P510/3
PHYSICS PRACTICAL
PAPER 3
JULY/AUGUST, 2017
3¼HRS

INTERNAL MOCK EXAMINATIONS, 2017

Uganda Advanced Certificate of Education

PHYSICS PRACTICAL

PAPER 3

3HOURS 15 MINUTES

INSTRUCTIONS TO CANDIDATES:

- Answer question **1** and **one**other question.
- Candidates will not be allowed to use the apparatus or write for the fifteen minutes
- Graph papers are provided
- Mathematical tables and non programmable calculators may be used
- Candidates are expected to record on their scripts all their observations as they are made and to plan the presentation of the records so that it is not necessary to make a fair copy of them. The working of the answers is to be handled in.
- Details on question paper should not be repeated in the answer nor in the theory of the experiment required.
- Marks are given mainly for a clear record of the observations

1. **In this experiment you will determine the acceleration due to gravity, g.**

(a) Measure and record the length, L, of the metal provided.

(b) Bend the rod at its mid-point so as to form a V-shape with an angle y^0, between its arms

(c) Clamp a paper clip between two small pieces of wood and suspend the rod on the clip so that the rodcan swing freely at its vertex as shown in *Fig.1*

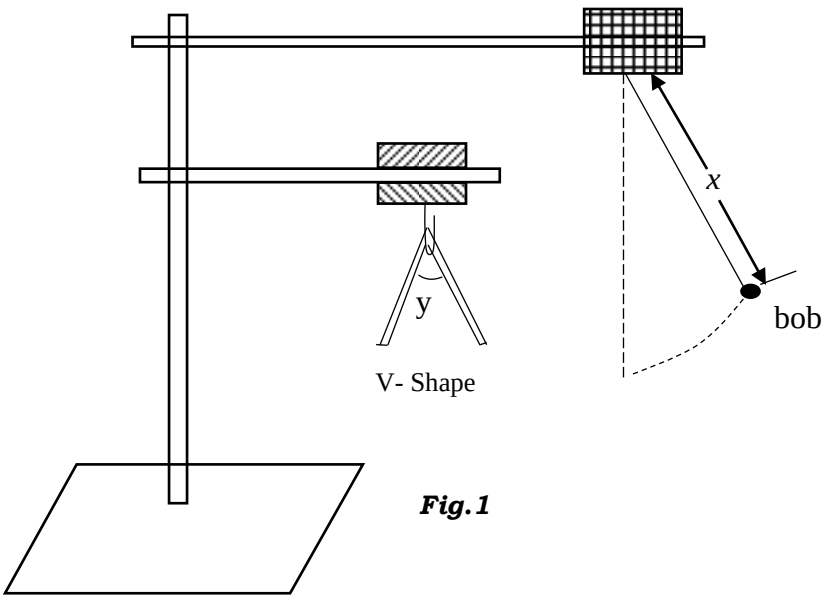

Fig.1

(d) Tie a piece of thread to the bob provided and clamp the thread between other two small pieces of wood so that the length, *x,* of pendulum is about 50cm as shown in *fig.1*

(e) Set the length***x***to 15cm. Displace both the pendulum bob and the rod through a small angle in the same direction and release them at the same instant so that each of them oscillates in its own vertical plane

(f) Adjust the angle **y** so that both the rod and the pendulum oscillate with the same frequency to atleast twenty complete oscillations.

(g) Measure and record angle y

(h) Repeat procedures (e) to (g) for values of ***x*** = 20, 25, 30, 35 and 40cm.

(i) Tabulate your results including values of **Sec** $\frac{1}{2}$ **y**.

(j) Plot a graph of ***x*** against **sec** $\frac{1}{2}$ **y**

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

(l) Adjust the angle y to $\mathbf{y^1}$= 30^0 and set the rod to perform small oscillations at its vertex in its own vertical plane.Obtain the time for twenty complete oscillations and determine the period, T, of the oscillations

(m) Calculate the acceleration due to gravity, **g** from the expression

$$\mathbf{Sec}\ \frac{1}{2}\mathbf{y^1} = \frac{\mathbf{g\,T^2}}{\mathbf{4\,\pi^2\,k}}$$

Question 2:

In this experiment, you will determine the refractive index,∩ of the material of the glass prism provided.

