MARANDA HIGH SCHOOL

Kenya Certificate of Secondary Education

POST MOCK 1 EXAMINATIONS 2021

CODE 232/3

PHYSICS

Paper 3

January 2021

TIME: $2\frac{1}{2}$ Hours

Name: .....Adm No: .....

Class: .....Candidate's Signature: ..... Date: ...../...../2021.

INSTRUCTIONS TO CANDIDATES

- *Write your name and index number in the spaces provided above.*
- *Sign and write the date of examination in the spaces provided*
- *Answer ALL the questions in the spaces provided in the question paper*
- *You are supposed to spend the first 15 minutes of the 2 ½ hours allowed for this paper reading the whole paper carefully before commencing your work.*
- *Marks are given for a clear record of the observations actually made.*
- *Non-programmable silent electronic calculators and KNEC Mathematical tables may be used except where stated otherwise.*

FOR EXAMINERS USE ONLY

QUESTION 1

	A	b	D	h	i	j	K	TOTAL
Maximum Score	2	2	1	5	5	3	2	20
Candidate's Score								

QUESTION 2

	b	C	D	F	g	h	I	TOTAL
Maximum score	1	1	1	5	5	3	4	20
Candidate's score								

TOTAL SCORE

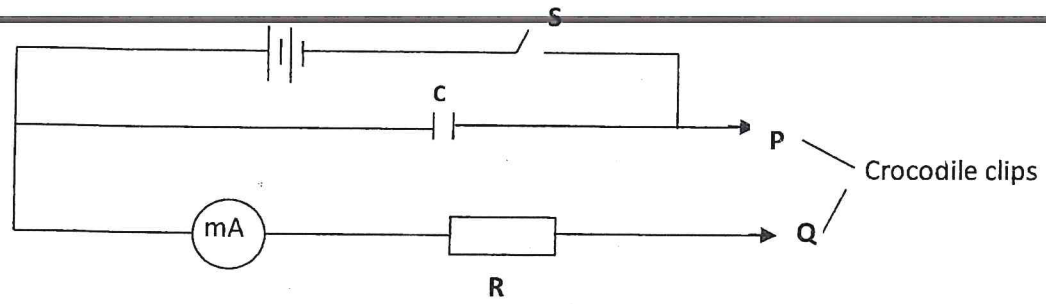
Question one

You are provided with the following:

- 2 new dry cells size D
- A cell holder
- A switch
- A milliammeter of range 0 to 1 mA
- A capacitor labeled C
- 8 connecting wires; at least four with crocodile clips on one end
- A stopwatch
- A carbon resistor labeled **R**

Proceed as follows

a. Connect the circuit as shown in the **Figure 1**below, where **P** and **Q** are crocodile clips.



b. Close the switch **S**

c. Name the process which takes place when the switch **S** is closed (1mark)

d.

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e. Connect the crocodile clips P and Q. Observe and record the highest reading of the milliammeter I_o (This is the current at $t_0 = 0$)

