NAME: ………………………………………… INDEX NO: ………………………………

SIGNATURE: ………………………………… DATE : ………………………………..

SCHOOL:……………………………………

232 / 3
PHYSICS
PAPER 3
(PRACTICAL)
JULY / AUGUST 2013
TIME: 2 ½ hours

NANDI CENTRAL DISTRICT MOCK 2013

Kenya Certificate of Secondary Education (KCSE)
PHYSICS
PAPER 3
TIME: 2 ½ 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 questions in the spaces provided.
(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 will be given for clear records of 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) All working must be clearly shown where necessary.
(h) Mathematical tables and silent electronic calculators may be used.

FOR EXAMINER'S USE ONLY

Question 1	(a)	(e)	(f)	(g)	(h)	TOTAL
Max. Score	2	7	5	2	4	20
Candidate's Score						

Question 2	(f)	(g)	(h)	(I)	(j)	(c)	TOTAL
Max. Score	5	5	2	2	1	5	20
Candidate's Score							

GRAND TOTAL

1. You are provided with the following:-
   - Wooden metre rule.
   - Five 50g masses.
   - Vernier calipers
   - Stop watch
   - G-clamp
   - Cellotape

Proceed as follows:

(a) Using the vernier calipers, measure and record the width x and the thickness y of the metre rule.

X…………………………………… (m) (1mk)

Y:……………………………………(m) (1mk)

(b) Set up the apparatus as shown in figure i below such that the length l = 0.9m.

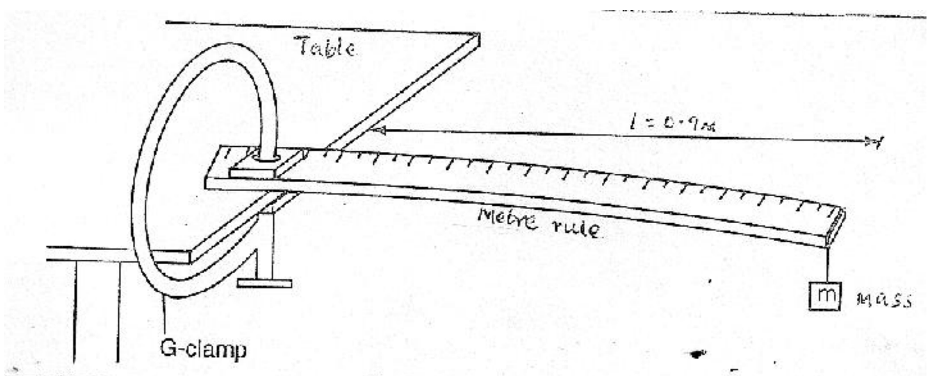


Figure (i)

(c) Using a cellotape, fix one 20gmass firmly on the metre rule such that geometrical centre is directly below the free edge of the metre rule.

(d) Pull the end of the metre rule with the mass m = 200g gently in order to produce small vertical displacement, then release to oscillate. Record the time t for 10 complete oscillations.

(e) Repeat part (c) and (d) for other values of mass equal to 40, 60, 80 100g and complete the table shown below. (7mks)

Mass (m) (kg)	0.02	0.04	0.06	0.08	0.10
Time t for 10 oscillations (s)					
Period T (s)					
$T^2 (S^2)$ (3d.p)					

(f) Plot the graph of T^2 (y-axis) against m. (5mks)

(g) Determine the slope, S, of the graph. (2mks)

(h) The relationship between T^2 and M is given as

$$T^2 = \frac{16\pi^2 l^3 m}{xy^3 k} + P$$

Where K and P are constants.

(i) Determine the value of k, given that: (3mks)

$$S = \frac{16\pi^2 l^3}{xy^3 k}$$

(ii) Determine the value of P, given that $P = T^2$, when $m = 0$ (1mk)

2. Part A

You are provided with the following apparatus:-

- A rectangular glass slab.
- A soft board.
- White sheets of paper.
- 4 optical pins.
- Four tamp pin

NB: You should have mathematical tables / calculator, geometrical set and a transparent ruler.

