RESOURCEFUL MOCK 2017

Uganda Certificate of Education
PHYSICS 535/3
TIME: 2¼ HOURS

INSTRUCTIONS TO CANDIDATES

*Answer question **1** and **one** other question*
Any additional question(s) answered will not be marked
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 for 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 papers are provided
Mathematical tables and silent non-programmable calculators may be used.

1. In this experiment, you will determine the constant ***k***, of the spring provided.
[20 marks]

PART I

a. Set up the apparatus as shown in figure **1**

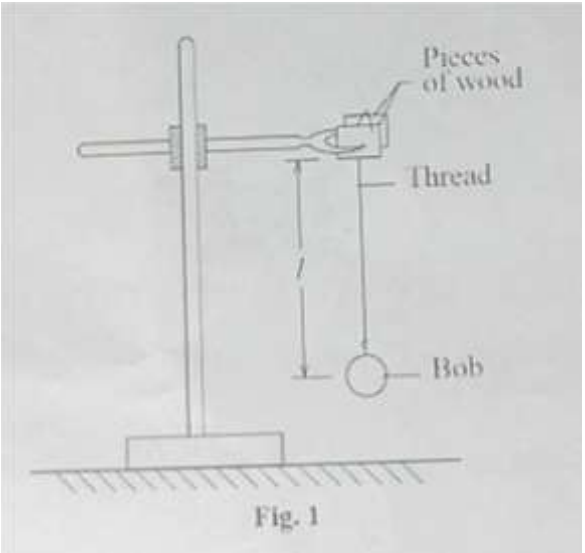


Fig. 1

b. Measure and record length ***l.***

c. Pull the bob slightly towards you and release it to oscillate.
d. Measure and record time, ***t***, for 20 complete oscillations

PART II

a. Clamp one end of the spring in the retort stand as shown in figure **2**

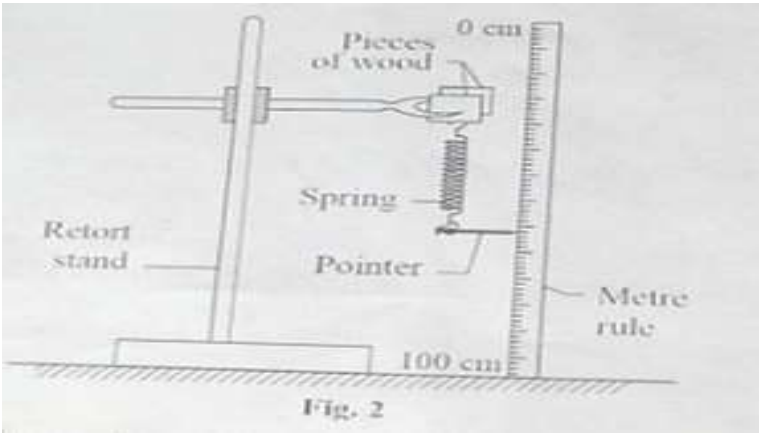


Fig. 2

b. Read and record the initial position, Y_0, of the pointer on the vertical metre rule scale placed with the zero mark at the top.
c. Suspended a mass, M = 0.10kg from the lower hook of the spring.
d. Read and record the new position, Y, of the pointer on the vertical metre rule as in (b).
e. Repeat procedure(s) (c) and (d) for M = 0.20, 0.30, 0.40, 0.50 and 0.60kg.
f. Record your results in a suitable table including values of $x = Y - Y_0$ in metres.
g. Plot a graph of M (along the vertical axis) against X (along the horizontal axis)
h. Determine the slope, S, of your graph.
i. Calculate, k, from the expression; $k = 1.6 \times 10^3 \left(\frac{\pi}{t}\right)^2 \times l \times S$

DISMANTLE THE SET-UP

2. In this experiment, you will determine the refractive index, n_g, of the glass block provided. [20mks]
   a. Fix a white sheet of paper onto the soft board.
   b. Place the board face of the glass block to rest on the white paper and trace its outline.
   c. Remove the glass block and label its CDEF as shown in figure 3