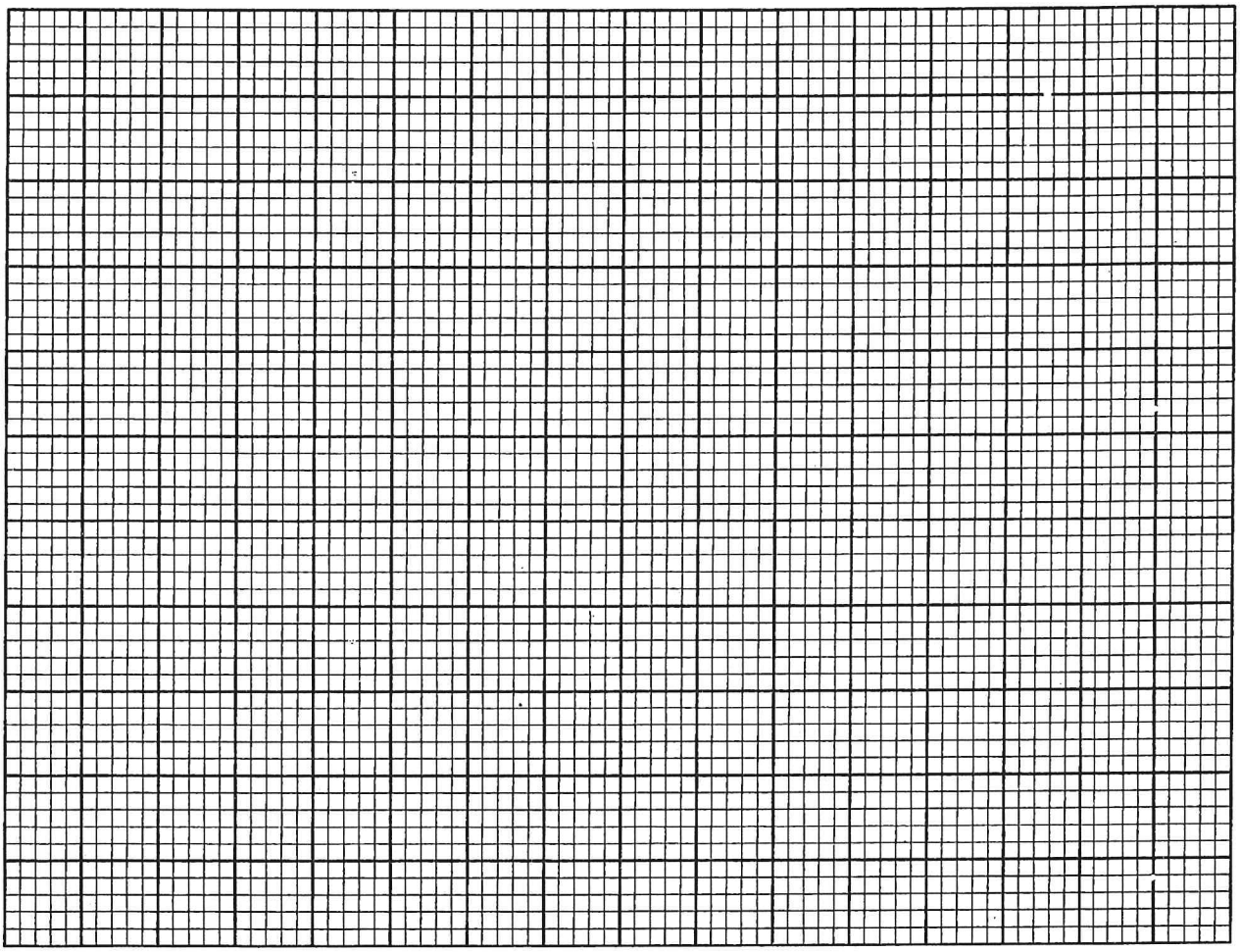
I_o = ... mA (1mark)

f. While the milliammeter show the maximum value of current I_o, open the switch S and start the stop watch simultaneously. Stop the stop watch when the current has dropped from I_o to 0.5 mA. Read and record in the table below the time taken

g. Reset the stop watch and close the switch. Repeat the procedure in (e) to measure and record the time taken for the current to drop from $\mathbf{I_o}$ to each of the other values shown in the **Table 1** below. (4marks)

Current **I** (mA)	**0.5**	**0.4**	**0.3**	**0.2**	**0.1**
Time **t** (s)					

h. Plot a graph of Current **I** (y – axis)(mA) against time **t** (s) (4marks)



i. From your graph, find **W** the value of **I** when **t = 10s**. (2marks)

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j. Given that **A = 10W**, determine the value of **A.** (1mark)

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k. Determine the voltage across **R** at **t = 10s** given that R = 4.7kΩ (3marks)

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Question 2

PART A

You are provided with the following apparatus;

- A nichrome wire
- A 50g mass
- A metre rule
- A test –tube
- A retort stand, boss and clamp

Proceed as follows.

a. Measure the length, L, of the nichrome wire provided

L = ... cm (1mark)

b. Wind the whole length of the wire tightly on the test-tube making sure that the turns are as close as possible but not overlapping. Measure the length, φ , of the coil made.

