

P510/ 3 INST. Sc.
PHYSICS
PRACTICALS
INSTRUCTIONS
JUL/AUG – 2019



NEZOPA DISTRICTS SECONDARY SCHOOLS
JOINT MOCK EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

MOCK EXAMS 2019

P510/3

PHYSICS PRACTICAL INSTRUCTIONS

JUL/AUG – 2019

CONFIDENTIAL:

- Great care should be taken that the information given below does not reach the candidates either directly or indirectly.

INSTRUCTIONS FOR PREPARING APPARATUS;

- The candidates will be instructed not to write out a detailed description of the apparatus.
- The teacher responsible for preparing the apparatus must give the details about some of the items of apparatus he/she has supplied.

NB: The head teacher MUST ensure that the teacher responsible for preparing the apparatus hands in his/her trial results properly sealed in a separate envelope and FIRMLY fastened (attached) to the candidates' scripts envelope (s).

In addition to the apparatus ordinarily contained in a Physics laboratory, each candidate is to be provided with;

QUESTION 1

- 1 G – clamp
- 1 metre rule
- 1 optical pin
- 1 piece of cello tape
- 1 mass hanger (100g)
- 3, 100g slotted masses
- 1 retort stand with two clamps
- 1 lab stool/office chair
- 1 spiral spring
- 4 pieces of wood measuring (5cm x 3cm x 1cm)
- 2 pieces of threads about 30cm long

QUESTION 2

- 1 rectangular glass block measuring (10cm x 6cm x 2cm)
- 1 equilateral glass prism
- 4 optical pins
- 4 drawing pins
- 1 soft board

QUESTION 3

- 1 constantan wire SWG 26 labelled W
- 1 constantan wire SWG 28 labelled Q
- 6 connecting wires (about 30cm each)
- 1, 5Ω standard resistor
- 2 dry cells (size D) in holder
- 1 jockey
- 2 crocodile clips
- 2 switches labelled K_1 and K_2
- 1 ammeter (0 – 1)A
- 2 pieces of cello tape
- 1 dry cell (size D) in a holder
- 1 potentiometer slide wire

END

P510/3
PHYSICS
PRACTICAL
Paper 3
JUL/AUG – 2019
3 ¼ HRS



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MOCK EXAMINATIONS 2019

PHYSICS PRACTICAL

Paper 3

3 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

- Answer question 1 and **one** other question.
- Candidates are **not** allowed to use the apparatus 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 of the question paper should **not** be repeated 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.

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

PART I

- Clamp the meter rule provided horizontally from point, P .
- Using a piece of thread suspend the end Q of the meter rule as shown in *figure 1*.

