Name .... Index Number ....

School .... Candidate's Signature ....

232/3 Date ....

PHYSICS

(PRACTICAL)

Paper 3

2015

2½ hours

MAKUENI COUNTY KCSE 2015 PREPARATORY EXAMINATION

Kenya Certificate of Secondary Education

PHYSICS

(PRACTICAL)

Paper 3

2½ hours

Instructions to candidates

(a) *Write your name and index number in the spaces provided above.*
(b) *Sign and write the date of examination in the spaces provided above.*
(c) *Answer all the questions in the spaces provided in the question paper.*
(d) *You are supposed to spend the first 15 minutes of the 2½ hours allowed for this paper reading the whole paper carefully before commencing your work.*
(e) *Marks are given for a clear record of the observations actually made, their suitability, accuracy and the use made of them.*
(f) *Candidates are advised to record their observations as soon as they are made.*
(g) ***Non-programmable** silent electronic calculators and KNEC mathematical tables may be used.*
(h) ***This paper consists of 9 printed pages.***
(i) ***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***
(j) ***Candidates should answer the questions in English.***

For Examiner's Use Only

Q1	**b**	**d**	**e**	**f (iv)**	**h**	**h(i)**	**h(ii)**	
Maximum Score	2	2	1	6	5	2	2	20
Candidate's Score								
Q2	a(ii)	a(iii)	a(iii)	b(i)	b(ii)	b(iii)		20
Maximum Score	2	2	5	5	3	3		
Candidate's Score								

GRAND TOTAL	

Sponsored by H.E. Prof. Kivutha Kibwana, Governor, Makueni County

QUESTION 1

PART A

You are provided with the following:

- A convex lens
- Two optical pins
- Some plasticine
- A metre rule

Proceed as follows:

(a) (i) Mount the lens at the 50 cm mark on the metre rule using plasticine.

(ii) Using plasticine, fix the object pin 32 cm from the lens.

(iii) Using a search on the other side of the lens, locate the image of the object pin. Move the search pin until it coincides with the image of the object pin (no parallax method).

