NAME: …… INDEX NO: ……..……

CANDIDATE'S SIGNATURE: ……..

DATE: ……

232/3
PHYSICS
(PRACTICAL)
SEPTEMBER 2017 **FORM FOUR**
2 ½ HOURS

KIKUYU SUB-COUNTY KCSE TRIAL EXAMINATION 2017

SEPTEMBER 2017

INSTRUCTIONS TO CANDIDATES

i. Write your name, index number, date and signature in the spaces provided above.
ii. Answer all the questions in the spaces provided in the question paper
iii. You are supposed to spend 15 minutes of 2 ½ hours allocated for this paper reading the whole paper before starting your work.
iv. Marks are given for a clear record of the observations actually made, their suitability, accuracy and the use made of them.
v. Record your observations as soon as you make them.
vi. Non-programmable silent electronic calculators and KNEC mathematical tables may be used.
vii. All questions are answered in English.

FOR EXAMINERS USE ONLY

QUESTION ONE

	c	d	e	f	g (i)	g (ii)	h (i)	h (ii)
Maximum score	5	5	3	2	1	1	1	2
Candidate's score								

Total

QUESTION TWO

	q	b	d	e	f
Maximum score	2	1	9	5	3
Candidate's score					

Total

Grand Total

QUESTION ONE

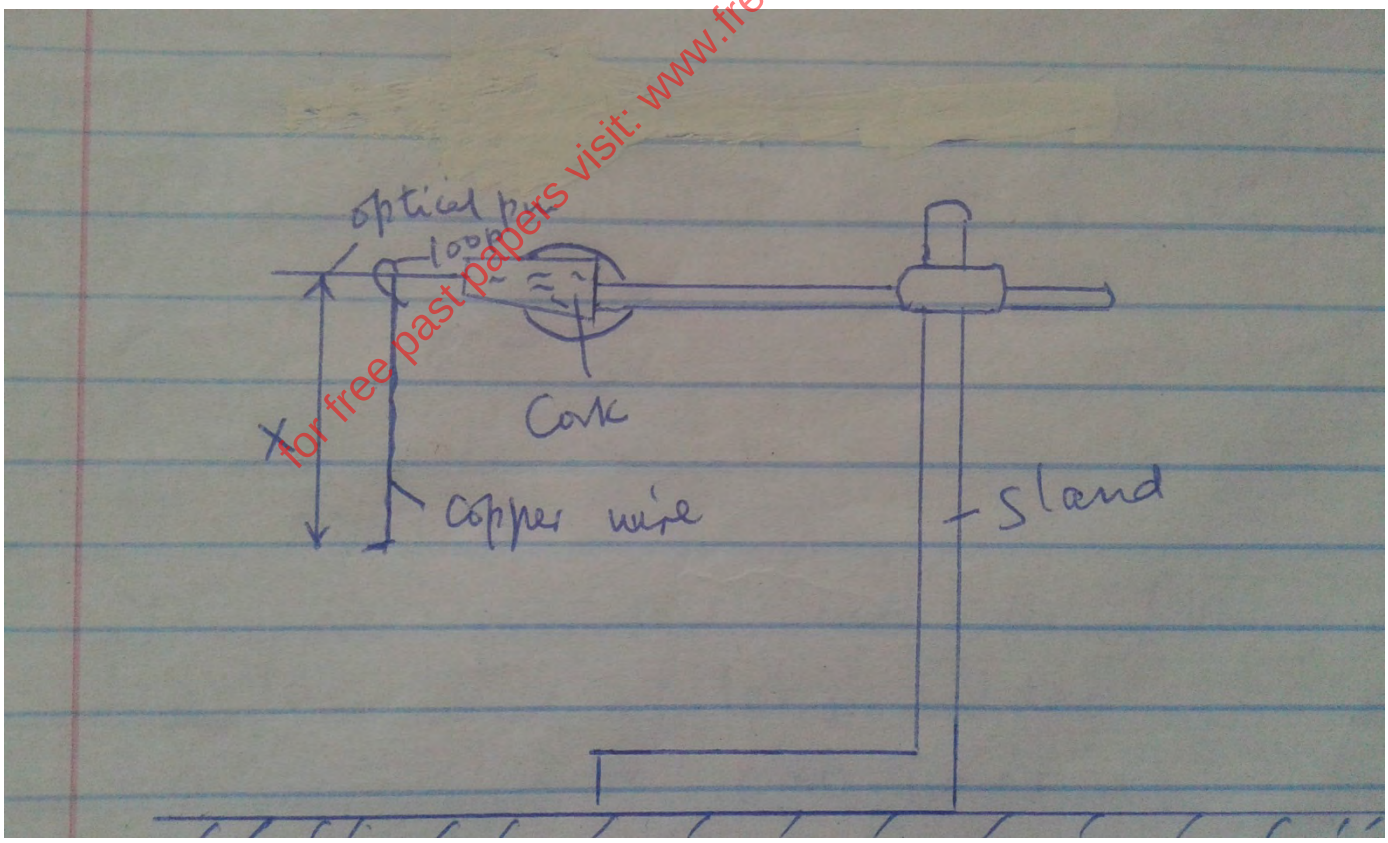
This question consists of two parts A and B. Attempt both parts.

