NAME _____ INDEX NO. _____

SCHOOL _____ SIGNATURE _____

DATE _____

232/3
PHYSICS
PAPER 3
(PRACTICAL)
JULY, 2017
TIME: 2½ HOURS

KITUI COUNTY MOCK
END OF TERM II FORM FOUR EXAMINATION, 2017
Kenya Certificate of Secondary Education (K.C.S.E)

232/3
PHYSICS
PAPER 3
(PRACTICAL)
TIME: 2½ HOURS

INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the spaces provided above.
2. Sign and write the date of the examination in the spaces provided above.
3. This paper consists of **two** questions.
4. Answer **all** the questions in the spaces provided in the question paper.
5. **All** working must be clearly shown.
6. You are not allowed to start working with the apparatus for the first ¼ hours of the **2½** hours allowed for this paper. This time is to enable you read the question paper and make sure you have all the apparatus you may need.
7. Marks are given for a clear record of the observations actually made, for their suitability and accuracy and the use made of them.
8. Candidates are advised to record their observations as soon as they are made.
9. Mathematical tables and electronic calculators **may be** used in calculations.
10. This paper consists of **7** printed pages.
11. Candidates should check to confirm that all pages are printed as indicated and no questions are missing.

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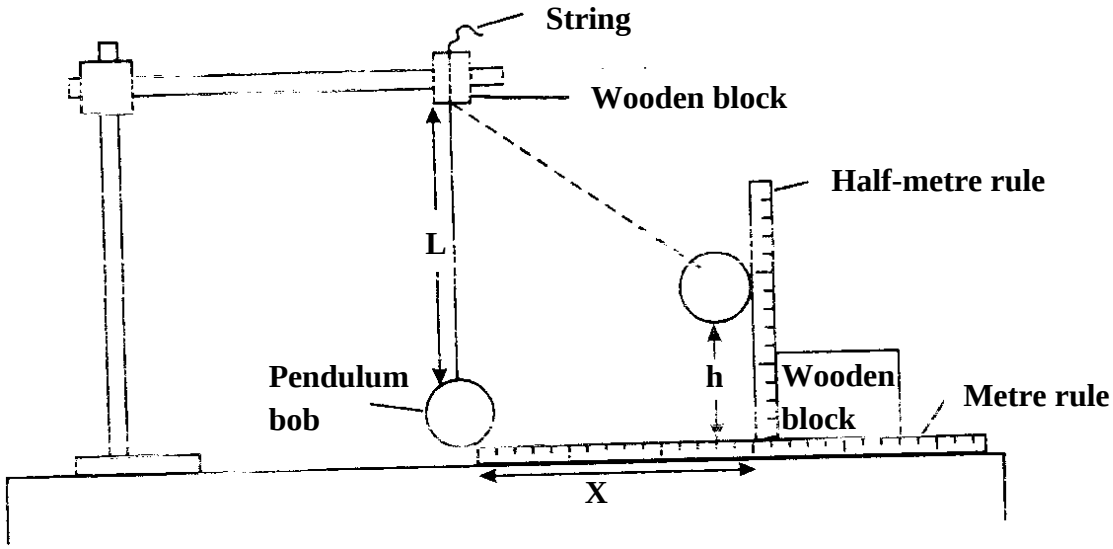
Question 1	a(i)	(ii)	(iii)	(iv)	(v)	b(i)	(ii)		Total
Maximum score	1	6	5	2	1	2	3		
Candidate's score									

Question 2	a(iv)	b(iii)	c	d(i)	(ii)	e	h(i)	h(ii)	h(iii)	h(iv)		Total		Grand total
Maximum score	2	2	6	1	1	2	2	2	1	1				
Candidate's score														

1. You are provided with:
   - A pendulum bob with a piece of thread attached
   - Two wooden blocks
   - Clamp, boss and retort stand
   - Metre rule
   - Half metre rule attached to wooden block
   - Cellotape about 10cm long
   - Stop watch

Proceed as follows

a) Fix the thread between the two wooden blocks and fasten in the clamp. Adjust the thread so that the length L shown below is 50.0cm. Fix the metre rule horizontally to the bench using the cellotape provided. Adjust the clamp so that the pendulum bob is next to the end of the metre rule as shown.