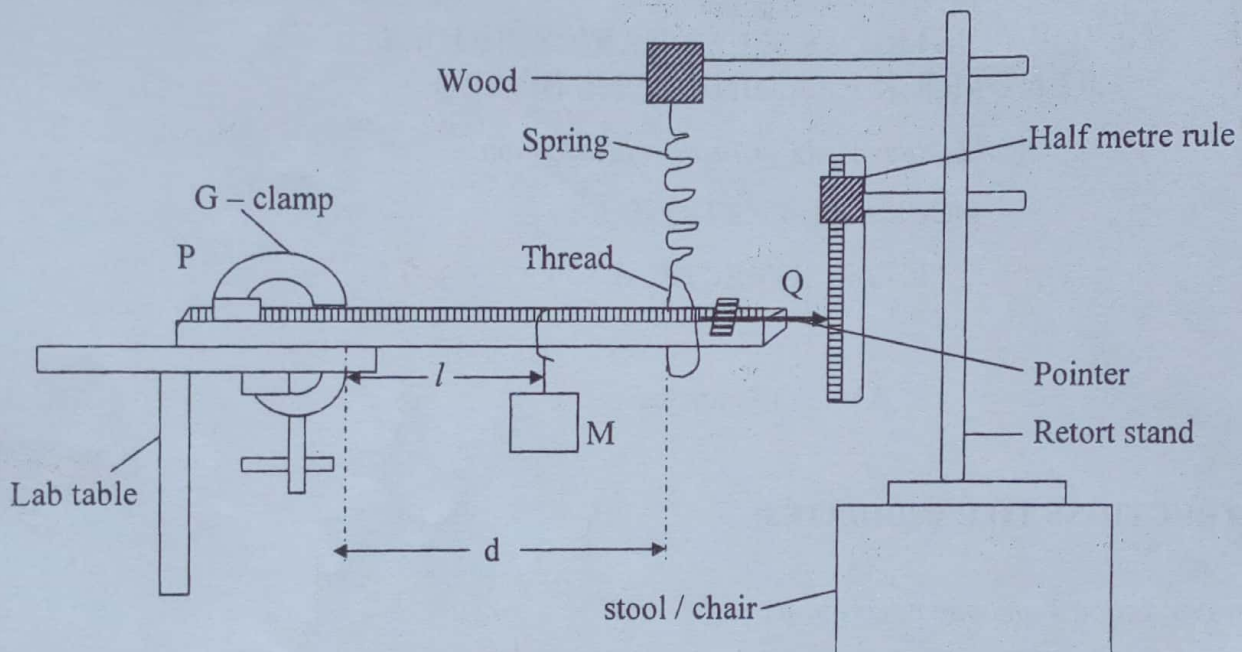


Fig 1

- Adjust the position of the spring until the metre rule balances horizontally and the distance, d , of the spring from P is $0.950m$
- Read and record the position of the pointer, P_0 , on the scale
- Hang the mass $M = 0.300kg$ at a distance $l = 0.200m$ from P . Read and record the new position of the pointer, P_n . Hence find the extension, e , of the spring in meters.
- Repeat procedure (e) for values of $l = 0.300, 0.400, 0.500, 0.600$ and $0.700m$
- Tabulate your results
- Plot a graph of e against l
- Find the slope, S , of your graph
- Calculate K from the expression;

$$K = \frac{11.5g}{S} \sqrt{1.6 \times 10^{-3}},$$

Where g is acceleration due to gravity

PART II

- (a) Arrange the beam as in **part I** but without the mass, **M**, such that the distance $d = 0.800m$.
- (b) Read and record the position of the pointer, V_0 .
- (c) Suspend a mass $M = 0.200kg$ at a distance $l = 0.400m$ from, **P**.
- (d) Read and record the new position of the pointer V_n . Find the extension, e_1 , of the spring.
- (e) Repeat procedures (b) to (d) for $M = 0.300$ and 0.400 and determine the extension e_2 and e_3 .
- (f) Calculate K_1 from the expression;

