SULIMO MOCK EXAMINATION

PHYSICS PAPER 3 - 2025

MARKING SCHEME

232/3

PHYSICS

PAPER 3

(PRACTICAL)

SULIMO MOCK EXAMINATION – 2025

Kenya Certificate of Secondary Education (K.C.S.E)

FOR EXAMINER'S USE ONLY

Question	Question 2	Total
20 Marks	20 Marks	GRAND TOTAL

QUESTION 1

PART A

You are provided with the following:

- 5 optical pins
- A glass block
- A plain paper
- A soft board
- 4 thumb pins

Proceed as follows:

Fix the white piece of paper on softboard using the thumb pins provided. Place the glass slab on the white paper and draw the outline of the block on the paper. Remove the block and indicate the sides ABC and D as shown. On side BC determine the centres of side BC using your ruler and fix pin P_0 as shown. Looking from one side at the opposite end of the slab fix pin P_1, P_2 so that they are in with the image I of P_0. On the other side locate the same image using pins P_3 and P_4 as shown in **figure 1**. Remove the glass block and produce lines P_1, P_2 and P_3, P_4 to their points of intersection which is the position of the image I.

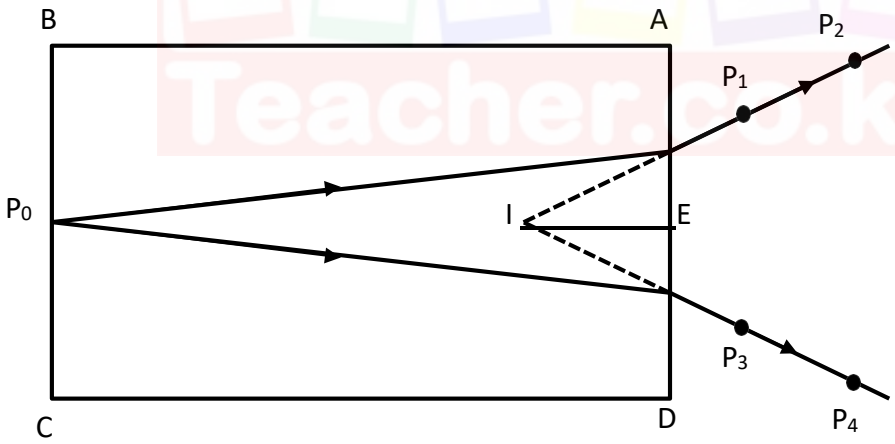


Figure 1

(i) Using the half metre rule, measure the lengths

EP_0 = **10.4 ±0.5 cm(1dp must)** √1 (1 Mark)

EI = **5.8 ±0.5 cm (1dp must)** √1 (1 Mark)

(ii) Determine the value of z given that:

$$z = \frac{EP_0}{EI}$$ (1 Mark)

$$Z=\frac{10.4\ cm}{5.8cm}$$

Z= 1.793 √1 (correct sub ans)

(iii) State the significance of z (1 Mark)

Refractive index √1

PART B

You are provided with the following apparatus.

- 2 new dry cells size D.
- A cell holder.
- 8 connecting wire at least two with crocodile clips.
- A resistance wire TQ of 1m long mounted on a metre rule.
- An ammeter (0-1A).
- A voltmeter (0 -3v).
- Lamp R.
- Switch S.
- A micrometer screw gauge (to be shared).

Proceed as follows:

Connect the circuit as in **figure 2** below;

TQ is the resistance wire.

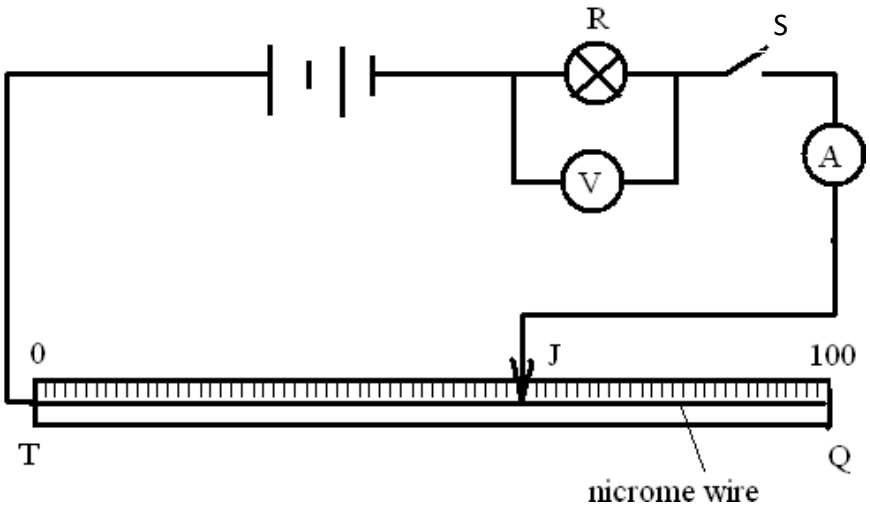


Figure 2

(i) With the jockey J at Q (*Y*= 100 cm from T) record the ammeter and voltmeter readings.

