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PHYSICS

PRACTICAL

PAPER 3

JULY/AUGUST 2023

TIME: 2¼ HOURS



MPISSHA JOINT MOCK EXAMINATION

UGANDA CERTIFICATE OF EDUCATION

PHYSICS PRACTICAL

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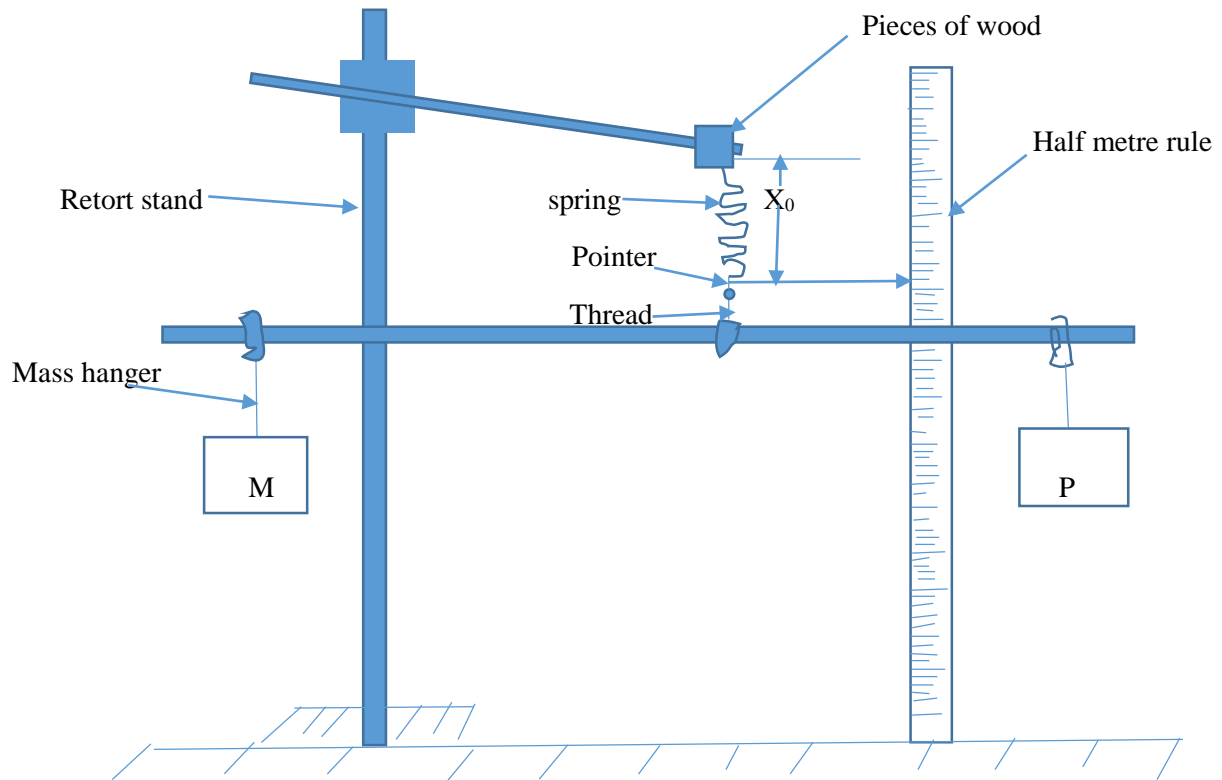
PAPER 3

TIME: 2hours 15 minutes

Instructions to the candidates:

- Answer question 1 and one other question
- Any additional question(s) answered will not be marked
- For each question, candidates will be required to select suitable apparatus from the equipments provided.
- You will not be allowed to start working with the apparatus for the first quarter of an hour.
- Marks are given mainly for clear record of the observations actually made, for their suitability and accuracy and for use made of them.

1. In this experiment ,you will determine the constant ,K, of the spring provided
 - a) Clamp the spring provided in a retort stand using two pieces of wood.
 - b) Suspend the metre ruler from the spring using a piece of thread.
 - c) Adjust the position of the loop and the metre ruler, until it balances horizontally.
 - d) Read and record the length, X_0 , of the spring, without including the hook of the spring.
 - e) Suspend the mass . $M=0.100\text{kg}$ and mass P from the metre ruler using pieces of wood as shown in the figure 1 below