$$K_1 = \frac{g}{N} \sqrt{197.5 \times 10^{-3}}$$

$$\text{Where } N = 5(e_2 - e_1) + \frac{5}{2}(e_3 - e_1)$$

2. In this experiment, you will determine the refractive index, n , of the glass.

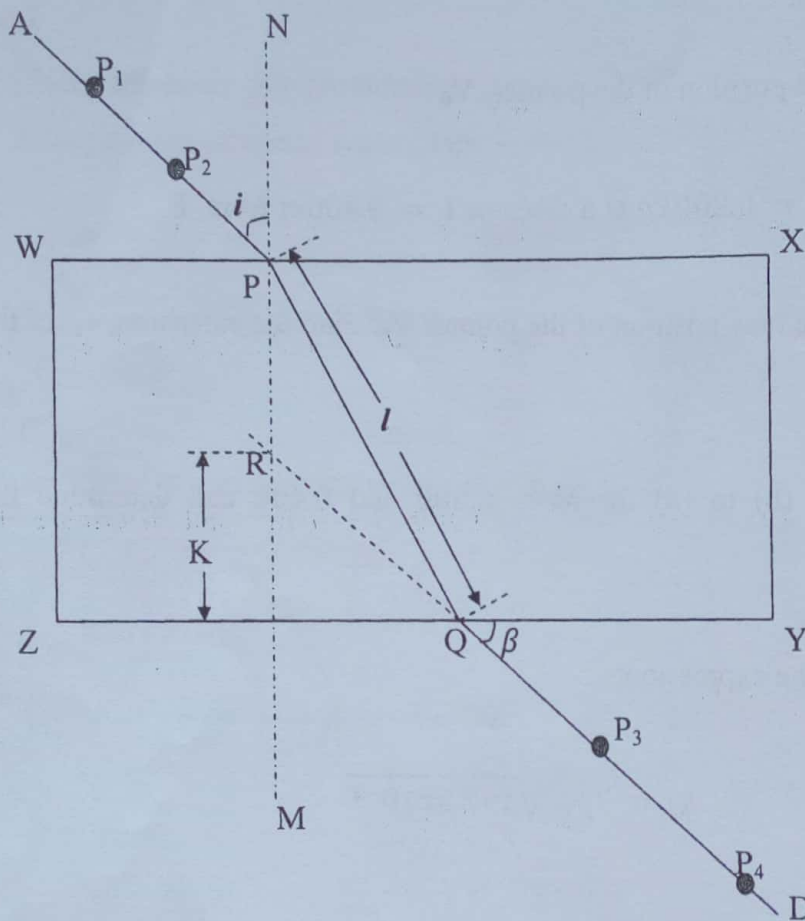


Fig 2

- (a) Fix the plain sheets of paper on a soft board.
- (b) Place the glass block on the paper with its largest face upper most.
- (c) Trace the outline of the glass block.
- (d) Remove the glass block and label its outline **WXYZ**
- (e) Draw a normal **NM** at **P** about 3cm from **W**.
- (f) Draw a line **AP** such that the angle $i = 10^\circ$ as shown in the figure 2 above.
- (g) Put the glass block on its outline.
- (h) Fix pins **P₁** and **P₂** vertically along **AP**.

- (i) While looking through the glass block from side **ZY**, fix pins **P₃** and **P₄** such that they appear to be in line with the images of **P₁** and **P₂**.
- (j) Remove the glass block and the pins.
- (k) Draw a line through **P₃** and **P₄** to meet **ZY** at **Q** and produce **DQ** to meet **NM** at **R**.
- (l) Measure and record angle **β** and the distances **K** and **l**.
- (m) Repeat procedures (f) to (l) for values of **$i = 20, 30, 40, 50$ and 60°** .
- (n) Record your results in a suitable table including values of **$\sin i$** and **$\frac{K}{l \tan \beta}$** .
- (o) Plot a graph of **$\sin i$** against **$\frac{K}{l \tan \beta}$** .
- (p) Calculate the slope, **n**, of the graph

3. In this experiment, you will determine the potential difference per unit length, τ , of the wire labelled, W provided by two methods.