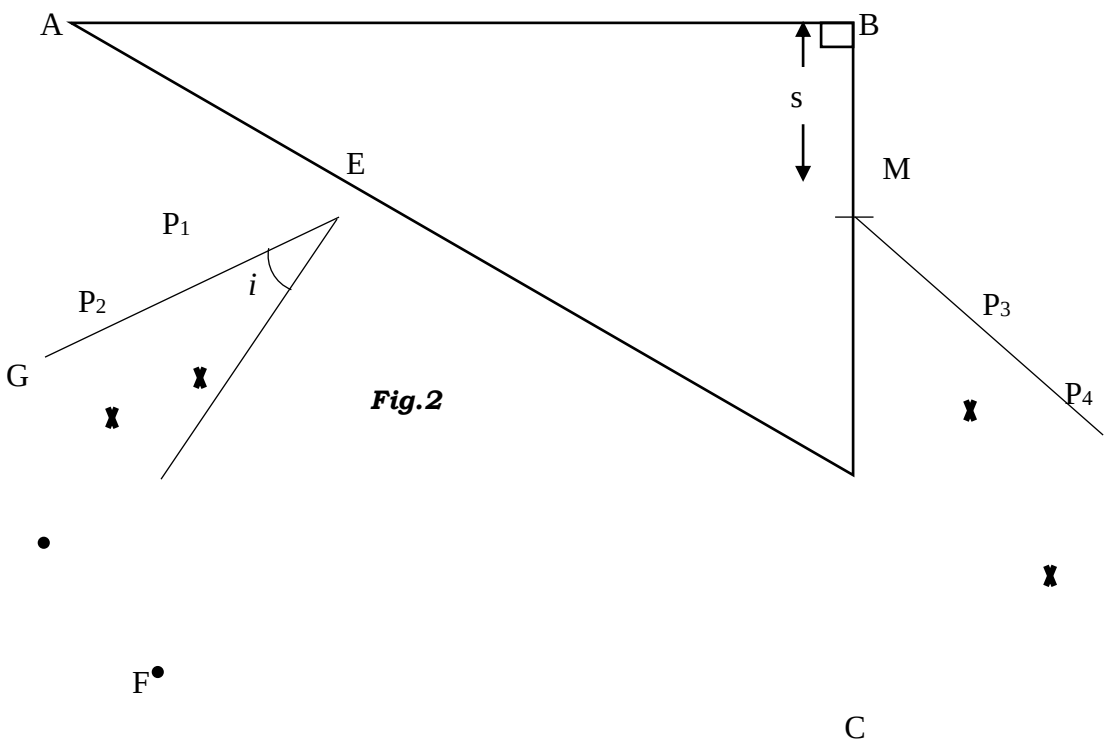

Fig.2

(a) Fix a plain sheet of paper on the soft board

(b) Place the glass prism with its triangular section facing upwards on the sheet of paper.

(c) Trace the outline of the prism as shown in F*ig. 2*

(d) Remove the glass prism

(e) Measure and record the length d, of AB in cm

(f) Mark a point E on AC a distance of 1.0cm from A.

(g) Draw a line EF perpendicular to AC

(h) Draw a line EG making an angle i=15^0 to EF.

(i) Fix two pins P_1 and P_2 on EG

(j) Replace the glass prism on its outline

(k) Looking through the face BC of the prism, fix two pins P_3 and P_4 so that they appear to be in line with theimages of P_1 and P_2.

(l) Remove the glass prism

(m) Draw a line through P_3 and P_4 to meet the line BC at M

(n) Measure the length, s, of BC in cm

(o) Repeat procedures (h) to (n) for values of i=20^0,25^0, 30^0 and 40^0

(p) Enter your results in a suitable table including values of $\sin^2 i$ and

$$y = \frac{(s-t)^2}{m^2+(s\sqrt{2}+1)^2}$$ where t = (d -$\sqrt{2}$) and m= (d $\sqrt{2}$) – 1

(q) Plot a graph of **sin ^{2} *i*** against **y**.

