Name:…… Adm. No. ……..

Class: ……

Signature:……..

232/3
PHYSICS
PRACTICAL
MARCH/APRIL 2016
TIME: 2 ½ HRS

M O K A S A J O I N T E X A M I N A T I O N

Kenya Certificate to Secondary Education

PHYSICS PAPER 3

PRACTICAL

Instructions

- *Write your name, admission number, class and signature in the spaces provided at the top of the page.*
- *Answer **all** the questions in the spaces provided in this 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 your start.*
- *Marks will be given for clear record of observations actually made, for their suitability and accuracy, and the use made of them.*
- *Candidates are advised to record their observations as soon as they are made.*
- *Electronic calculators and mathematical tables may be used.*

FOR EXAMINER'S USE ONLY

Question(s)	Maximum Score	Candidate's Score
1	20	
2	**I** 16	
	II 4	
TOTAL	**40**	

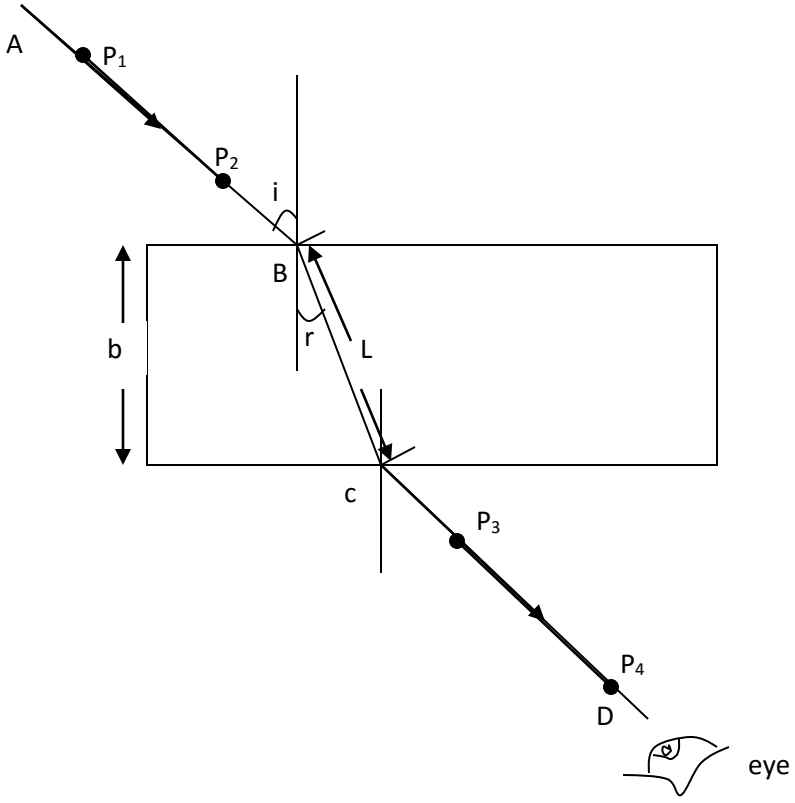
This paper consists of **10** printed pages. Candidates are advised to check and to make sure all pages are printed.

1. You are provided with the following;

- a rectangular glass block
- 4 optical pins
- a soft board
- a plain paper

Proceed as follows:

(a) Place the glass block on the plain paper with one of the largest face upper most. Trace round the glass block using a pencil as shown below.



(b) Remove the glass block and construct a normal at B. Construct an incident ray AB of angle of incidence, i = 20^0.

(c) Replace the glass block and trace the ray ABCD using the optical pins.

(d) Remove the glass block and draw the path of the ray ABCD using a pencil. Measure length L and record it in the table below.

Angle i^0	L (cm)	L^2 (cm^2)	$\frac{1}{L^2}$ (cm^{-2})	$Sin^2 i$
20				0.1170
30				0.2500
40				0.4132
50				0.5868
60				0.7500
70				0.8830

(6 marks)

(e) Repeat the procedure above for the angles of incidence given.

(f) Calculate the value of L^2 and $\frac{1}{L^2}$; Record in the table.

(g) Plot a graph of $\frac{1}{L^2}$ (y-axis) against $\text{Sin}^2 i$.

(5 marks)

G R A P H

(h) Calculate the gradient, S. **(3 marks)**

Given that the equation of that graph is: : $\frac{1}{L^2} = -\left(\frac{1}{n^2 b^2}\right) \cdot Sin^2 i + \frac{1}{b^2}$

(i) Determine the $\frac{1}{L^2}$ – intercept C and the $Sin^2 i$ – intercept B.

