NAME…… INDEX NO……/…….

SCHOOL…… DATE ……..…

CANDIDATE'S SIGNATURE……

232/3
PHYSICS
Paper 3
(PRACTICAL)
JUNE/JULY- 2012
Time: 2 ½ Hours

BUTERE DISTRICT JOINT EVALUATION - 2012

Kenya Certificate of Secondary Education (K C.S.E.)

INSTRUCTIONS TO CANDIDATES

1. Write your **name** and **Index Number** in the spaces provided above.
2. **Sign** and write the **date of examination** in the spaces provided above
3. Answer **all** the questions in the spaces provided in the question paper.
4. 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.
5. Marks are given for **a clear record of the observations** actually made, their suitability, accuracy and the use made of them.
6. Candidates are advised to **record** their observations as soon as they are made.
7. **Non-programmable silent electronic calculators** and **KNEC** mathematical tables may be used.

QUESTION I

PART A	II	IV	V	VI
MAXIMUM SCORE	1	1	1	2
CANDIDATES SCORE				

TOTAL ☐

PART B	II	III	IV	V
MAXIMUM SCORE	5	5	3	2
CANDIDATES SCORE				

TOTAL ☐

QUESTION 2

PART C	a	g	h(i)	h(ii)	i
MAXIMUM SCORE	2	6	5	3	4
CANDIDATES SCORE					

TOTAL ☐

GRAND TOTAL ☐

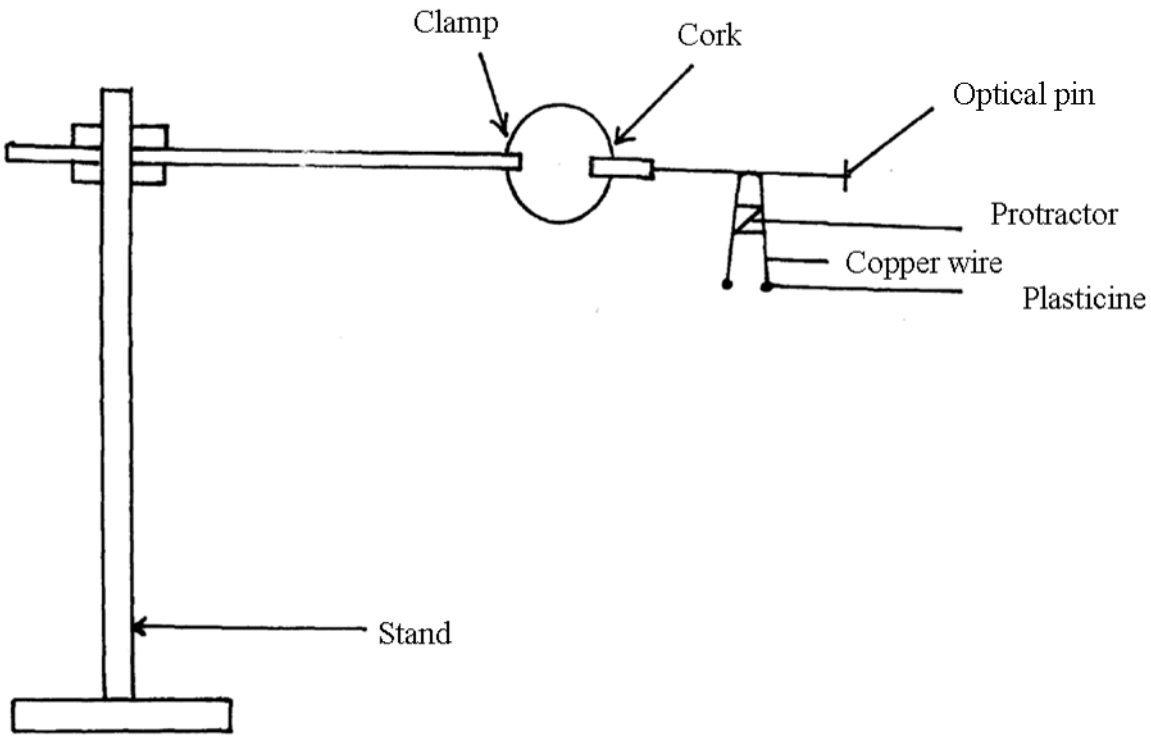
This paper consists of 8 printed pages.
Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing

Question 1 (Part a) (13 marks)

You are provided with the following apparatus

- Clamp
- Stand
- Optical pin
- Copper Wire
- Protractor (your own)
- Two pieces of plasticine
- Stop watch
- Cork

a) Set up the apparatus as shown in the diagram below.