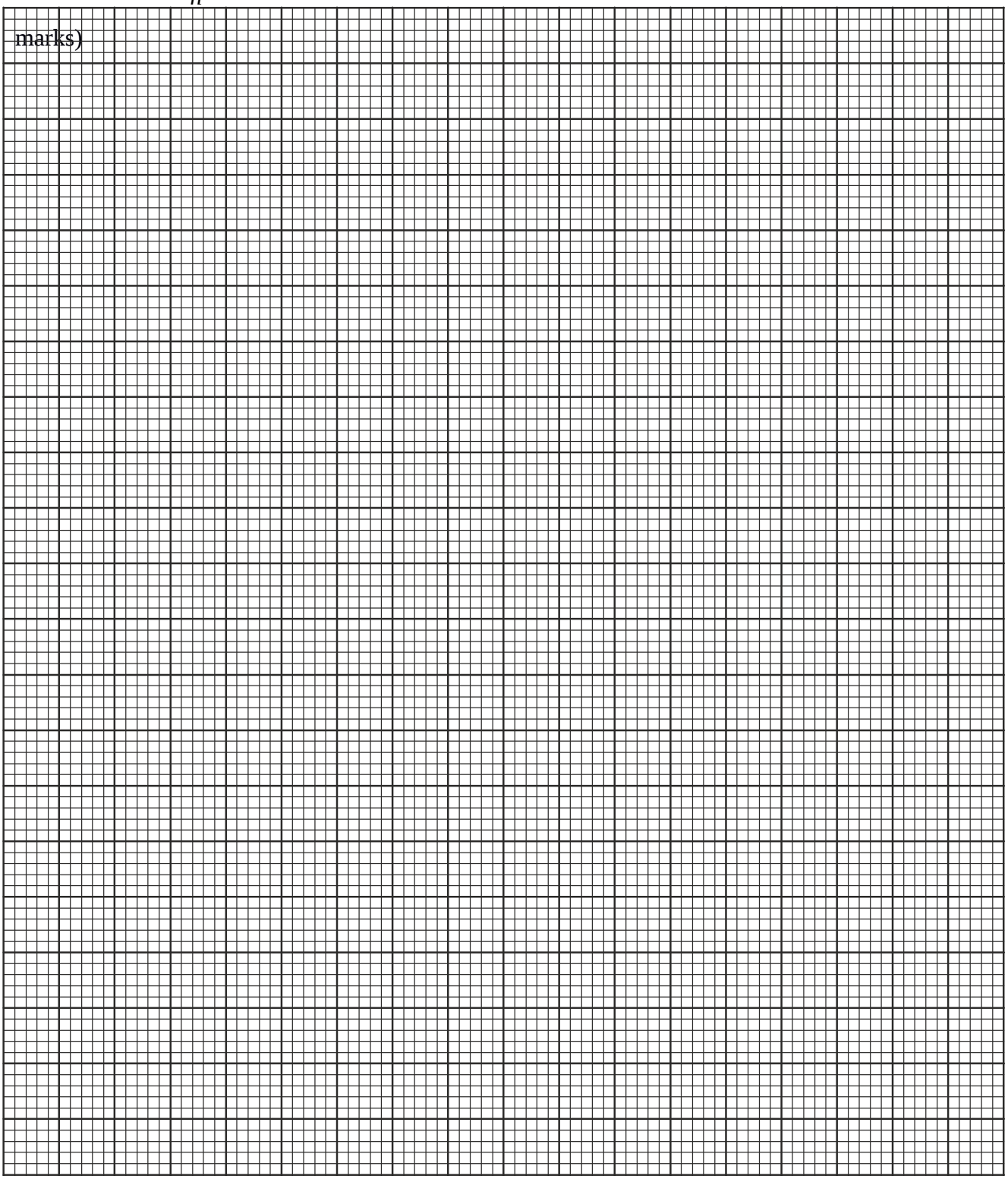


i) Displace the marble by a horizontal distance x = 20cm and measure the corresponding vertical displacement h = _____cm (1 mark)

ii) Repeat the experiment to find h for each of the following values of x : 25cm, 30cm, 35cm, 40cm and 45cm. Complete the table below. (6 marks)

x (cm)	h (cm)	x^2 (cm^2)	$\frac{x^2}{h}$ (cm)
20		400	
25		625	
30		900	
35		1225	
40		1600	
45		2025	

iii) Plot the graph of $\frac{x^2}{h}$ (y – axis) against h. (5 marks)



iv) Determine the slope of the graph. (2 marks)

v) From the graph, find the value of $\frac{x^2}{h}$ when h = 0. (1 mark)

b) Raise the clamp slightly without changing the length L so that the pendulum is free to swing.

i) Determine the period, T, for one oscillation by timing 20 oscillations.