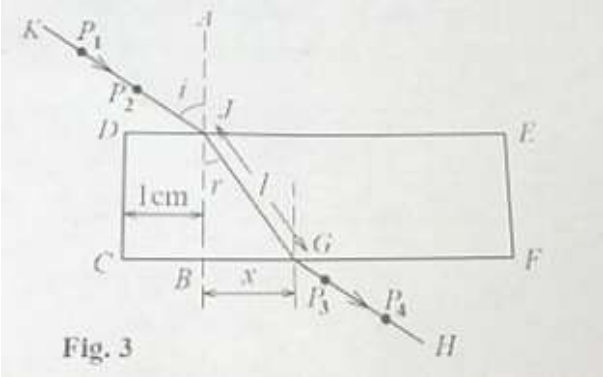
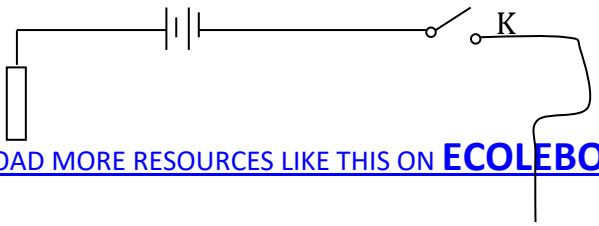


Fig. 3

d. Draw the normal AB to DE and CF at a distance 1.0cm from DC to meet DE and J and CF at B.
e. Measure angle i = 10^0
f. Fix pins P_1 and P_2 on KJ
g. Replace the block onto its outline.
h. Looking from side CF, fix pins P_3 and P_4 such that they appear in line with the images of P_1 and P_2.
i. Remove pins P_3 and P_4 and the glass block from its outline.
j. Draw the line HG through P_4 and P_3 to meet CF at G.
k. Measure and record the angle, ***r***, and distances ***x*** and ***l.***
l. Repeat procedure(s) (e) to (k) for ***i*** = 20, 30, 40, 50, and 60^0
m. Record your results in a suitable table including values of *x* Cos *r* and Sin *i*
n. Plot a graph of Sin *i* (along the vertical axis) against *x* Cos *r* (along the horizontal axis)
o. Determine the slope, S, of the graph.
p. Calculate, t, from the expression $t = l \cos r$ using values of ***l*** and ***r*** at $i = 30^0$.
q. Calculate, n_g, from $n_g = S \times t$

HAND IN YOUR TRACING PAPER TOGETHER WITH THE REST OF THE WORK

3. In this experiment, you will determine the internal resistance, ***r***, of the cells provided. [2mks]
   a. Record the resistance, R_s, of the standard resistor provided.
   b. Connect the two dry cells in series across the voltmeter and record the reading, E of the voltmeter.
   c. Fix the bare wire, W provided on the bench using sellotape.
   d. Connect the circuit shown in figure 4 starting with length y = 0.200m.



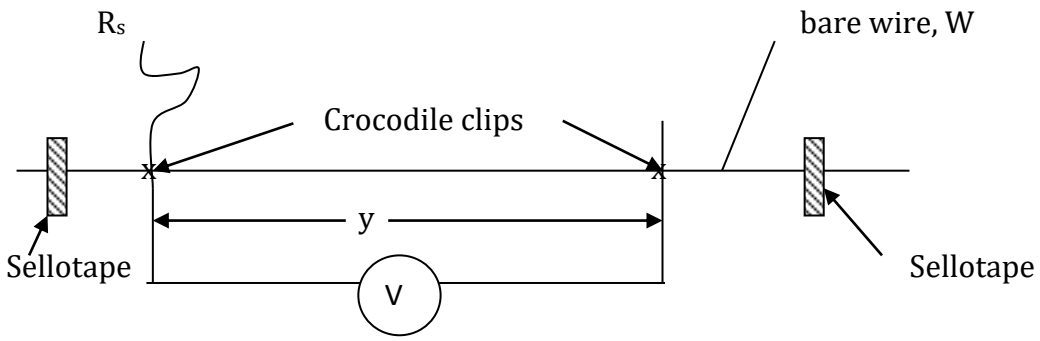


Fig. 4

e. Close switch K
f. Record the reading, V, of the voltmeter
g. Open switch K.

h. Repeat the procedure from (d) to (g) for values of y = 0.300, 0.400, 0.500, 0.600 and 0.700m.
i. Record your results in a suitable table including values of $\frac{1}{y}$ and $\frac{E}{V}$
j. Plot a graph of $\frac{E}{V}$ (along the vertical axis) against $\frac{1}{y}$ (along the horizontal axis).
k. Find the slope, S, of the graph.
l. Calculate the internal resistance, r, from the expression; 4.4S = r + R_s.

DISMANTLE THE SET –UP

END