b) Bend the wire in the middle so as to make an angle of 50°. Attach the two small pieces of plasticine at both ends of the bent wire as shown in the diagram

c) Place the bent wire on the optical pin and give a small horizontal displacement. Take the time for 10 oscillations and record in the table below:

d) Repeat the procedure above for other values of θ and complete the table below (6mks)

Angle θ^0	Time t for 10 oscillations (sec)	Periodic Time T (sec)	Frequency f (HZ)	$f^2(Hz)^2$	$Cos(\theta/2)$
50					
60					
70					
80					
90					
100					

e) (i) On the graph paper provided, plot a graph of f^2 (y-axis) against $Cos(\theta/2)$ (4mks)

ii) Determine the gradient of the graph (1 mk)

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iii) The equation for the oscillation of the wire is given by the formula

$$f^2 = \frac{1.5K}{4\pi L}\cos\left(\frac{\theta}{2}\right)$$

Given that L= 0.15m

Use the gradient of the graph to determine the value of K (2mks)

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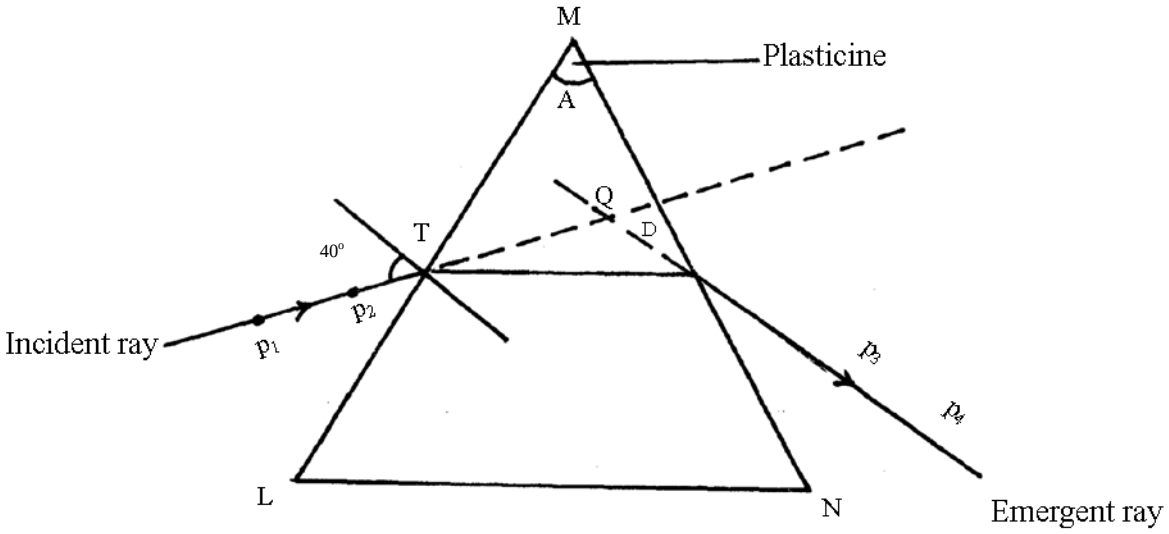
Question 1 (part b) (7mks)

You are provided with the following apparatus:

- Prism
- 4 optical pins
- Plain paper
- Protractor
- Some plasticine
- Soft board

I) Set up the apparatus as shown below.



II). Measure angle A of the prism using a protractor. (1mk)

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Ill). Place the prism on a plain paper and trace its outline with a pencil. Attach some plasticine to the prism to indicate the prism angle, A.

Construct a normal at point T along LM. Draw an incident ray to strike the prism at 40°.

Replace the prism and stick pins P_1 and P_2 to define the incident ray. View pins P_1 and P_2 from the opposite face (MN). Insert pins P_3 and P_4 so that they appear to be in line with images of P_1 and P_2

Remove the prism and join P_3 and P_4 to give emergent ray.

Extrapolate the emergent ray into the prism so as to meet the extrapolated incident ray at Q.

