**P510/3**

**PRACTICAL**

**PHYSICS**

Paper 3

**July/Aug. 2019**

3¼ hrs

**Uganda Advanced Certificate of Education**

**MOCK EXAMINATIONS**

**PHYSICS PRACTICAL**

Paper 3

3 hours 15 minutes

**INSTRUCTIONS TO CANDIDATES:**

*Answer question* **1** *and* **one** *other question.*

*Any additional question(s) answered will* **not** *be marked.*

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

*Graph papers are provided.*

*Mathematical tables and non – programmable scientific electronic calculators may be used.*

*Candidates are expected to record 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 handed in.*

*Details on the question paper should* **not** *be repeated in the answer, nor is the theory of the experiment required unless specifically asked for. However, candidates should record any special precautions they have taken and any particular features of their methods of going about the experiment.*

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

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**Turn Over**

1. In this experiment, you will determine the force constant , acceleration of free

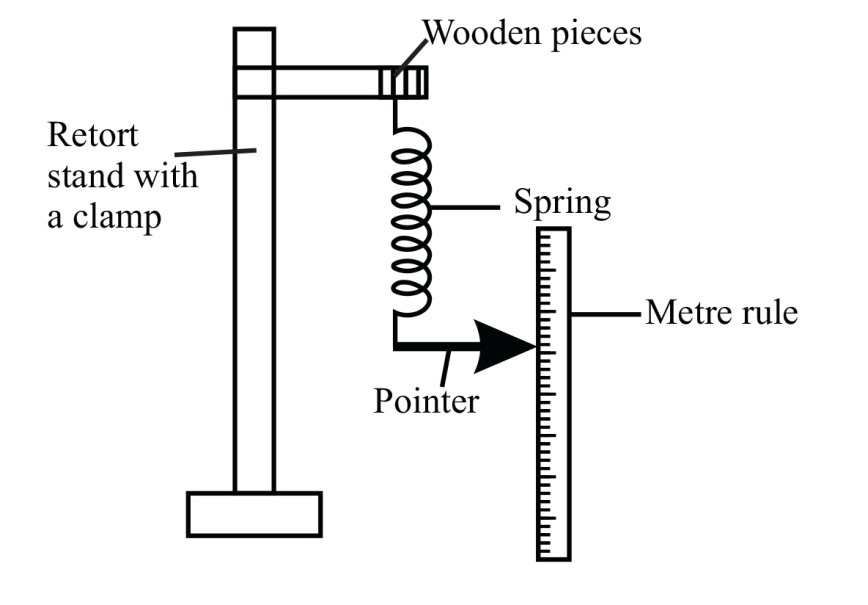
fall, and the effective mass, of the spring provided.

**Procedure:**

**Part 1**

1. Clamp the spring using the two pieces of wood and attach a pointer to the

free end of the spring making sure that the spring is vertical and the pointer is horizontal as shown in the figure below;



***Fig. 1***

1. Read and record the initial position, ***Po*** (in meters) on the vertical meter

rule.

1. Suspend a mass from the lower end of the spring. Read

and record the new pointer position, ***P***1 (in meters).

1. Obtain the value of the extension, ***e***, of the spring.
2. Replace the mass with and record the new pointer

position, ***P2*** (in meters).

1. Obtain the new extension, of the spring.
2. Calculate the constant, , of the spring from the expression

where .

1. Find the constant, , from the expression ( – ).

**Part II**

1. Suspend a mass, , from the spring, in part 1.
2. Pull the mass vertically downwards through a small displacement and

release it.

1. Measure the time, for oscillations of the mass. Hence obtain the

period of oscillations, .

1. Repeat the procedure (a) to (c) for values of , , ,

and .