(r) Find the slope, **P,** of the graph.

(s) Calculate the refractive index,$\cap$ of the materials of the prism from the equation$\cap = \sqrt{P}$

Question 3.

In this experiment, you will check the calibration of an ammeter using a slide wire potential meter

(a) Connect the voltmeter provided a cross the terminals of the cell marked E,

(b) Read and record the voltmeter reading E_o

(c) Connect the circuit shown in F*ig.3*

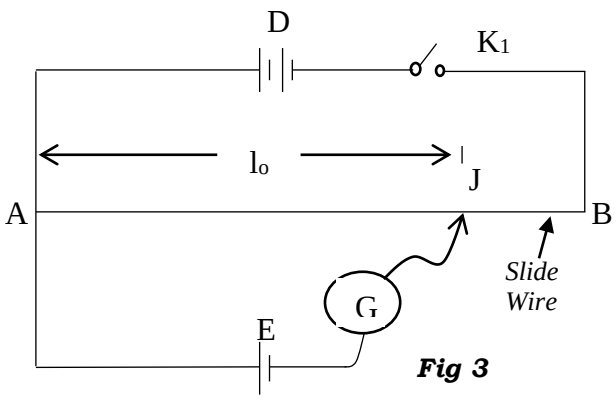

Fig 3

(d) Close switch, K_1

(e) Move the sliding contact, J, along the slide wire, AB to locate a point on it for which G shows no deflection.

(f) Measure and record the balance length, l_o

(g) Open switch, K_1,

(h) Calculate the value of **k** from the expression

$$k = \frac{E_o}{l_o x R_s}$$ where R_s = 1Ω

(i) Connect the circuit shown in *Fig 4*

D

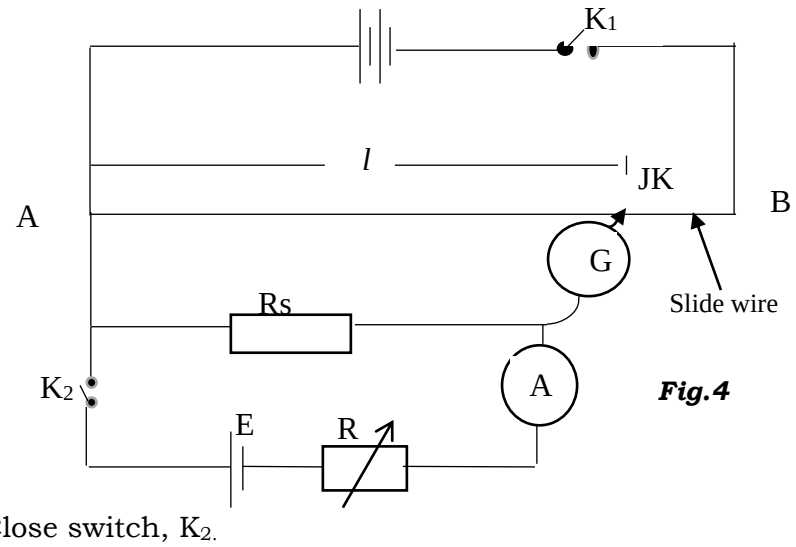

Fig.4

(j) Close switch, K_2.

(k) Adjust the rheostat, R, until the ammeter, A reads I_r = 0.15A

(l) Close switch K_1

(m) Move the sliding contact, J, along the slide wire to locate a point on it for which G shows no deflection.

(n) Measure and record the balance length l

(o) Open switch, K_1

(p) Repeat procedures (k) to (o) for ammeter readings I_r = 0.20, 0.25, 0.30, 0.35, 0.40, 0.45 and 0.50A

(q) Tabulate your results including the values of$I_a=kl$

(r) Plot a graph of I_a against I_r

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

(t) Comment on the value of the slope.

END