NAME……..... INDEX NO…….....…..……

CANDIDATE'S SIGNATURE……...

DATE……..…….....

232/3
PHYSICS (PRACTICAL)
PAPER 3
JULY/AUGUST 2011
TIME: 2½ HRS.

NANDI SOUTH, NANDI EAST AND TINDIRET DISTRICTS JOINT EXAMINATION 2011

Kenya Certificate of Secondary Education
PHYSICS PAPER 3 (PRACTICAL)
TIME: 2½ HRS.

INSTRUCTIONS TO CANDIDATES:

*(a) Write your **Name** and **Index Number** in spaces provided **above**.*
*(b) **Sign** and write the date of examination in spaces provided **above**.*
*(c) Answer **ALL** the questions in spaces provided in the question paper.*
(d) You are supposed to spend the first 15 minutes of 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) Mathematical table and electronic calculators **may be** used.*
(h) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

FOR EXAMINER'S USE ONLY

Questions	Maximum Score	Candidate's Score
1	20	
2	20	
TOTAL	40	

Question 1

You are provided with the following apparatus.

- A metre rule.
- A retort stand and clamp.
- A pointer/drawing pin.
- A half metre rule.
- Two 1kg masses or a suitable combinations of 1kg.
- 2 pieces of thread about 30cm long.
- 2 knife edges.
- 1 100 grams mass.
- A piece of cello tape or plasticine.

Proceed as follows:

(a) Place the knife edge provided at the 30cm mark of the metre rule and place the 100g mass at end A of the metre rule. (See figure 1)

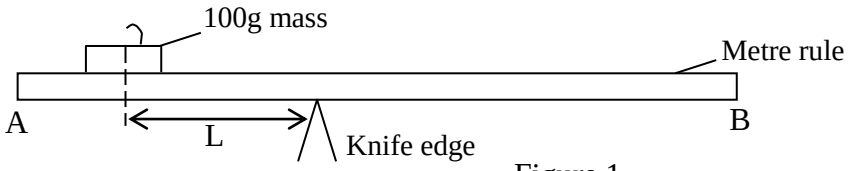

Figure 1

(b) Adjust the position of the mass until the metre rule balances horizontally, measure and record the distance L between the knife edge and the centre of the mass. Dismantle the apparatus.

L = _____cm (1mk)

Calculate the mass, M, of the metre rule from the results in (b). (3mks)

M = _____ kg

_____

_____

_____

_____

(c) Fix the pointer pin at the 50cm mark of the metre rule provided using cello tape. Place the metre rule on the knife edges so that the distance, d, between the knife edges is equal to 70cm and the knife edges are equidistant from the 50cm mark. Clamp a half metre rule vertically near the 50cm mark of the metre rule. Mark the current position of the pointer on the half metre rule scale using a piece of thread.

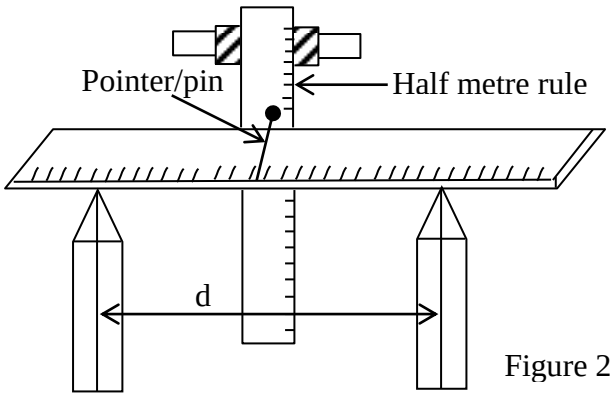

Figure 2

(d) Hang the 1kg masses at a distance 5cm from each end of the metre rule. (See figure 3)