1. Tabulate your results including values of .
2. Plot a graph of against .
3. Determine the slopes, , of the graph.
4. Calculate the value of from the expression .
5. Read and record the intercept, , on the – axis.
6. Calculate the effective mass, , of the spring from .
7. In this experiment you will determine the refractive index, of a glass prism. (33 marks)

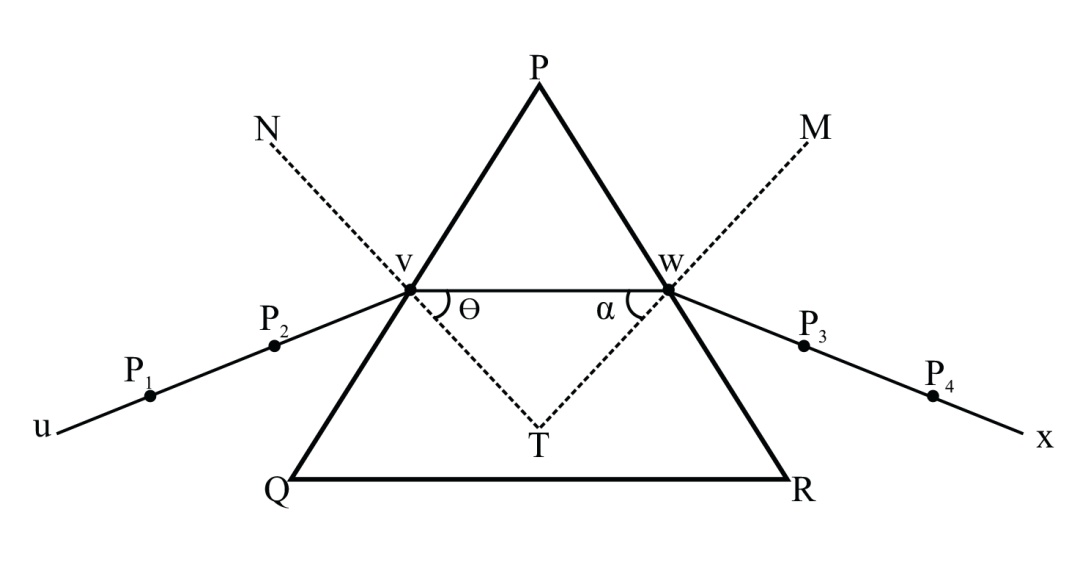
**Part 1**

1. Fix a plain sheet of paper on a soft board using pins.
2. Place the glass prism on the paper and trace its outline.
3. Remove the prism and label its outline as shown in the figure 2

below.

1. Mark point, midway between and along .

**Turn Over**



***Fig. 2***

1. Draw a normal to side through point .
2. Draw line making an angle of with the normal.
3. Fix pins ***P1*** and ***P2*** vertically upright on line .
4. Replace the prism on its outline.
5. While viewing through face ***PR***, fix pins ***P3*** and ***P4*** such that they appear to

be in line with pins ***P1*** and ***P2***.

1. Remove the prism.
2. Draw a line ***XW*** through the marks of ***P3*** and ***P4***.
3. Join ***V*** to ***W***.
4. Draw a normal ***MW*** at ***W*** and extending it until it meets the normal ***NV***.
5. Measure and record angles θ and .
6. Calculate the constant ***A*** from .