IV). a) Measure angle D (2mks)

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b) Calculate the value of (3mks)

$$\eta = \frac{\cos\left(90^0 - \frac{A+D}{2}\right)}{Sin\left(\frac{A}{2}\right)}$$

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c) What is the significance of η? (1mk)

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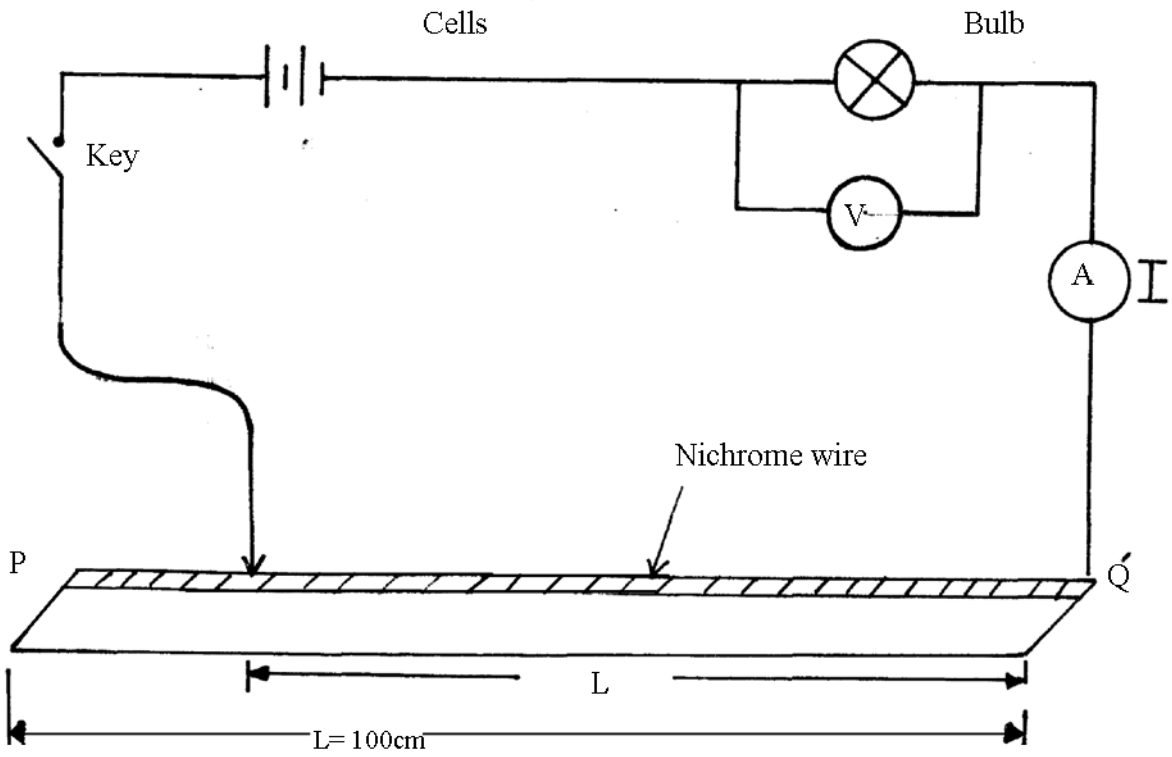
Question 2 (20 marks)

You are provided with the following

- Two dry cells (size D)
- One bulb
- Voltmeter (0 — 3v or 0 -5v)
- Ammeter (0-2.5A)
- A mounted nicrome wire mounted on a millimeter scale
- Switch
- Sewen connecting wire at least two with crocodile clips
- Micrometer screw gauge

Proceed as follows:

a) i) Set up the circuit as shown in figure below:



b)

ii) With the crocodile clip at P take the voltmeter reading and the ammeter reading.

Record V and I.

Repeat the readings for L= 80, 60, 40, 20 and 0cm respectively.

Complete the table below

Length(cm)	100	80	60	40	20	0
Voltage, V(V)						
Current I(A)						

iii) What changes do you observe on the bulb as L decreases from P? (1mk)

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iv) Plot a graph of the ammeter reading (y-axis) against voltmeter reading. (5mks)

(Provide a graph paper)

v) Determine the slope of your graph at V= I volt. (2mks)

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vi) What physical quantity is represented by the slope of the graph at any given point (1mk)

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c) i) Given the apparatus in a (i) above, draw a diagram of the circuit you would use to determine the current through the resistance wire and the potential difference across. (1mk)

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ii) Set up the circuit you have drawn. Record the ammeter reading I and the voltmeter reading V. when L = 100cm. (2mks)

V =

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I =

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iii) Using a micrometer screw gauge, measure the diameter of the wire. (1 mk)

d=_____ m

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iv) Calculate the quantity:

ρ =0.785 $\frac{(V)}{I}\frac{(d^2)}{L}$ and give its units, where L is one metre. (2mks)