Time for 20 oscillations = _____seconds (1 mark)

ii) Period T = _____ seconds (1 mark)

iii) Calculate the value of P from the following equation. (3 marks)

$T = 2\pi\sqrt{\frac{P}{g}}$ where g = $10ms^{-2}$

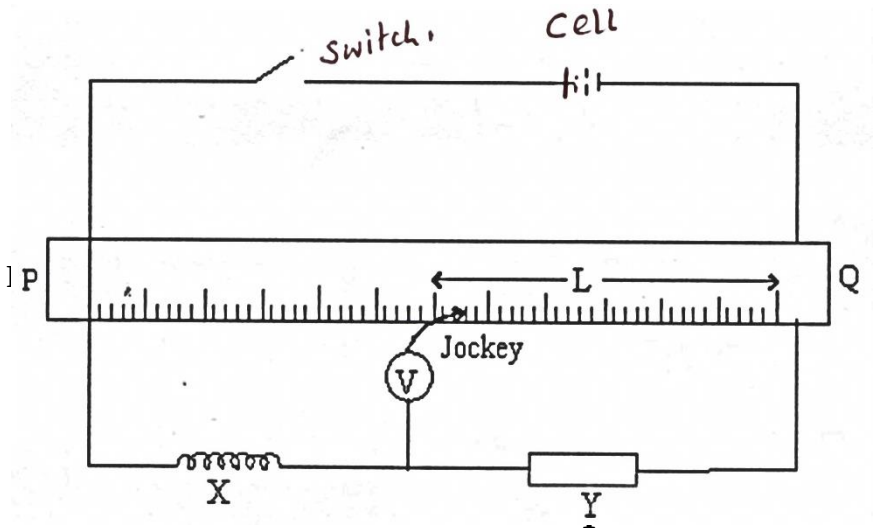
2. Part A

You are provided with:

- A Nichrome wire, 1m long, mounted on mm scale and labelled PQ at the ends.
- A Nichrome wire of length 15cm labelled X
- A 10 ohm resistor labelled Y
- A dry cell (New)
- A switch
- A voltmeter (0 – 2.5V) and
- 8 connecting wires (4 with crocodile clips)

Proceed as follows

a) i) Set up your apparatus as shown.



i) Close the switch, place the jockey at P and then at Q. (The voltmeter deflects in opposite directions)

iii) Place the contact J, 5cm from Q and record the voltmeter reading.

iv) Repeat this for values of L indicated in table 2. Record the corresponding values of V.

Length (cm)	5	15	25	35	45
V (volts)					

Table 2 (2 marks)

b) i) Interchange the voltmeter terminals. Place jockey at P and make sure the voltmeter pointer deflects to the right.

ii) Place the jockey on the wire 95cm from Q and record the voltmeter reading.

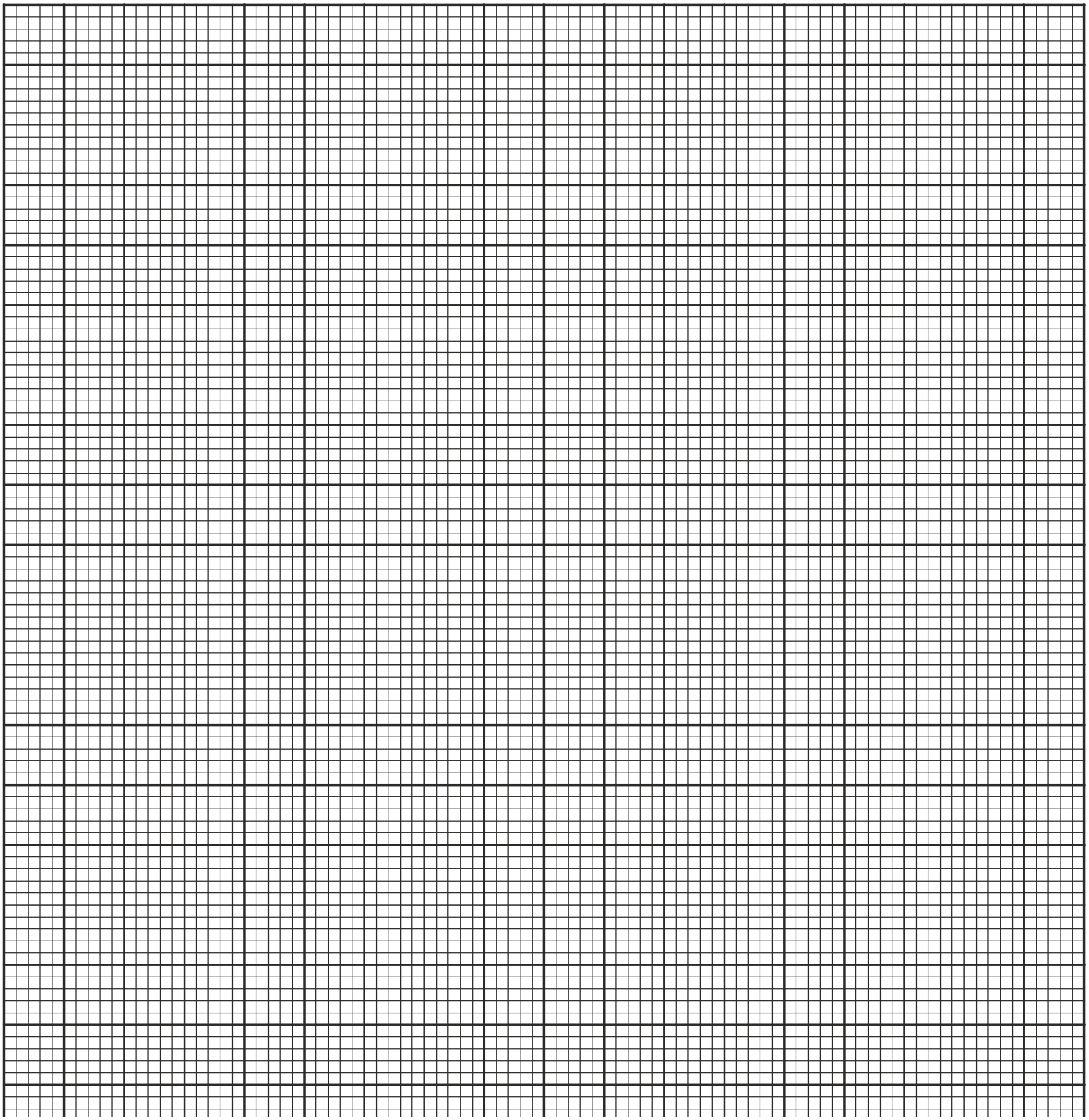
iii) Repeat this for values of L given in table 3.