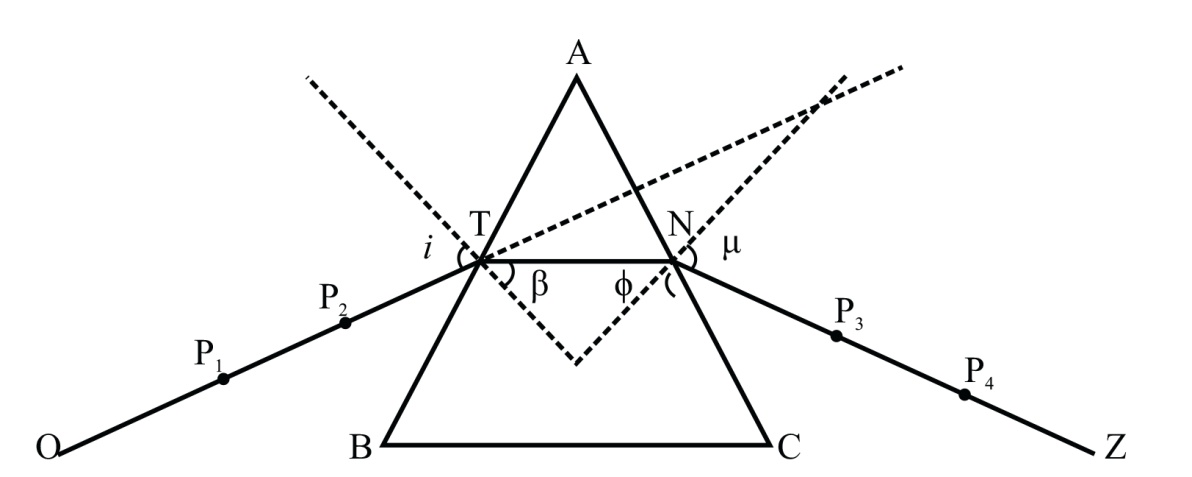
**Part II**

1. Fix the second sheet of paper provided on the soft board using drawing

pins.

1. Place the glass prism on the sheet of paper and trace its outline ***ABC*** as

shown in fig 3 below.



***Fig. 3***

1. Remove the prism and draw a normal to ***AB*** at a point ***T***, a distance of

about from point ***A***.

1. Draw line ***OT*** making an angle with the normal.
2. Place the optical pins ***P1*** and ***P2*** vertically on the line ***OP*** such that the

angle ***i*** is equal to .

1. Replace the prism on its outline.
2. While observing pins, ***P1*** and ***P2*** through face ***AC***, fix pins ***P3*** and ***P4*** such

that they appear to be in line with pins ***P1*** and ***P2***.

1. Remove the prism and pins and join ***Z*** to ***N*** through ***P4*** and ***P3*** and join also

***N*** to ***T***.

1. Measure and record the angles; , and .
2. Repeat procedure (d) to (g) for , , , , ,,

and .

1. Tabulate you results including values of; ,

and .

1. Plot a graph of against .

**Turn Over**

1. Determine from your graph, the value for which has the lowest

value.

1. Calculate the refractive index, , of glass from the expression;

.

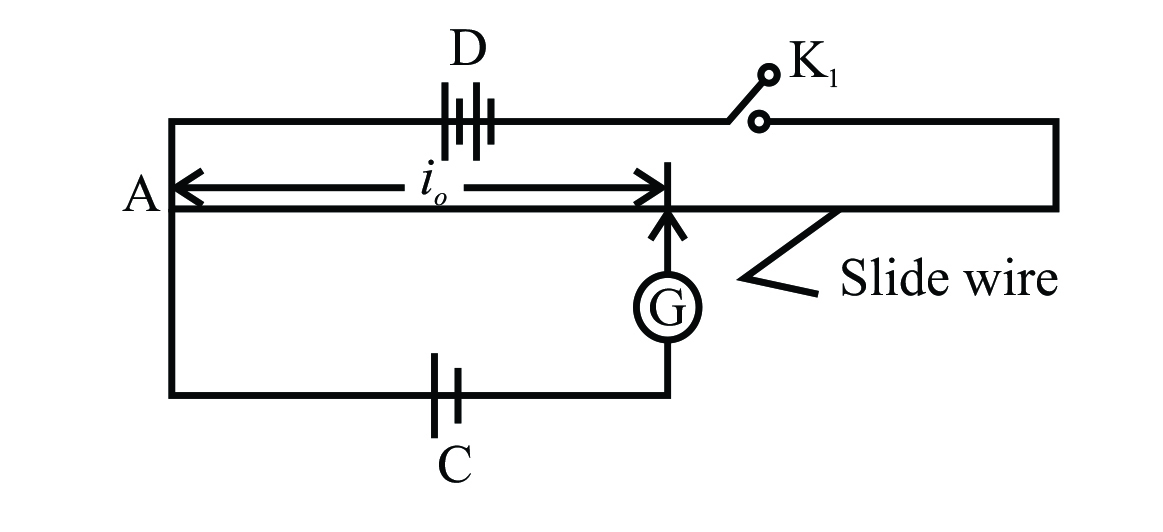
HAND IN THE PLAIN SHEETS OF PAPER WITH THE TRACINGS TOGETHER WITH THE REST OF THE WORK.