C = _____ **(1 mark)**

B = _____ **(1 mark)**

(j) Calculate the value of Q given by; **(2 marks)**

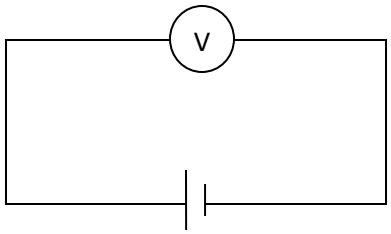
$$Q = -\left(\frac{C}{S}\right) \div B$$

(k) Hand in your constructions on the plain paper together with the answer script. **(2 marks)**

2. **I.** You are provided with the following:

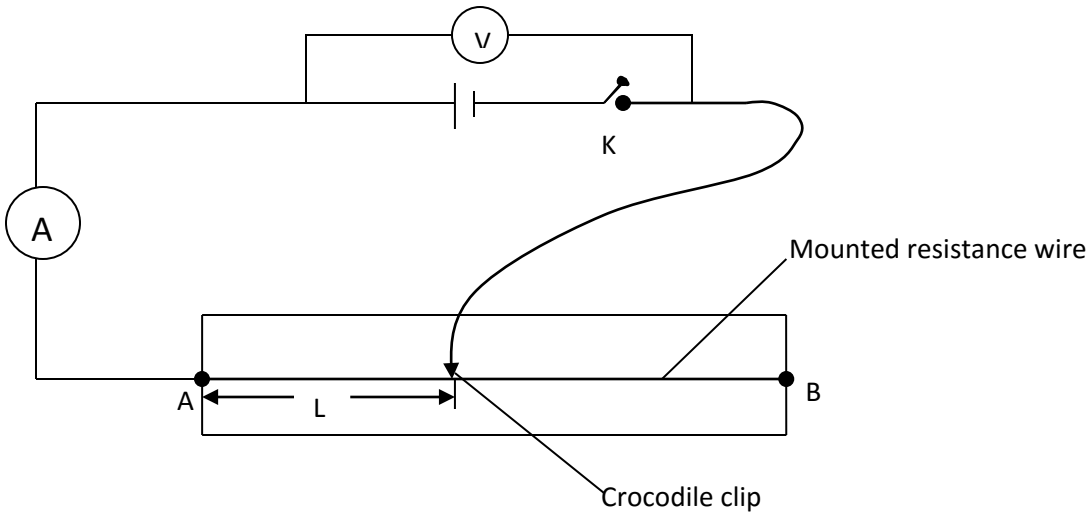
- A voltmeter
- An ammeter
- A dry cell
- A cell holder
- A switch
- 7 connecting wires (4 wires with crocodile clips at one end)
- A mounted resistance wire.

(a) Connect voltmeter across the dry cell on an open circuit. Measure its e.m.f.



E = _____ **(1 mark)**

(b) Now connect the apparatus provided as shown below.



Place the crocodile clip/jockey on the wire AB starting with L = 20 cm. Close the switch K. Record the terminal p.d. , V and corresponding current I. Repeat for other values of L shown and complete the table.

Length L (cm)	Terminal p.d. V(V)	Current I (A)	$\frac{1}{R} = \frac{I}{V} (\Omega^{-1})$	$\frac{1}{V}$ (V^{-1})
20				
30				
40				
50				
60				
70				

(6 marks)

(c) Plot a graph of $\frac{1}{V}$ (y-axis) against $\frac{1}{R}$. **(4 marks)**

G R A P H

(d) Given that the equation of graph is; $\frac{1}{V} = \frac{r}{E} \cdot \frac{1}{R} + \frac{1}{E}$

Determine from the graph:

(i) the intercept C on $\frac{1}{V}$ - axis

C = _____ **(1 mark)**

and hence calculate the e.m.f. E of the cell. **(2 marks)**

(ii) the slope *S* of the graph. **(2 marks)**

(e) (i) Use the values of *C* and *S* above to find W, given by $W = \frac{S}{C}$ **(1 mark)**

(ii) What is the physical meaning of *W*. **(1 mark)**

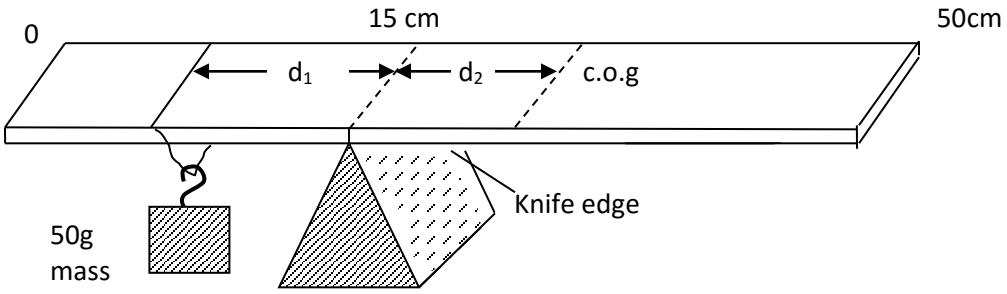
2. **II.** You are provided with the following;

- Half-metre rule
- Knife edge (raised)
- A thread (approx. 20cm in form of a loop)
- 50g mass

(a) Determine the c.o.g of the half-metre rule.

c.o.g. = _____ cm mark. **(1 mark)**

(b)



(i) Pivot the rule at 15cm mark and balance it with the mass as shown. When it is well balanced, note and record the position of the 50g mass; **(1 mark)**

Position of 50g mass = _____ cm mark

(ii) Use your results to determine the weight of the rule. **(2 marks)**