Length (cm)	95	90	85	80	75
V (volts)					

Table 3 (2 marks)

c) On the same axis plot two graphs of V(y – axis) against L using the values in table 2 and table 3.

(6 marks)



d) From your graphs determine.

i) The value of V when L = 0 (1 mark)

ii) The value of L where the two graphs intersect. (1 mark)

L = _____

e) Work out the value of the unknown resistance of wire X, R_X using the expression.

Where R_y is the resistance of resistor **y**. (2 marks)

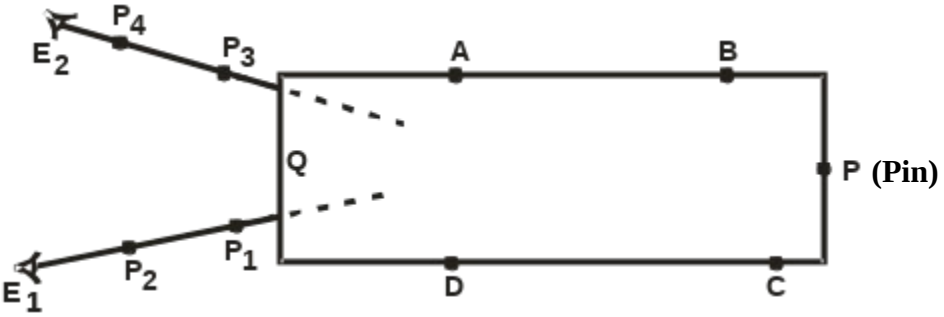
$$\frac{R_X}{R_Y} = \frac{L}{100 - L}$$

Part B

f) You are provided with the apparatus below.

- Five optical pins and four office pins
- A plain white A4 piece of paper
- Soft board
- Glass slab

Place the glass slab on the white piece of paper and trace its outline. Secure it in place (In its position) by the office pins A, B, C, D as shown in the diagram below.



g) i) Fix the pin P firmly at the end of the slab and with your eye E_1 at the opposite of the slab fix pin P_1 and then P_2 in line with the image I of the pin (See diagram)

Remove the pins P_1 and P_2 and mark their positions P_1 and P_2 respectively.

ii) Similarly fix P_3 and then P_4 so that they are in line with the image I of P. Again remove the pins P_3 and P_4 and mark their positions respectively. Remove the glass slab and pins ABCD

h) Join P_1P_2 produced with the tracing of the slab outline. Join P_3P_4 produced to intersect line P_1P_2.

Label this point of intersection I, the supposed position of the image of pin P.

i) Submit the plain paper used in the experiment. (2 marks)

ii) Measure the lengths QP and QI

QP (1 mark)

QI (1 mark)

iii) Determine the ratio $\frac{QP}{QI}$ (1 mark)

iv) What is the significance of the ratio in (II) above? (1 mark)