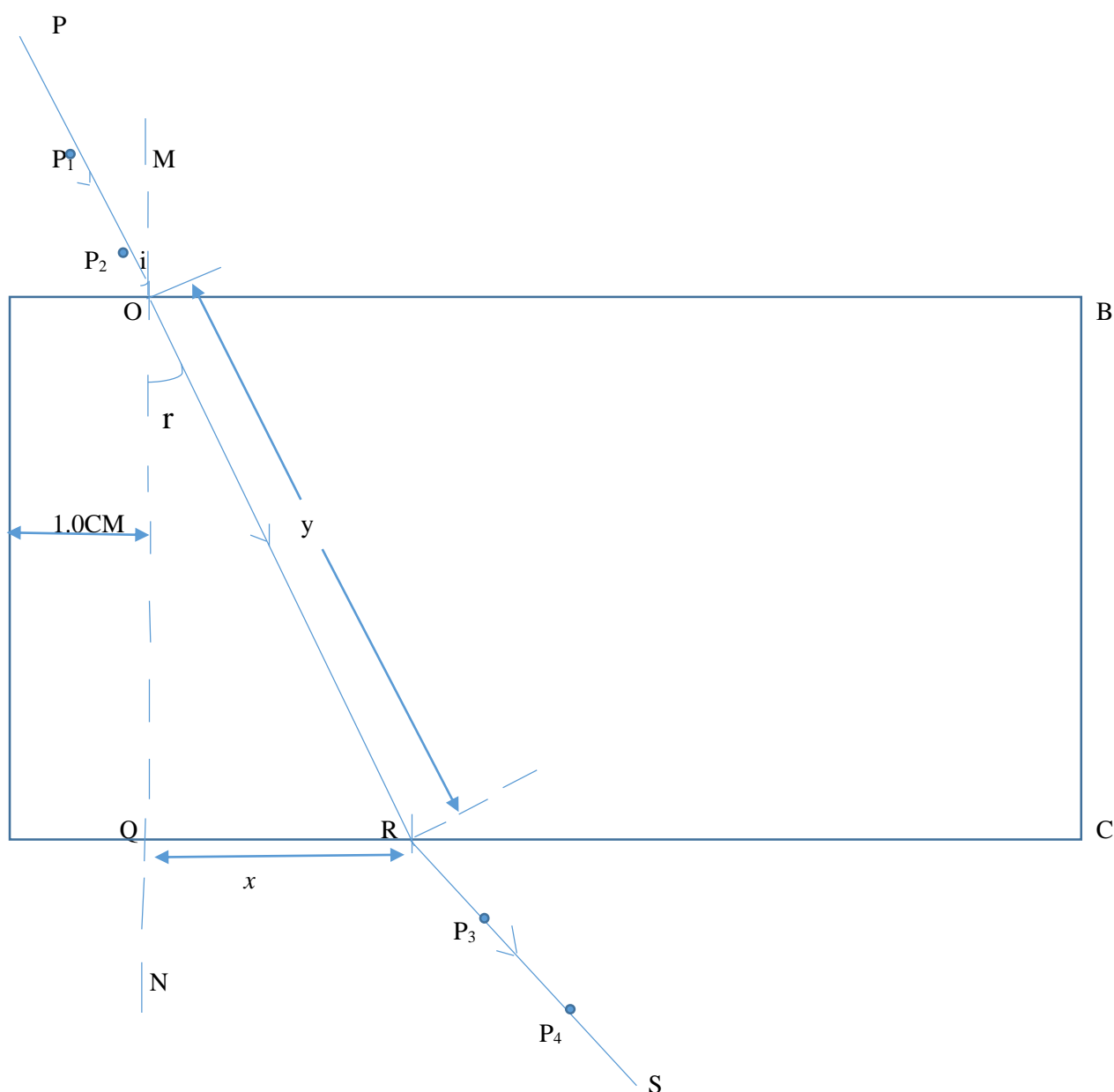
- (f) Adjust position of M and P until the metre-rule balances horizontally.
- (g) Measure and record the new length, X of the spring.
- (h) Repeat procedures (f) to (g) for values $M=0.200, 0.300, 0.400, 0.500$ and 0.600kg
- (i) Record your result in a suitable table including values of $(M+P)$ and $(X-X_0)$
- (j) Plot a graph of $(M+P)$ (a long the vertical axis) against $(X-X_0)$ (a long the horizontal axis)
- (k) Determine the slope, S, of the graph
- (l) Calculate the value of the spring constant, K, from the expression

$$\frac{1}{S} = \frac{g}{K}$$

Where $g=10\text{Nkg}^{-1}$

(30marks)

2. In this experiment ,you will determine the refractive μ of the material of glass provided
- Fix a white sheet of paper on to a soft board.
 - Place the broad face of the glass block to rest on the white sheet of paper, and trace its outline.
 - Remove the glass block and label its outline ABCD as shown in figure 2 below