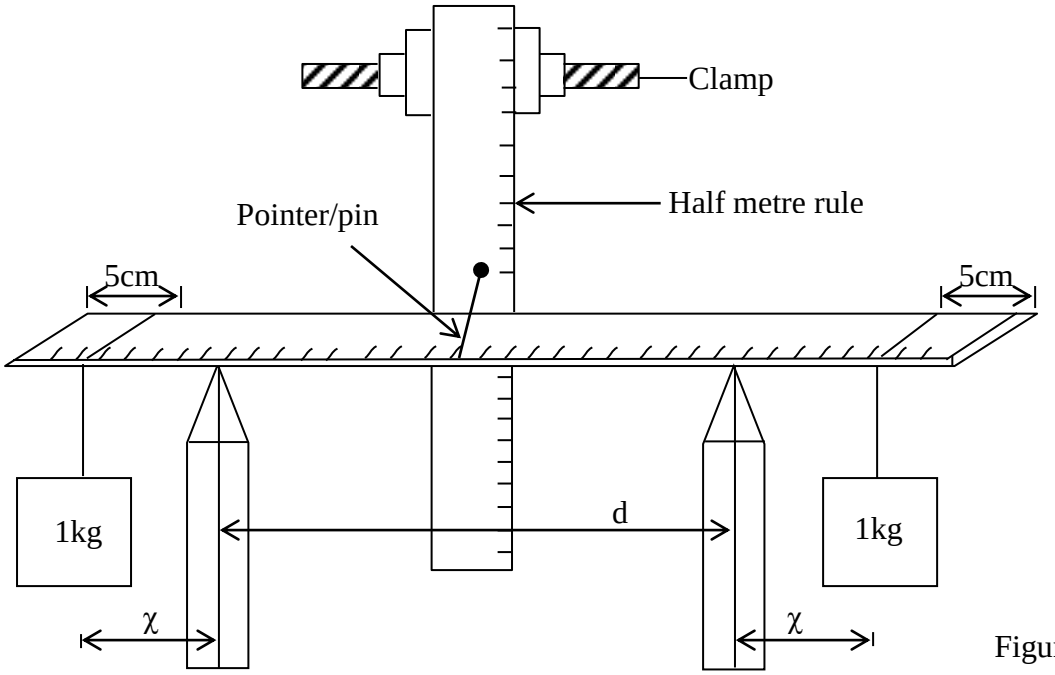

Figure 3

(e) Note the new position of the pointer. Find the vertical displacement, h, produced at the centre of the metre rule and record it in the table. Measure the distance, χ, of one knife edge from the point of suspension of the mass. Record the value of χ in table 1.

(f) Repeat the procedures in (d) and (e) for other values of, d, shown in table 1. (60cm, 50cm, 40cm and 30cm).

Table 1

Distance, d, (cm)	70	60	50	40	30
Vertical displacement, h, (cm)					
Distance χ, (cm)					
d^2 (cm^2)					
h/χ					

Complete the table for values of d^2 and h/χ. (6mks)

(g) On the grid provided, plot a graph d^2 (Y-axis) against h/χ. (5mks)

(h) Find the slope, K, of the graph. (3mks)

GRAPH

(i) Calculate the constant P of the metre rule using the equation: (2mks)

$$P = \frac{km}{1000}$$

_____

_____

_____

_____

_____

_____

Question 2

PART A:

You are provided with the following apparatus:

- Two dry cells.
- Ammeter (0-3A).
- Volmeter (0-5V)
- Eight connecting wires each with a crocodile clip at one end.
- Six 10 ohm carbon resistors.
- A switch.
- A cell holder.

Proceed as follows:

(a) Set up the circuit as shown in figure 4. (M is one of the 10 ohms carbon resistors).

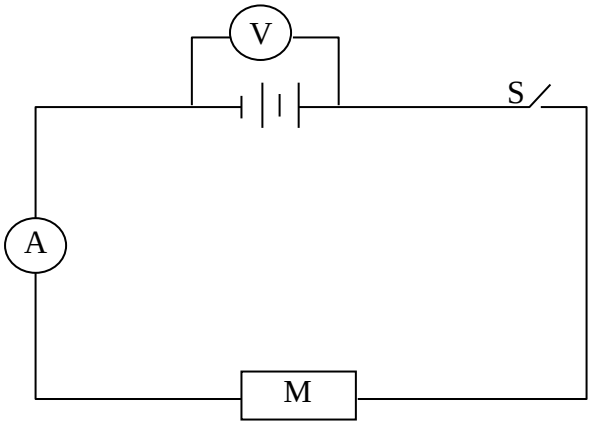

Figure 4

(b) With the switch S open, record the reading E_o of the voltmeter.

E_o = _____ volts. (1mk)

(c) Now remove the voltmeter. Close the switch and record in table 2 the current I flowing in the circuit. Open the switch S.

(d) Remove the resistor M. Using the carbon resistors provided, make <u>suitable</u> combinations of the resistors to obtain the effective resistance, R, shown in the table 2. For each value of R record the current I flowing in the circuit. Complete the table.

Table 2

R (ohms)	10.0	5.0	3.3	2.5	2.0	1.7
I (Amperes)						
$^1/_I$ (A^{-1})						

(4mks)

(e) Plot a graph of $^1/_I$ (Y-axis) against R. (5mks)

(f) Determine the slope M of the graph. (2mks)

_____

_____

_____

_____

_____

(g) Evaluate the value of the constants: (1mk)

(i) $K = \frac{1}{M}$

_____

_____

_____

_____

_____

(ii) $P = \frac{E_oK}{4r}$ where r is the value of the R-axis intercept. (4mks)

PART B

You are provided with the following apparatus:

- One concave mirror, M and mirror holder.
- One white screen (s).
- One candle.
- One metre rule.

Proceed as follows:-

(h) Set up the apparatus as shown in figure 5.

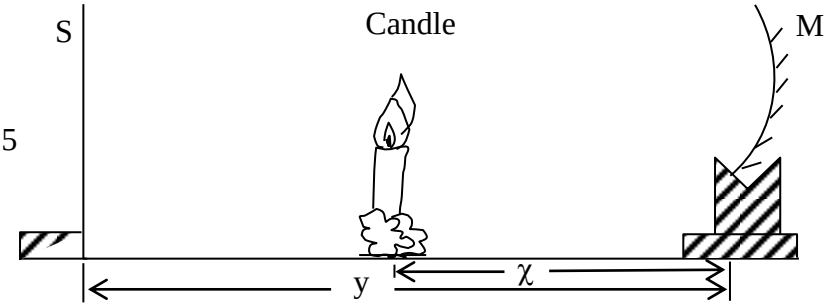

Fig. 5

(i) Place the candle at a distance χ = 25cm from the mirror. Move the screen to and fro until a sharp inverted image of the candle is formed on the screen. (The flame of the candle should be on the axis of the mirror). Measure the distance y, between the mirror and the screen and record it in table 3.

Table 3

χ(cm)	25	35
y(cm)		

(2mks)

(ii) Repeat (i) for χ = 35cm, and record the corresponding value of y.

(iii) Use all the values in table 3 to calculate the focal length f, of the mirror M. (3mks)