φ =.....cm (1mark)

c. Remove the coil from the test-tube. Straighten the first and the last turns of coil. Bend one end to make a hook.
d. Count and record the number, N, of complete turns remaining on the coil.

N =..... (1mark)

e. Measure and record the distance h_1 between the end turns of the coil as shown on the **Figure 2** below.

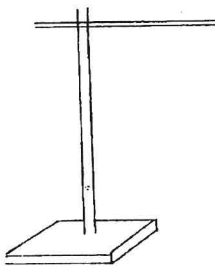

Figure 2

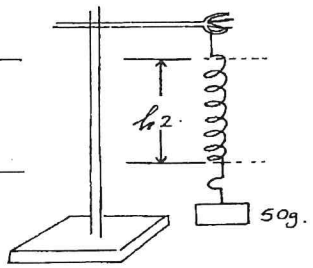

Figure 3

h_1.....cm (1mark)

f. Load a 50 g mass on the coil as shown in **Figure 3** above. Measure and record the distance,h_2 , between the end turns of the coil.

h_2.....cm (1mark)

g. Determine the spring constant K in S.I units. (2marks)

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h. Obtain the constant, p, for the wire from the expression: (3marks)

$$P = \frac{4mgR^3}{Kr^4}$$

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Where: m is the mass used, g is acceleration due to gravity ($g = 10m/s^2$), and

$$R = \frac{L}{2\pi N} \quad and\ r = \frac{\varphi}{2N}$$

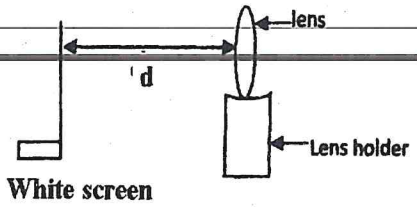
PART B

You are provided with the following apparatus:

- A screen with cross wire
- lens and a lens holder
- A white screen
- About 10cm candle stick
- A Metre rule
- Lighting source.(match box)

Proceed as follows:

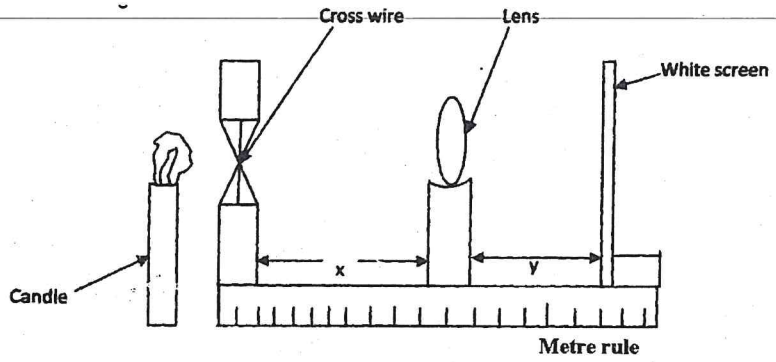
a. Arrange the lens and screen as shown in the diagram below.



Adjust the distance of the lens from the screen until a sharp image of a distant object is formed on the screen. Measure and record the distance d (1mark)

d = ...cm

b. Place the metre rule on a horizontal table so that the millimeter scale faces upwards, place the candle at one end of the metre rule and the screen with cross wire at the zero cm mark (just near the candle).Arrange the lens and the white screen as shown below:



i. Adjust the lens so that the distance x is 30cm.