- Draw a normal MN to AB and CD at a distance of 1.0cm from AD to meet AB at O and CD at Q
- Draw a line PO at an angle $i = 10^\circ$
- Stick two pins P_1 at P_2 , vertically along PO
- Replace the glass block on to its outline

- h) While looking through the glass block from side CD, stick two other two pins P_3 and P_4 such that they appear to be in line with Pins P_1 and P_2 .
- i) Remove the glass block and the pins P_3 and P_4
- j) Draw line SR through P_4 and P_3 , to meet CD at R.
- k) Join O to R
- l) Measure and record angle r , and distances x and y .
- m) Repeat procedure (e) to (l) for values of $i=20, 30, 40, 50$ and 60° .
- n) Enter your results in a suitable table in values of $\sin i$ and x/y
- o) Plot a graph of $\sin i$ (along the vertical axis) against x/y
- p) Determine the slope, μ , of the graph.
- q) State any source of errors that affect the accuracy of your answer.

NB; Hand in your tracing paper with your answer booklet.

(30 Marks)

3. In this experiment, you will determine the internal resistance, r , of the cells provided.

a) Read and record the values of resistance, R , of the standard resistor provided.

b) Connect the two dry cells to the voltmeter as shown in the fig 3(a) below.

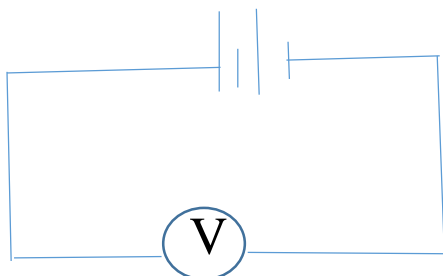


Fig 3(a)

c) Read and record the voltmeter reading, E ,

d) Disconnect the circuit.

e) Fix the bare, W , on the metre rule using the sellotape.

f) Connect the circuit as shown in the fig 3 (b) below.

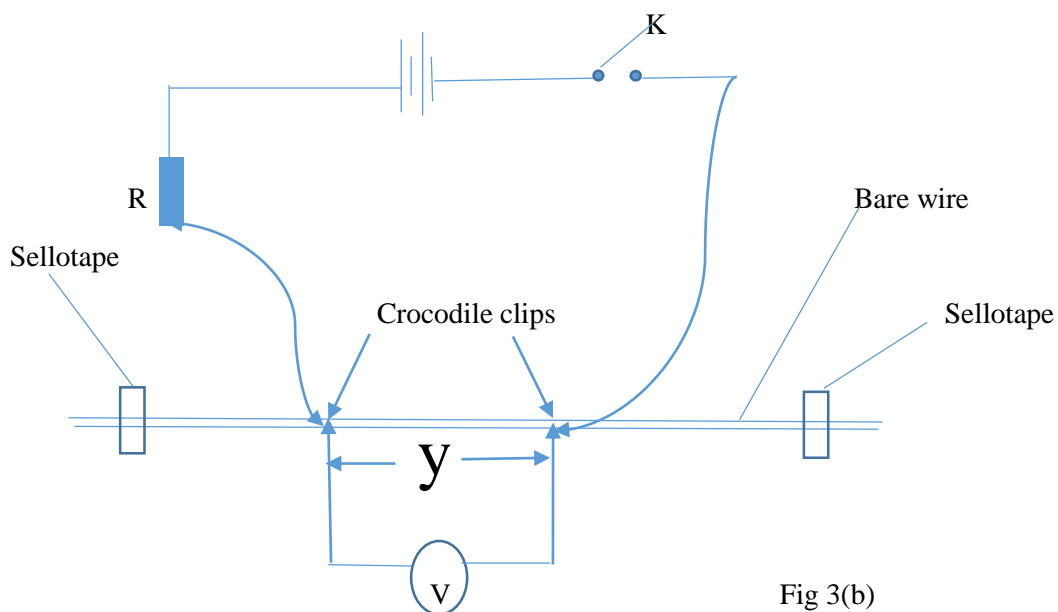


Fig 3(b)

g) Start with length $y = 0.200\text{m}$, close switch, K .

h) Read and record the reading, V , of the voltmeter.

i) Open the switch, K .

j) Repeat the procedures from (g) to (i) for values of $y = 0.300, 0.400, 0.500, 0.600$ and 0.700m

k) Record your results in a suitable table including values of $1/y$ and E/V .

l) Plot a graph of E/V (along the vertical axis) against $1/y$ (along the horizontal axis)

m) Find the slope, S of the graph.

n) Find the internal resistance, r , from the expression.

$$4.4S = r + R$$

(30 marks)