535/3
PHYSICS
Paper 3
June/July 2023
2¼ hours

ACEITEKA JOINT MOCK EXAMINATIONS 2023

UGANDA CERTIFICATE OF EDUCATION

PHYSICS

Paper 3

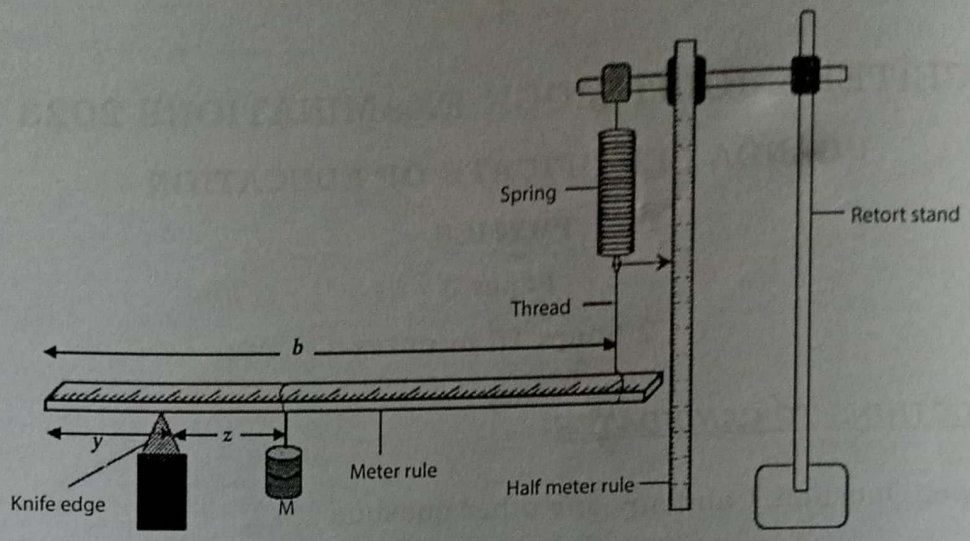
2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES

- Answer Question **1** and any **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 are **not** allowed to start working with the apparatus for the first quarter of an hour.
- Marks are given 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 force constant, τ of the spring provided.

(a) Clamp a spring with a pointer and a metre rule such that distance b = 90.0cm as shown in the figure below



(b) Adjust the position of the knife edge such that $y = 5.0\text{cm}$

(c) Read and record the position, P_0 of the pointer on the metre rule

(d) Suspend a mass, $\mathbf{M = 0.100kg}$ from the ruler such that $\mathbf{Z = 40.0cm}$

(e) Read and record the new position, P of the pointer

(f) Find the extension, x in metres

(g) Repeat procedures (d) to (f) for values of $\mathbf{M = 0.200, 0.300, 0.400}$ and $\mathbf{0.500kg}$

(h) Record your results in a suitable table

(i) Plot a graph of x against M

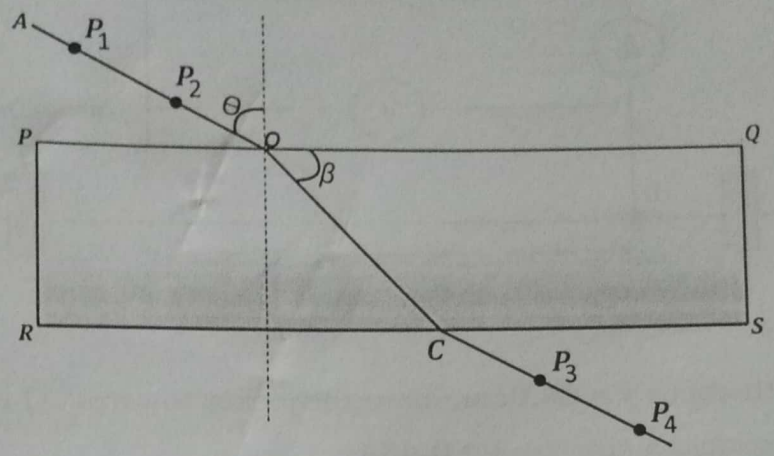
(j) Find the slope, S of the graph

(k) Calculate the force constant, τ from; $\tau = \frac{g}{S}$ where g = $10ms^{-2}$

(l) Outline any ***two*** possible sources of errors in the experiment

2. In this experiment, you will determine the index number, N of glass.

a) Trace the outline of the glass block on a white sheet of paper and draw a normal at **O, 2.0cm** from **P**



b) Draw a line **AO** such that, $\theta = 15^{o}$. Fix pins P_1 and P_2 on AO

c) Replace the block. While looking through the block from the face RS, fix pins P_3 and P_4 such that they are in line with images of P_1 and P_2

d) Remove the block, draw a line through the pin marks of P_3 and P_4 and join C to 0. Measure and record angle, β

e) Repeat procedures **(b)** to **(d)** for values of, $\theta = 25^{o}, 35^{o}, 45^{o}, 55^{o}$ and 65^{o}

f) Tabulate your results including values of $\sin\theta$ and $\cos\beta$

g) Plot a graph of $\sin\theta$ against $\cos\beta$

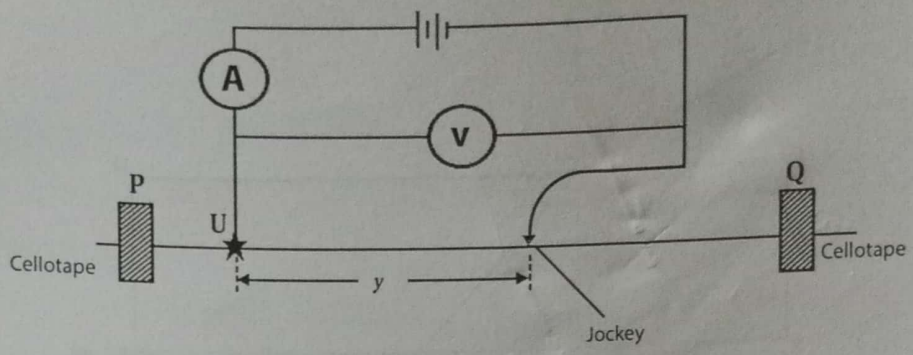
h) Find the slope, N of your graph

i) State any ***two*** possible sources of errors in the experiment

Hand in your tracing paper

3. In this experiment, you will be required to determine the E.m.f, E and internal resistance, r of the cells provided.

a) Set up the circuit as shown in the figure below.



b) Starting with about y = **25.0cm**, move the jockey towards, Q until the ammeter registers a current, **I = 0.45A**

c) Read and record the voltmeter reading, V in volts

d) Repeat the procedures **(c)** and (d) for **I = 0.55, 0.65, 0.75** and **0.85A**

e) Enter your values of the ammeter reading I, and the voltmeter reading V, in the suitable table

f) Plot a graph of I against V

g) From the graph, find the slope, ϕ

h) Find the value of, r which is given in the expression; $r = \frac{1}{\phi}$

i) Find from the graph, the value of V, where I = 0 and call it E

j) Suggest any ***two*** possible sources of errors in the experiment

THE END