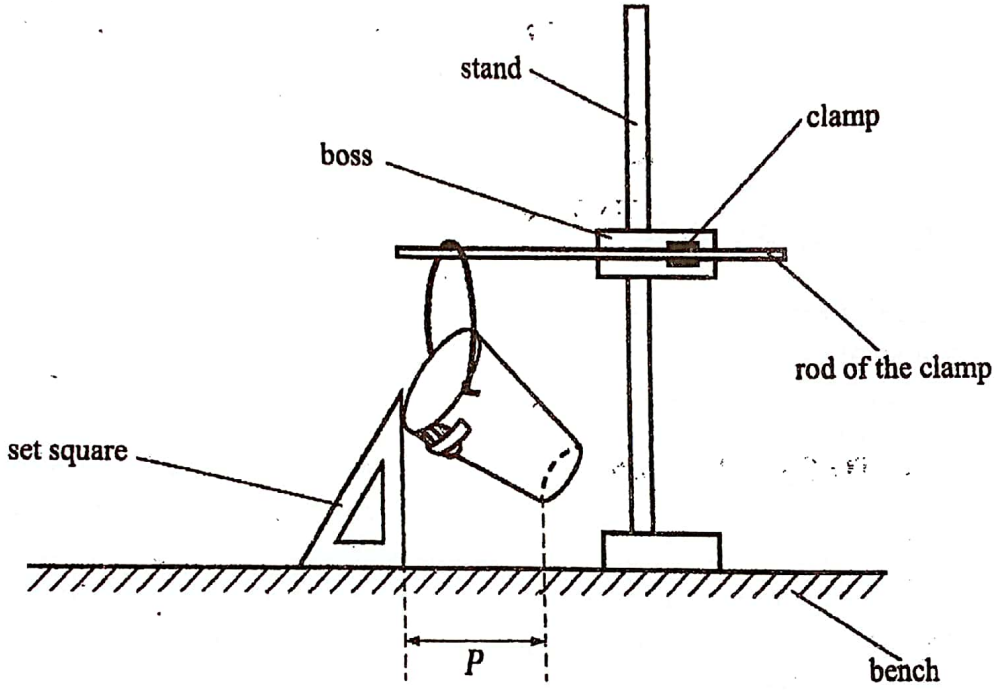

Fig. 1

(e) Measure and record the horizontal distance, P_0, between the edges of the cup.

(f) Measure a volume, $V = 10cm^3$ of water using a measuring cylinder and pour it gently into the cup.

(g) Record the total mass, m of water in the cup (*The mass of $1cm^3$ of water is 1g*).

(h) Measure and record the horizontal distance, P, between the edges of the cup.

(i) Repeat procedures (f) to (h) for values of $V = 20, 30, 40, 50$ and $60\ cm^3$.

(j) Record your results in a suitable table, including values of $\sqrt{m}$ and $\sqrt{P}$.

(k) Plot a graph of $\sqrt{P}$ **(along the vertical axis)** against $\sqrt{m}$ **(along the horizontal axis).**

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

(m) Read and record the intercept, C, on the $\sqrt{P}$ – axis

DISMANTLE THE SET UP OF THE APPARATUS

CamScanner

ic cup provide
20 marks)

In this experiment, you will determine the effective width, W of the glass block provided *(30 marks)*

(a) Measure and record the width, W_1, of the block provided using a half meter rule.

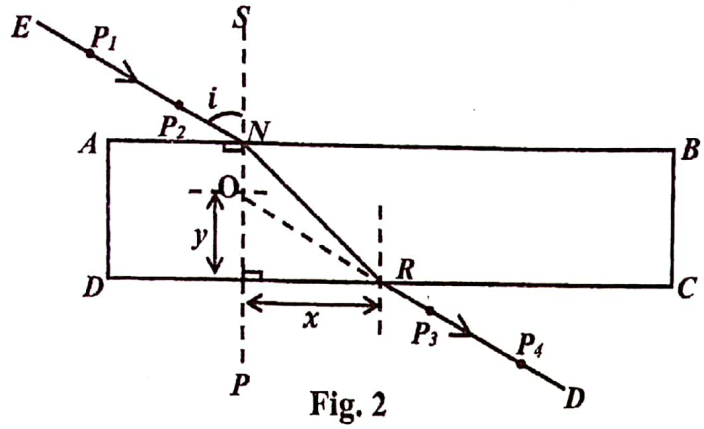

Fig. 2

(b) Place the glass block on plane paper on a soft board and draw its outline $ABCD$.