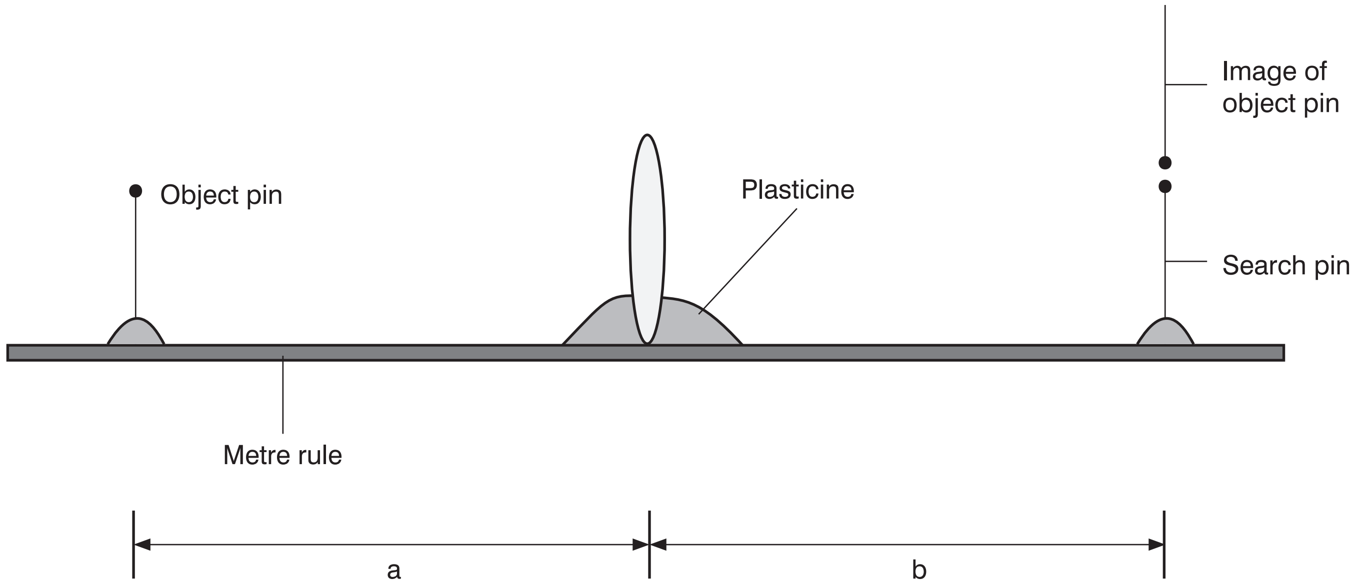

Figure 1

(b) Record the value of length b in Table 1 below. (2 marks)

Table 1

Length a, (cm)	32	40
Length b, (cm)		

(c) By adjusting length a to 40 cm, repeat the procedure in part (a)(iii) and obtain the respective values of b.

(d) If the relationship between a and b is given by the equation

$\frac{1}{Z} = \frac{a + b}{ab}$,

calculate the value of Z in each case. (2 marks)

....

....

....

....

(e) Calculate the average value of Z. (1 mark)

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PART B

You are provided with the following:

- A metre rule
- One retort stand
- A boss and clamp
- One 20 g mass
- Five cylindrical masses with hooks labelled M_a, M_b, M_c, M_d and M_e
- A measuring cylinder
- Three pieces of cotton thread
- A beaker with water

Proceed as follows:

(f) (i) Suspend the metre rule on the clamp using one piece of thread. Balance the rule and note the position of its centre of gravity. This point of suspension should be maintained throughout the experiment.

(ii) Suspend the cylindrical mass M_a at a distance of 3.0 cm from the centre of gravity of the rule using a loop of thread. Suspend the 20 g mass to balance the mass. (See Figure 2). Record in Table 2, L_1, the distance between the centre of gravity of the rule and the balance point for the 20 g mass.

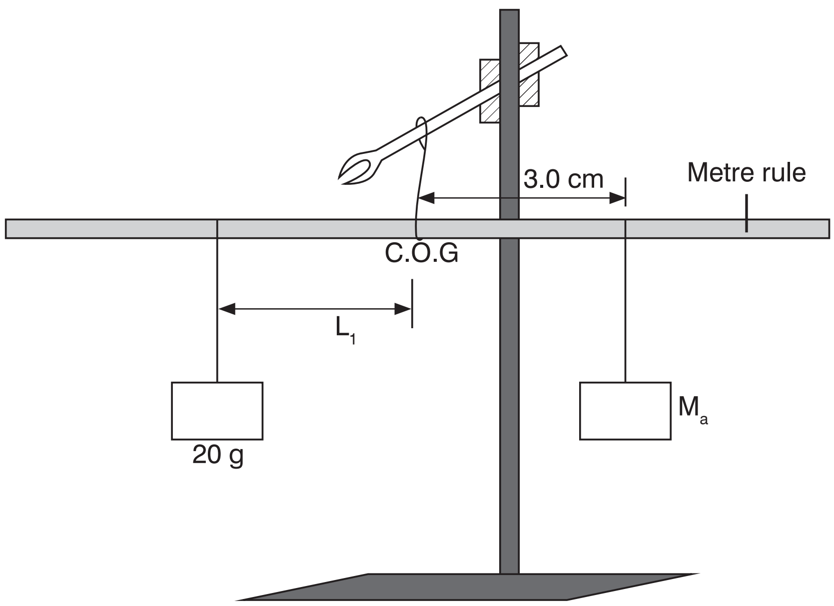

Figure 2

(iii) Suspend M_a fully immersed in water. Adjust the position of the 20 g mass to balance M_a (See Figure 3).

Record in Table 2, L_2, the distance between the balance point for the 20 g mass and the centre of gravity of the rule.