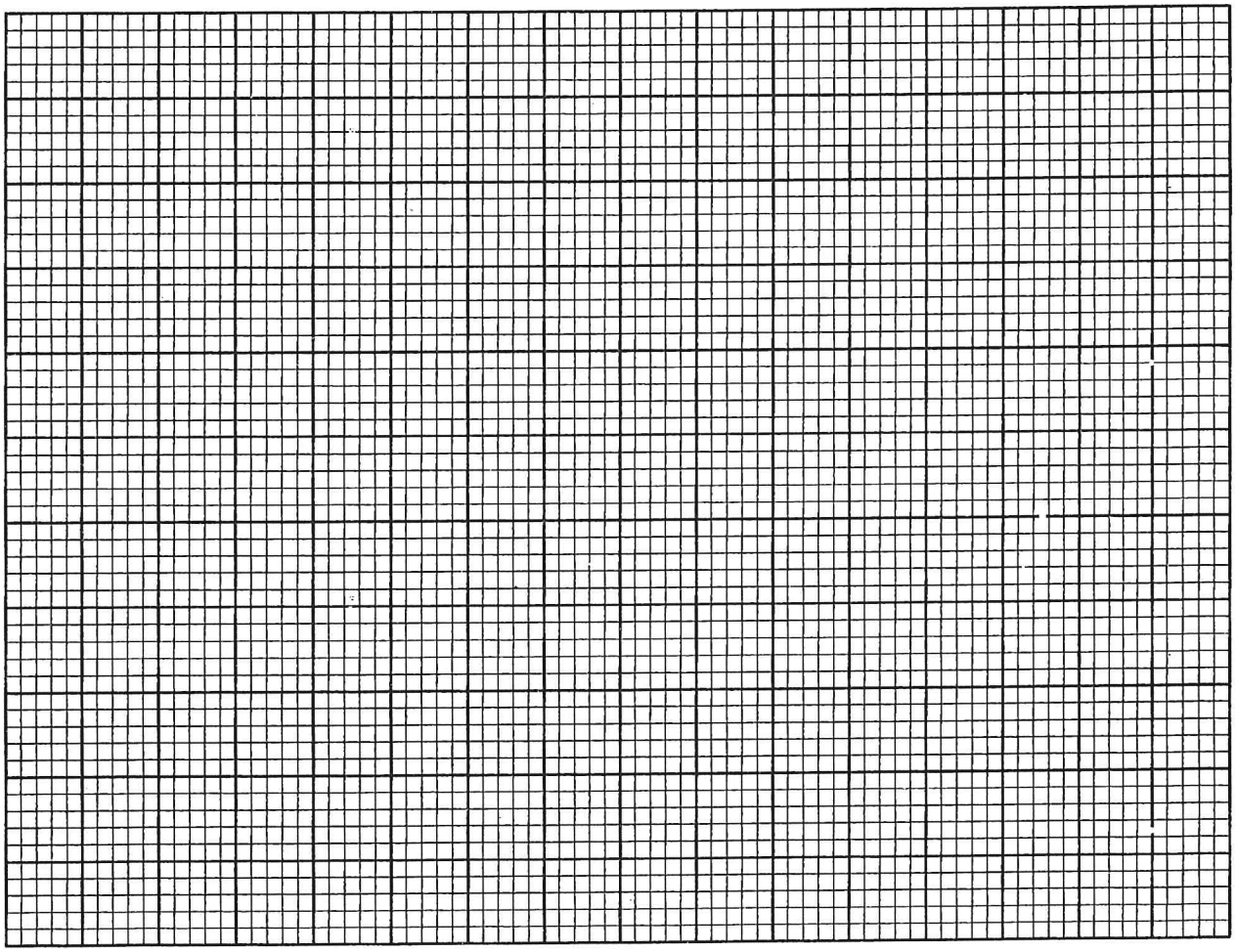
ii. Adjust also the position of the white screen to obtain a sharp image of the cross wire and record the value of y in the table below.

iii. Repeat steps b (i) and b (ii) above for values of **x** = 35cm, 40cm,45cm,50cm and record the corresponding values of **y** each time in the table below.

iv. Hence complete the table. (4marks)

x(cm)	30	35	40	45	50
y(cm)					
y + x (cm)					
yx (cm^2)					

v. Plot a graph of (**y + x**) (y - axis) against **yx**.(x-axis) (4marks)



c. Determine the gradient of your graph. (2marks)

d. Given that the equation of graph is $1 = f\left(\frac{y+x}{xy}\right)$ Use the graph to find the value of **f** (3marks)

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