(c) Draw the normal PNS at point N, 1.0cm from A.

(d) Draw line EN such that $i = 45^0$.

(e) Fix pins P_1 and P_2 about 10cm apart on EN.

(f) Fix pins P_3 and P_4 such that they appear to be in line with images of P_1 and P_2 as seen through face DC of the block.

(g) Remove the block and draw line joining P_3 and P_4 to DC and label the point of intersection, R.

(h) Join point R to the normal PNS at point O.

(i) Measure and record distances x and y.

(j) Repeat procedures (d) to (h) for $i = 50^0, 55^0, 60^0, 65^0$ and 70^0.

(k) Tabulate the results including values of x^2 and y^2.

(l) Plot a graph x^2 **(along the vertical axis)** against y^2 **(along the horizontal axis)**.

(m) Read the intercept, I on the x^2 - axis.

(n) Calculate the width, W_2 of the block from: $W_2 = 2\sqrt{\frac{I}{5}}$

(o) Calculate the effective width, W from: $W = \frac{W_1+W_2}{2}$.

HAND IN YOUR TRACINGS TOGETHER WITH YOUR ANSWER SHEETS

CamScanner

3. In this experiment, you will determine the ratio, ρ, of internal resistance of a pair of dry cells to the resistance per centimeter of the wire labelled, W provided. *(30 marks)*

(a) Fix the bare wire labelled, W, on the bench using sellotape.

(b) Connect the circuit shown in figure 3.

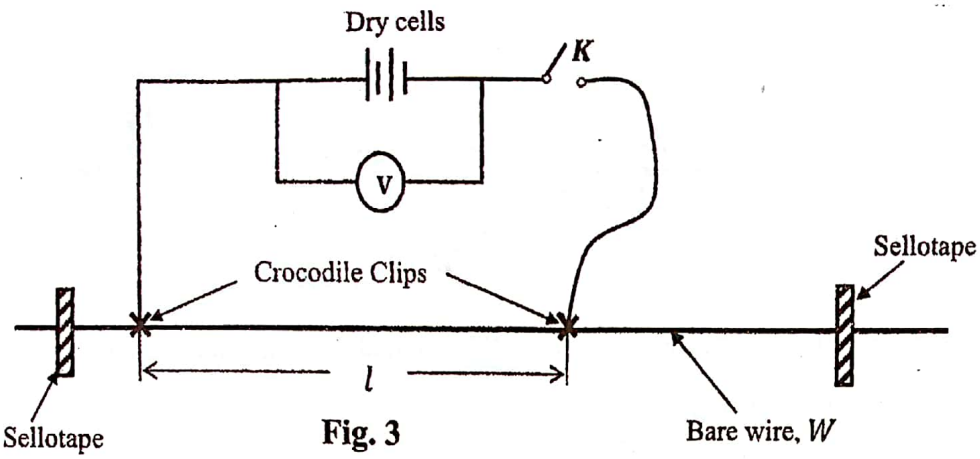

Fig. 3

(c) Starting with a length, $l = 20$cm, read and record the voltmeter reading, V_0.

(d) Close switch, K.

(e) Read and record the voltmeter reading, V_1.

(f) Open switch, K.

(g) Repeat procedures (c) to (f) for values of $l = 30, 40, 50, 60$ and 70cm.

(h) Record your results in a suitable table including values of $V = (V_0 - V_1)$ and $\frac{V_1}{l}$.

(i) Plot a graph of V **(along the vertical axis)** against $\frac{V_1}{l}$ **(along the horizontal axis).**

(j) Determine the slope, ρ, of the graph.

DISCONNECT THE CIRCUIT

END

CamScanner