V = **0.5V** √½**(1dp)** I =**0.14A** √½**(2dp)** (1 mark)

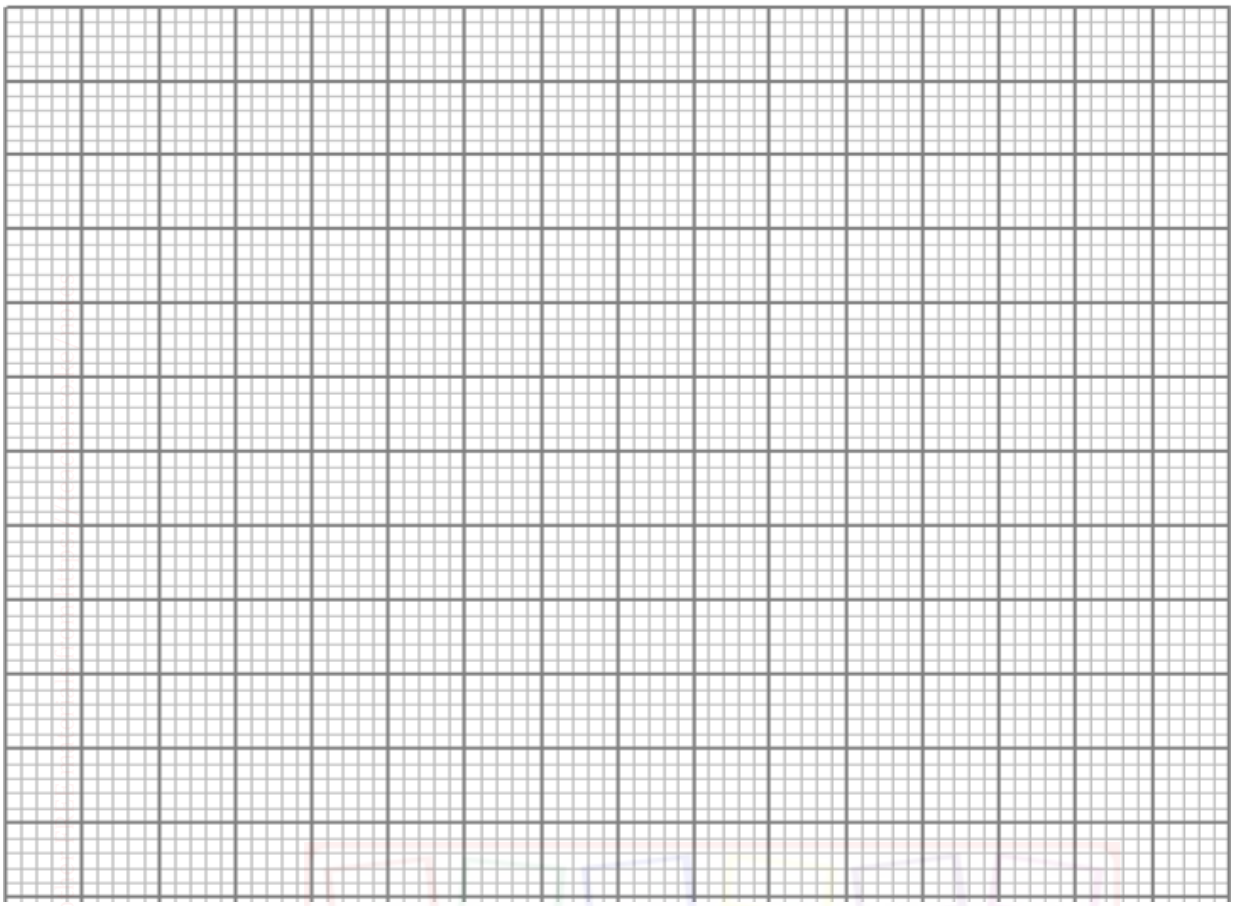
(ii) Repeat (a) (i) for other values of Y and records the ammeter and voltmeter readings in the table below.

Table 1

Y(cm)	80	60	40	20	0	
Ammeter reading, I (A)	**0.16**	**0.18**	**0.20**	**0.22**	**0.24**	**@ √½ (2dp)**
Voltmeter reading, V (v)	**0.6**	**0.8**	**1.0**	**1.3**	**1.8**	**@ √½ (1dp)**
$R = \frac{V}{I}(\Omega)$	**3.750**	**4.444**	**5.000**	**5.909**	**7.500**	**√1(4s.f)**

(6marks)

(iii) Plot a graph of R (y- axis) against *Y (x- axis).* (5marks)



Axis √1

Scale √1

Plotting **√2**

Curve √1

5mks

iv) From your graph, find the slope **s** at Y = 40 cm. (2 marks)

Tangential gradient with correct substitution **√1** **(student values)**

Correct evaluation with correct unit **√1**

(v) Using a micrometer screw gauge, measure the diameter D of the wire. ($\frac{1}{2}$ mark)

D **= 0.032** cm **√½** **(4dp must)**

(vi) Calculate the quantity,

$p = 0.5 \left(\frac{D^2}{s} \right)$ at Y= 40cm. ($1\frac{1}{2}$ marks)

Correct substitution and answer √1½

QUESTION 2

PART A

You are provided with the following:

- Rubber cork.
- Vernier calipers.
- Beam balance.