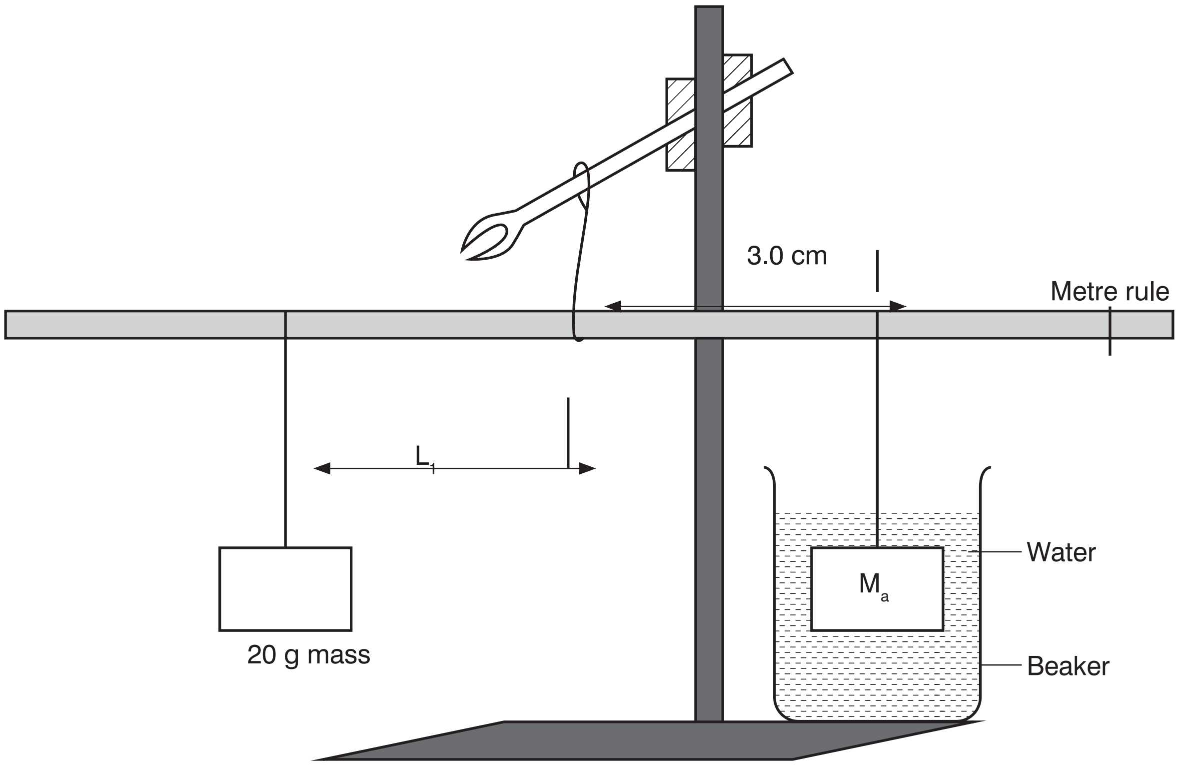

Figure 3

(iv) Half fill a measuring cylinder with water using the loop to hold M_a. Immerse it into the measuring cylinder. Ensure that it is fully submerged. Determine the volume (V) of the mass Ma using the new and initial levels of water. (6 marks)

Mass	M_a	M_b	M_c	M_d	M_e
Volume V (cm^3)					
L_1 (cm)					
L_2(cm)					
$L_1 - L_2$ (cm)					

(g) Repeat the procedure (f) (ii) to (f) (iv) for other masses suspended 3.0 cm from the c.o.g and complete the table (replacing M_a with M_b, M_c, etc).

(h) On the grid provided, plot a graph of volume (x-axis) against $(L_1 - L_2)$. (5 marks)

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

(ii) Given the equation of the graph as $V = \frac{21}{5K}(L_1 - L_2)$, determine the constant K. (2 marks)

QUESTION 2

PART A

You are provided with the following:

- A voltmeter
- An ammeter
- Six connecting wires
- A torch bulb
- Two new dry cells
- A cell holder
- A switch

Proceed as follows:

(a) (i) Connect the apparatus provided as shown in Figure 4 below.