METHOD I

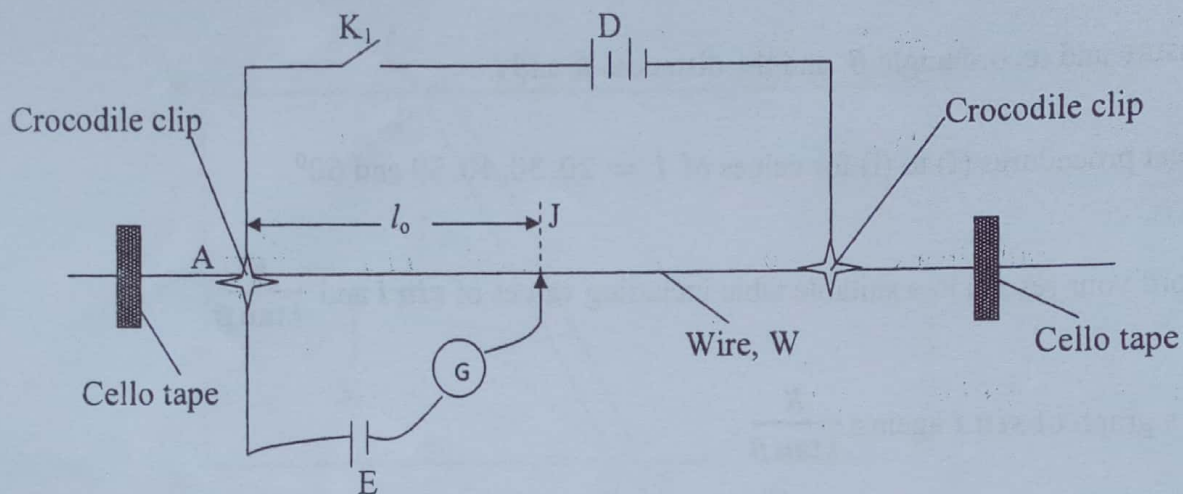


Fig 3

- Connect the circuit as shown in figure 3 above.
- Close switch K_1 .
- Adjust the position of the sliding contact, J until the galvanometer shows no deflection.
- Measure and record the balance length, l_0 in metres.
- Open switch, K_1 .
- Calculate, τ , from $\tau = \frac{3}{2l_0}$.
- Disconnect cell E for the circuit.

METHOD II

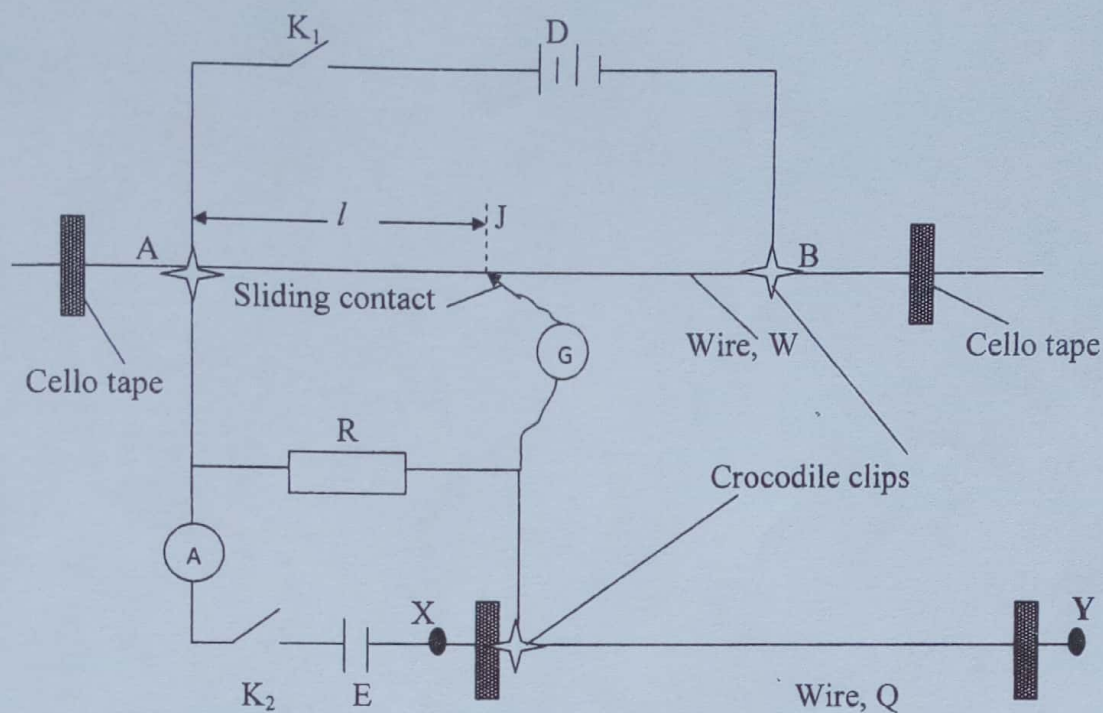


Fig 4

- Connect the circuit as shown in *figure 4* above.
- Close switch K_2 , keeping switch, K_1 , open.
- Adjust the position of the crocodile clip along the wire Q until the reading on the ammeter, $I = 0.10A$.
- Close switch K_1 , keeping switch K_2 closed and adjust the position of the sliding contact, J along wire AB until the galvanometer shows no deflection.
- Measure and record the balance length, l , in meters.
- Open switches K_1 and K_2 .
- Repeat procedures (b) to (f) for values of $I = 0.12, 0.14, 0.16, 0.18, 0.20$ and $0.22A$.
- Tabulate your results.
- Plot a graph of I against l .
- Determine the slope, S , of your graph.
- Calculate the value of, τ , from;

$$\tau = 5s$$

END