1. In this experiment, you will determine;
2. the pd per , the slide wire potentiometer.
3. the calibration of a voltmeter using a slide wire potentiometer.

(33 marks)

**PART 1**

1. Connect the voltmeter provided across the terminals of the cell labelled .
2. Read and record the reading of the voltmeter.
3. Connect the circuit shown in figure 4 below.



**B**

***Fig. 4***

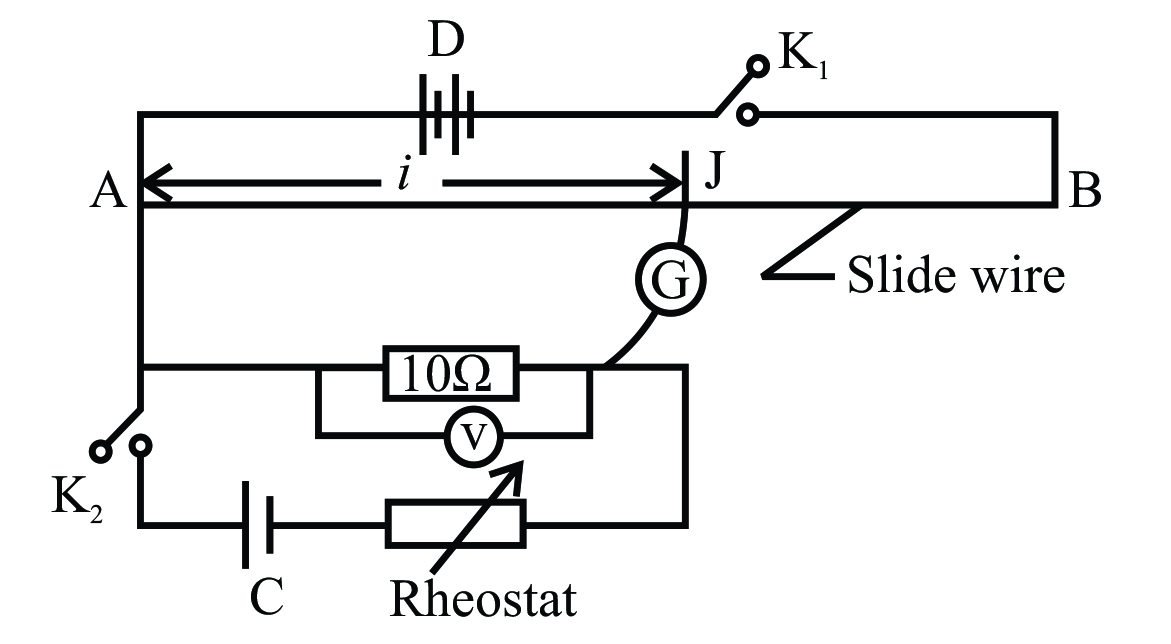
1. Close switch ***K1***.
2. Move the sliding contact along the slide wire to locate a point on ***AB*** for

which the galvanometer ***G*** shows no deflection.

1. Measure and record the balance length .
2. Open switch ***K1***.
3. Calculate the value of from the expression .

**PART II**

1. Connect the circuit shown in figure 5 below.



***Fig. 5***

1. Close switches ***K1*** and ***K2***.
2. Adjust the rheostat until the voltmeter reading .
3. Move the sliding contact along ***AB*** to locate the balance point when ***G***

shows no deflection.

1. Read and record the balance length .
2. Open switches ***K1*** and ***K2***.
3. Repeat procedures (b) to (f) for voltmeter readings, = , ,

, , and .

1. Tabulate your results, including values of .
2. Plot a graph of against .
3. Determine the slope ***S2*** of the graph.
4. Comment on the value of the slope.

**END**