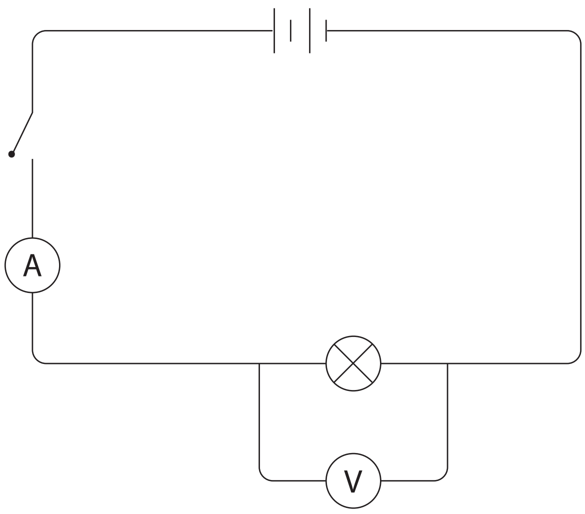

Figure 4

(ii) Close the switch and record the ammeter and voltmeter readings.

I = (1 mark)

....

V = (1 mark)

....

(iii) Using the relation $KV = I$,
calculate K for the bulb stating its units. (2 marks)

PART B

You are provided with the following:

- Two dry cells
- A voltmeter
- An ammeter
- A wire mounted on a mm scale (1 m long)
- A switch

Proceed as follows:

(a) (i) Connect the circuit as shown in Figure 5 below.

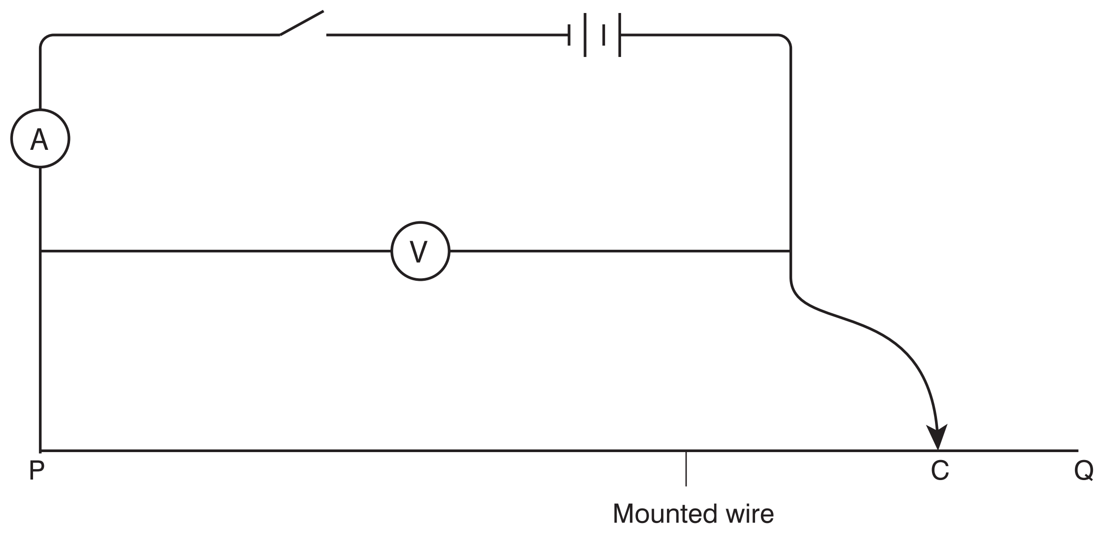

Figure 5

The switch should be open when no readings are being taken.

(ii) Adjust the length of the nichrome wire PQ to PC = 75 cm, using the crocodile clip at C. Close the switch and record the voltmeter and ammeter readings in Table 3 below.

(iii) Repeat (a) (ii) for length PC equal to 65 cm, 55 cm, 45 cm, 35 cm and 25 cm. (5 marks)

Table 3

Length PC (cm)	75	65	55	45	35	25
P.d.(V)						
Current I (A)						

(b) (i) On the grid provided, plot a graph of I (x-axis) against V. (5 marks)

(ii) Determine the slope of your graph. (3 marks)

(iii) If the equation relating I and V is

$$I = \frac{1.2}{R} V + \log P,$$

use your graph to determine the values of:

R (1½ marks)

....

P (1½ marks)

....