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

UGANDA TEACHERS' EDUCATION CONSULT (UTEC)

Uganda Certificate of Education

PHYSICS

(PRACTICAL)

Paper 3

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

*Answer **question 1 and any other question.***

*Candidates are **not** allowed to use the apparatus or write for the first 15 minutes.*

Graph papers are provided.

Mathematical tables and non programmable calculators may be used

Candidates are expected to record all their observations as these observations are made and to plan presentation of records so that it's not necessary to make a fair copy of them.

Details of the question paper should not be represented in the answer, nor is the theory of the experiment required unless specifically asked for. Candidates should however, record any special precautions they have taken and any particular feature of their method of going about the experiment.

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

Turn Over

1. **In this experiment you will determine a constant θ of the spring provided.**

(a) Clamp the spring provided as shown in the figure below.

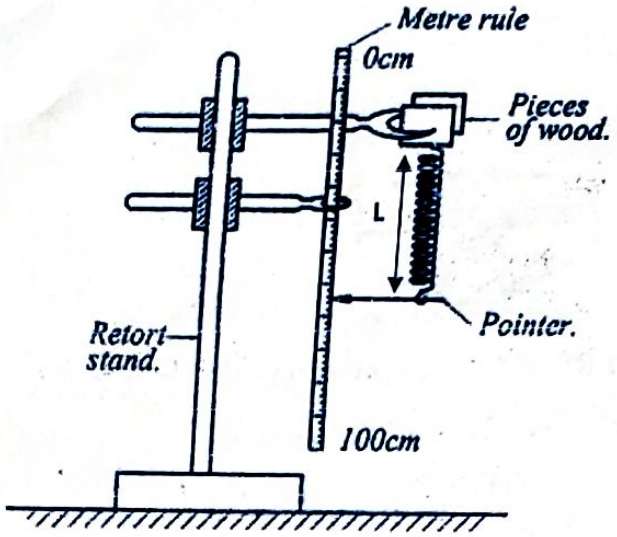

Fig. 1

(b) Measure the un stretched length L_0 when the spring is unloaded.

(c) Add a mass m = 0.050kg on the spring.

(d) Measure and record the new length L of the spring in meters.

(e) Repeat procedures (c) to (e) for m = 0.100, 0.150, 0.200, 0.250 and 0.300kg.

(f) Record your results in a suitable table.

(g) Plot a graph of L **(along the vertical axis)** against m **(along the horizontal axis)**.

(h) From your graph find the value of m for which $\mathbf{L = 2L_0}$. Call this value m_1.

(i) Unload the spring, suspend a mass **W** = 0.200kg from the spring.

(j) Pull the mass downwards through a small distance and release it to oscillate vertically.

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

(l) Calculate period **T** time for one oscillation

(m) Find the value of θ from the expression $\theta = \frac{WL_0}{0.50}T^2$.

2. **In this experiment, you will determine the focal length, f, of lens provided.**

Procedure;

(a) Fix the manila card provided on the table using a cello tape.

(b) Fix the base of the lens holder exactly on the line passing through the mid-point of the manila card as shown in ***figure 2.***

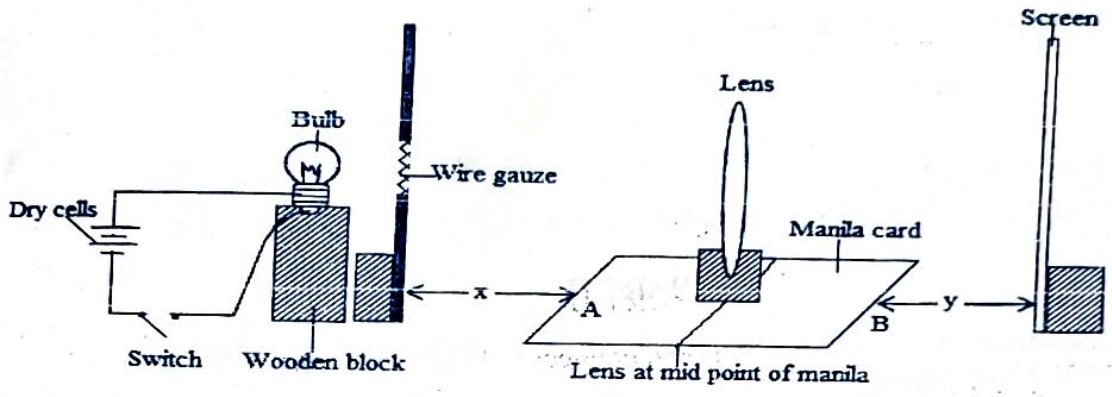

Figure 2

(c) Align the screen, lens and illuminated wire gauze such that the centre of the lens and the gauze are at the same height above the table and in a straight line.