Proceed as follows:

a) Using a vernier caliper, measure the lengths D, d, and h as shown in **figure 3.**

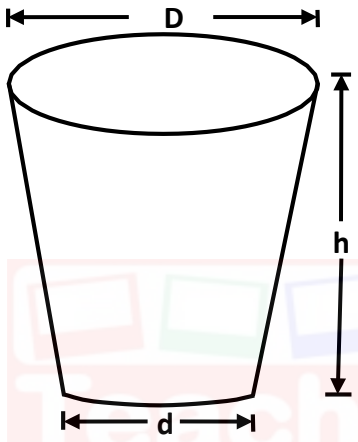


Figure 3

D = **0.0252m** ±0.0010m √1 **(4 dp must)** (1 mark)

d = **0.0193 m** ±0.0010m √1 **(4dp must)** (1 mark)

h = **0.0300m**±0.0010m √1 **(4dp must)** (1 mark)

b) (i) Measure the mass, M of the rubber bung using the beam balance.

M = 0.0241±0.0005 kg √1 **(4dp must)** (1 mark)

(ii) Given that $Q = \frac{(d+D)}{4}$, determine the value of Q. (1 mark)

(iii) Determine the value of r given that:

$$\pi r Q^2 = \frac{M}{h}$$ (1 mark)

Correct substitution and answer with the correct unit √1

(iv) State the unit of r and its significance.

Unit: **kilogram per cubic metre** √1 (1 mark)

Significance **density**√1 (1 mark)

PART B.

You are provided with the following:

- 50g mass with a hook.
- A piece of string of length about one metre.
- Metre rule.
- Stop watch.
- A complete stand with a boss and a clamp.
- Two pieces of wooden blocks for clamping.

Proceed as follows:

a) Suspend the mass on the stand such that distance D = 70cm as shown in **figure 4** below. This distance should remain fixed throughout the experiment. Adjust the string so that the mass hangs at a distance H = 5cm. Give the mass a slight displacement sideways, let it oscillate freely and measure the time t for 10 oscillations. Record the time **in table 2** below.

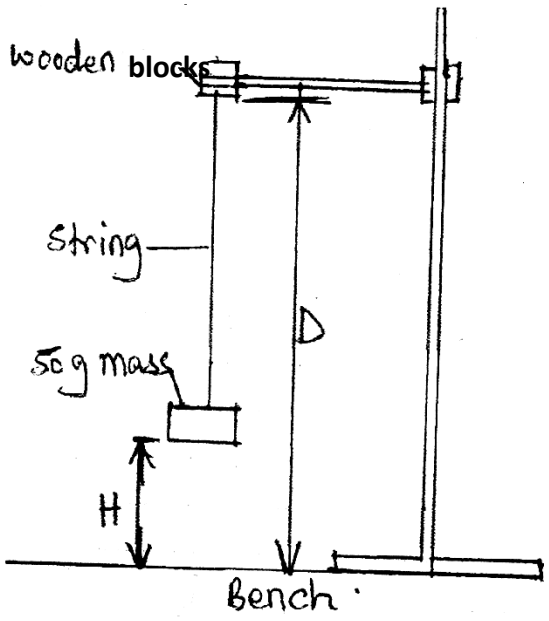


Figure 4

b) Repeat the experiment to obtain more values of time t for other lengths 10, 15 and 20cm respectively. Complete **table 2.**

H (cm)	5	10	15	20	
Time for 10 oscillations (s)	**15.90**	**15.28**	**14.54**	**13.82**	**@ √1 at most 3 correct (2dp must)**
Period T (s)	**1.590**	**1.528**	**1.454**	**1.382**	**all correct √1 (4.f)**
T^2 (S^2)	**2.528**	**2.335**	**2.114**	**1.913**	**all correct (4s.f) √1**

(5 marks)

c) Determine the average value of T^2 from the table above. (2 marks)

Correct evaluation and answer with correct unit √1

d) Determine the value of g in SI unit, at L = 0.20m, given that T and L are related by the equation: (3 marks)

$$T = 2\pi\sqrt{\frac{L}{g}}$$

Correct substitution, evaluation and answer √1 √1 √1

e) State **two** sources of errors in the experiment, that could contribute to your answer above. (2 marks)

✓ **Error in determining length**

✓ **Error in determining time**

e)State **two** sources of errors in the experiment, that could contribute to your answer above. (2 marks)

- ✓ **Error in determining length**
- ✓ **Error in determining time .**
- ✓ **air resistance**
- ✓ **friction at the pivot point**
- ✓ **amplitude of the swing**
- ✓ **instrument erors from the stopwatch**
- ✓ **variations in string length due to elasticity.**