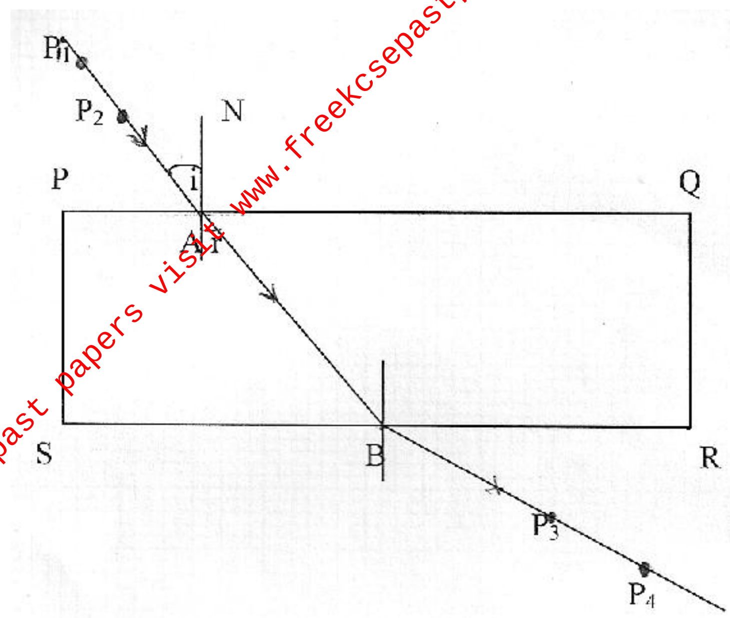
Proceed as follows:

(a) Fix a white sheet of paper on the soft board using tamp pins.

(b) Place the glass slab on the white piece of paper. Trace the outline of the glass slap on the paper.

(c) Stick two pins P_1 and P_2 so that the line joining them falls on the edge of the glass obliquely, forming an angle of 15^0 with normal NA.

(d) Stick two other pins P_3 and P_4 so that they appear to be in line with the images of object pins P_1 and P_2 in the slab as shown on the diagram below.



(e) Now remove the slab. Draw the lines joining P_1 and P_2 and P_3 and P_4. Extend the two lines to meet the outline of the block at the points A and B respectively. The lines P_1 and P_2, AB and P_3 and P_4 show the path the ray follows as it passes from one medium to another: air to glass and back to air again. Mark the direction with arrows.

(f) Measure the angle of refraction (r) between AB and the normal. Record it in the table below. Repeat the procedure for angles of incidence of 30^0, 45^0, 60^0 and 75^0 and record the values in the table below. (5mks)

Angle of incidence (i^0)	15^0	30^0	45^0	60^0	75^0
Angle of refraction (r^0)					
Sin i^0					
Sin r^0					

(g) Draw a graph of sin i^0 (Y-axis) against sin r^0 (X-axis) in the grid provided below.

(5mks)

(h) Determine the gradient of the graph and write down the equation of the graph.

(2mks)

(i) Compare the value of refractive index, n, if n = sin i / sin r using a point on the graph. (2mks)

(j) NB: Remember to hand in the pieces of white sheet of paper you used. (1mk)

PART B

You are provided with the following:-

i. Two dry cells and a cell holder

ii. One voltmeter (0-5V)

iii. One ammeter (0-1A) or (0-2.5A)

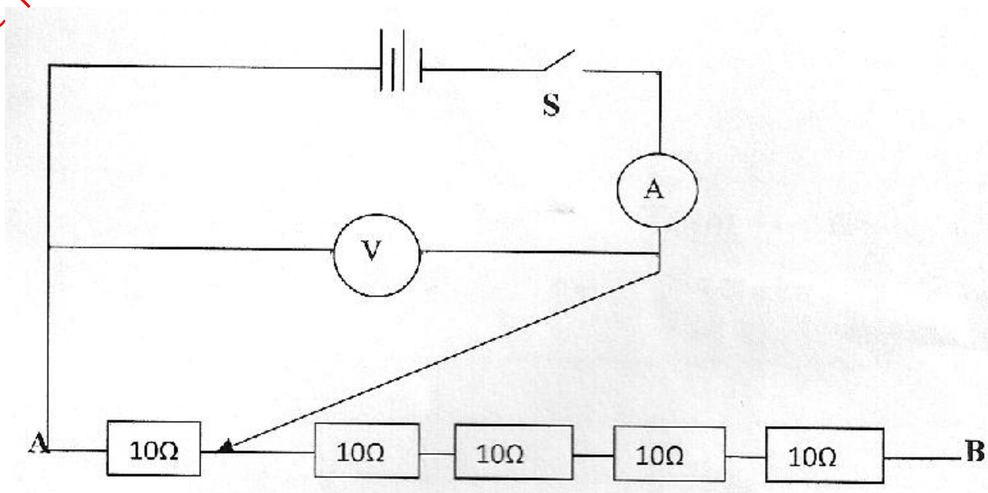
iv. Five resistors labeled AB

v. One resistor labeled R

vi. A switch

vii. 7 connecting wires

(a) Set the circuit as shown below.



(b) With the crocodile clip across resistor 10Ω, close the switch, read and record the ammeter and voltmeter reading in the table below.

(c) (i) Repeat the procedure (e) above with crocodile clips across resistors 20Ω, 30Ω, 40Ω and 50Ω respectively, each time recording the corresponding values for V and I in the table below and complete the table. (4mks)

Resistors (Ω)	10	20	30	40	50
Current I (A)					
Voltage V(V)					
$K = {}^{V}/_{I}$					

(ii) Determine the average value of K. (1mk)