535/3
PHYSICS
Paper 3
July/Aug. 2023
2¼ hours

MASAKA DIOCESE EXAMINATION BOARD

UCE Joint Mock Examinations 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 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 work and 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.

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

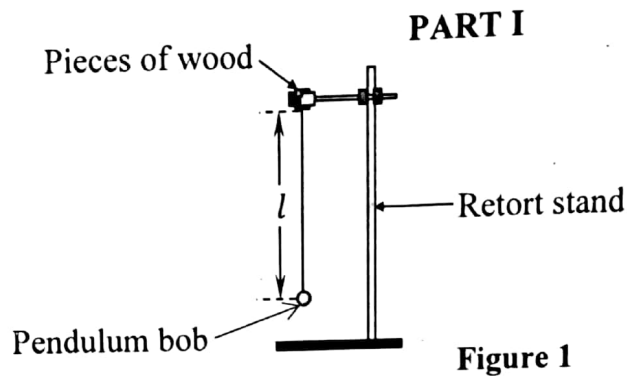An account of the method of carrying out the experiment is **not** required.

Squared papers are provided.

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

Turn Over

1. In this experiment you will determine the constant, h, of the spring provided.

(30 marks)

PART I

Figure 1

(a) Set up the apparatus as shown in figure 1.

(b) Adjust the length, l, of the pendulum string to 50.0 cm.

(c) Displace the pendulum bob through a small angle and allow it to oscillate.

(d) Measure and record the time, t, for 20 oscillations.

PART II

(e) Clamp the spring provided so that the pointer points against the ascending scale of the metre rule as shown in figure 2.

Figure 2
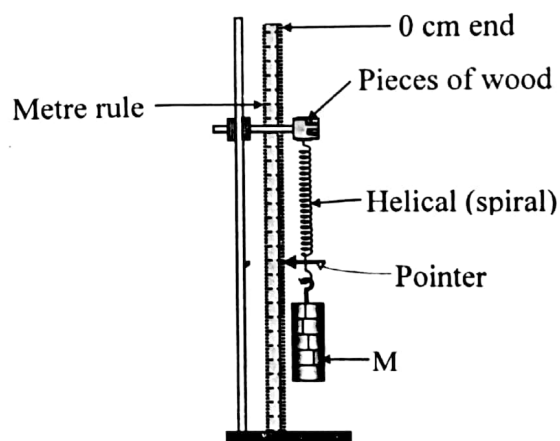
(f) Read and record the initial position P_o of the pointer.

(g) Hang a mass M = 0.100kg on the lower part of the spring.

(h) Read and record the new position P_1 of the pointer.

(i) Repeat procedures (g) to (h) for M = 0.200, 0.300, 0.400, 0.500 and 0.600 kg.

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(j)   Record your results in a suitable table including values of $x = P_1 - P_0$.

(k)   Plot a graph of M (**along the vertical axis**) against x (**along the horizontal axis**).

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

(m)   Calculate the value of, h, from the expression:

$$h = \frac{7.9 \times 10^3 S}{t^2}.$$

(n)   Suggest any two sources of error in this experiment.

2. In this experiment you will determine constant, p, of the lens provided.
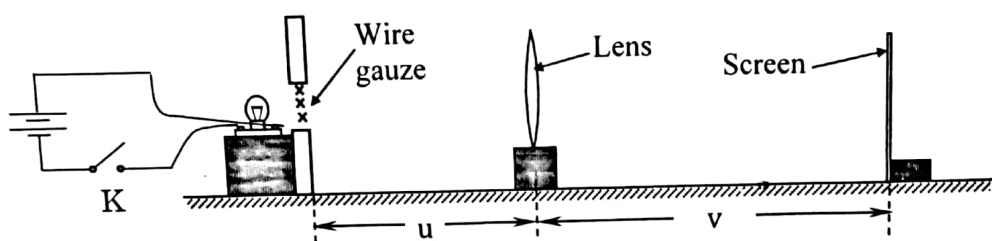(30 marks)

Figure 3

(a)   Arrange the torch bulb, the lens, and the screen as shown in figure 3.

(b)   Adjust the object distance $u = 45$ cm and close the switch.

(c)   Move the screen until a sharp image of the wire mesh is obtained on it.

(d)   Measure and record distance, v between the lens and screen.

(e)   Open the switch.

(f)   Repeat procedures (b) to (e) for values of $u = 40, 35, 30, 25$ and 20 cm.

(g)   Put your results in a suitable table including values of $\frac{1}{u}$ and $\frac{1}{v}$

(h)   Plot a graph of $\frac{1}{v}$ (**along the vertical axis**) against $\frac{1}{u}$ (**along the horizontal axis**).

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

(j)   Read and record the intercept C on the $\frac{1}{v}$ – axis.

(k)   Calculate the constant, p, from the expression;

$$p = \frac{-S}{C}.$$

(l)   State any two possible sources of errors in this experiment.

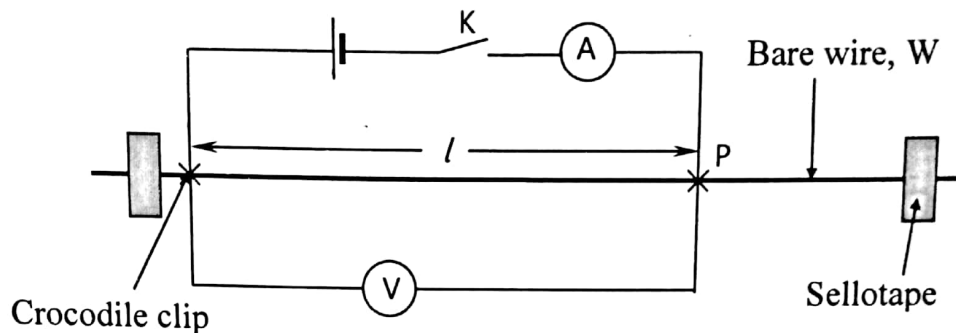3. In this experiment you will determine the constants, ω and β of the cell provided.

Figure 4

(a) Fix the bare wire, W, on the table using Sellotape.

(b) Connect the circuit shown in Figure 4 with l, about 95cm.

(c) Close the switch, K.

(d) Adjust the crocodile clip at P, until the ammeter reading, $I = 0.20$A.

(e) Read and record the voltmeter reading, V, and length, l.

(f) Open switch, K.

(g) Repeat procedures (c), to (f), for $I = 0.30, 0.40, 0.50, 0.60$ and 0.70A.

(h) Record your results in a suitable table including values of $\frac{1}{V}$ and $\frac{1}{l}$.

(i) Plot a graph of $\frac{1}{V}$ **(along the vertical axis)** against $\frac{1}{l}$ **(along the horizontal axis)**

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

(k) Find the intercept, C, on the $\frac{1}{V}$ - axis.

(l) Calculate constant, ω of the cell from

$$\omega = \frac{1}{C}.$$

(m) Find the constant, β of the cell from

$$S = \frac{C\beta}{3.15}.$$

(n) Suggest any two ways of minimizing errors in this experiment.

END