(d) Place the wire gauze object at a distance $x = 2.5cm$ from the edge A of the manila card.

(e) Move the screen to obtain a clear image of the object on the screen.

(f) Record the distance, y, of the screen from edge of the manila card.

(g) Repeat procedures (**d**) to (**f**) for values of $x = 5.0$, 7.5, 10.0, 12.5 and 15.0cm.

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

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

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

(k) Calculate the focal length, f, the express $\mathbf{S} = \frac{1}{f^2}$.

HAND IN YOUR TRACING PAPER

3. **In this experiment, you will determine the internal resistance, r, of the dry cell provided.**

PART I

a) Connect the circuit as shown in figure 3.

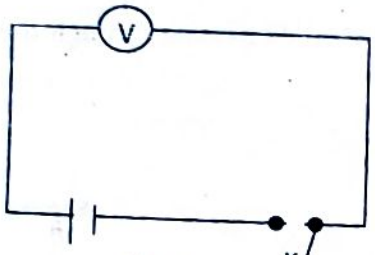

Fig.3

b) Close switch, **K**.

c) Read the value, **E**, of the voltmeter reading.

PART II

a) Disconnect the circuit in part 1, and connect it as shown in ***figure 4***.
With P_o = 1.00m.

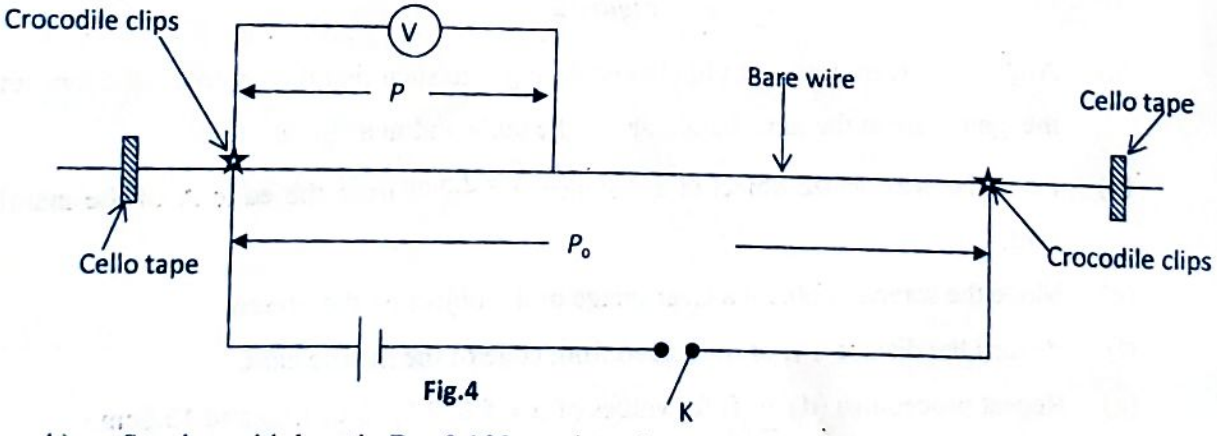

Fig.4

b) Starting with length **P** = 0.100 m, close the switch, **K**

c) Read and record the voltmeter reading V,

d) Open switch, **K**.

e) Repeat the procedures from (b) to (d) for values of **P** =0.200, 0.300, 0.400, 0.500, and 0.700 m.

f) Record your results in a suitable table.

g) Plot a graph of **V** (along the vertical axis) against **P** (along the horizontal axis)

h) Find the slope, **S**, of the graph.

i) Calculate the internal resistance, r, of the cell from the expression,

$$r = 3.7\left(\frac{E}{S} - p_0\right)$$

DISMANTLE THE SET UP

END