PART A

You are provided with the following:

- Copper wire
- Stop watch
- A retort stand, boss and clamp
- An optical pin mounted on a cork
- Wire cutters (to be shared)
- A meter rule or half meter rule

a) Clamp the cork so that the pin is horizontal. Hang the copper wire from the pin by the loop as shown in the figure below. Ensure the wire is straight and the length X between the lower tip and the pin is 32cm. if the length exceeds 32cm reduce by cutting at the lower tip using the wire cutters provided.



b) Displace lower tip of the wire slightly in a plane perpendicular to the optical pin and then release it. Measure the time t for 10 oscillations and record the values in the table below.

c) Repeat the procedure in (b) above for other values of X in the table. (*Note that each length X is obtained by cutting off an appropriate length from the lower tip of the wire. For example to get X = 28cm cut off from the lower end).*
Complete the table. (5 mks)

Length X (cm)	32	28	24	20	16	12
Time t for 10 oscillations						
Period T = t/10 (s)						
T^2 (s^2)						

d) Plot a graph of T^2 (y-axis) against X. (5 mks)
(* ATTACH GRAPH PAPER)

e) Determine the slope S of the graph. (3mks.)

e) Obtain the value of K in the equation. (2 mks)

$$\frac{S}{8} = \frac{\pi}{3K}$$

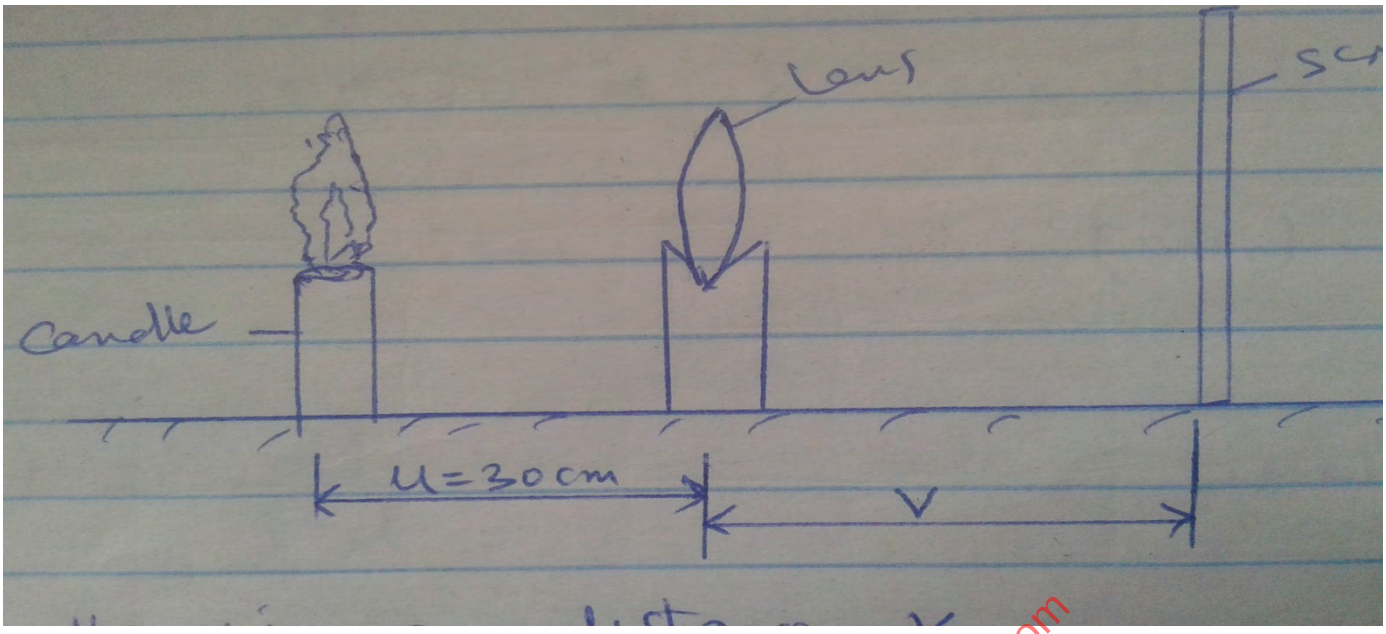
PART B

You are provided with the following:

- A lens and a lens holder
- A screen with cross-wires
- A candle
- A meter rule

Proceed as follows:

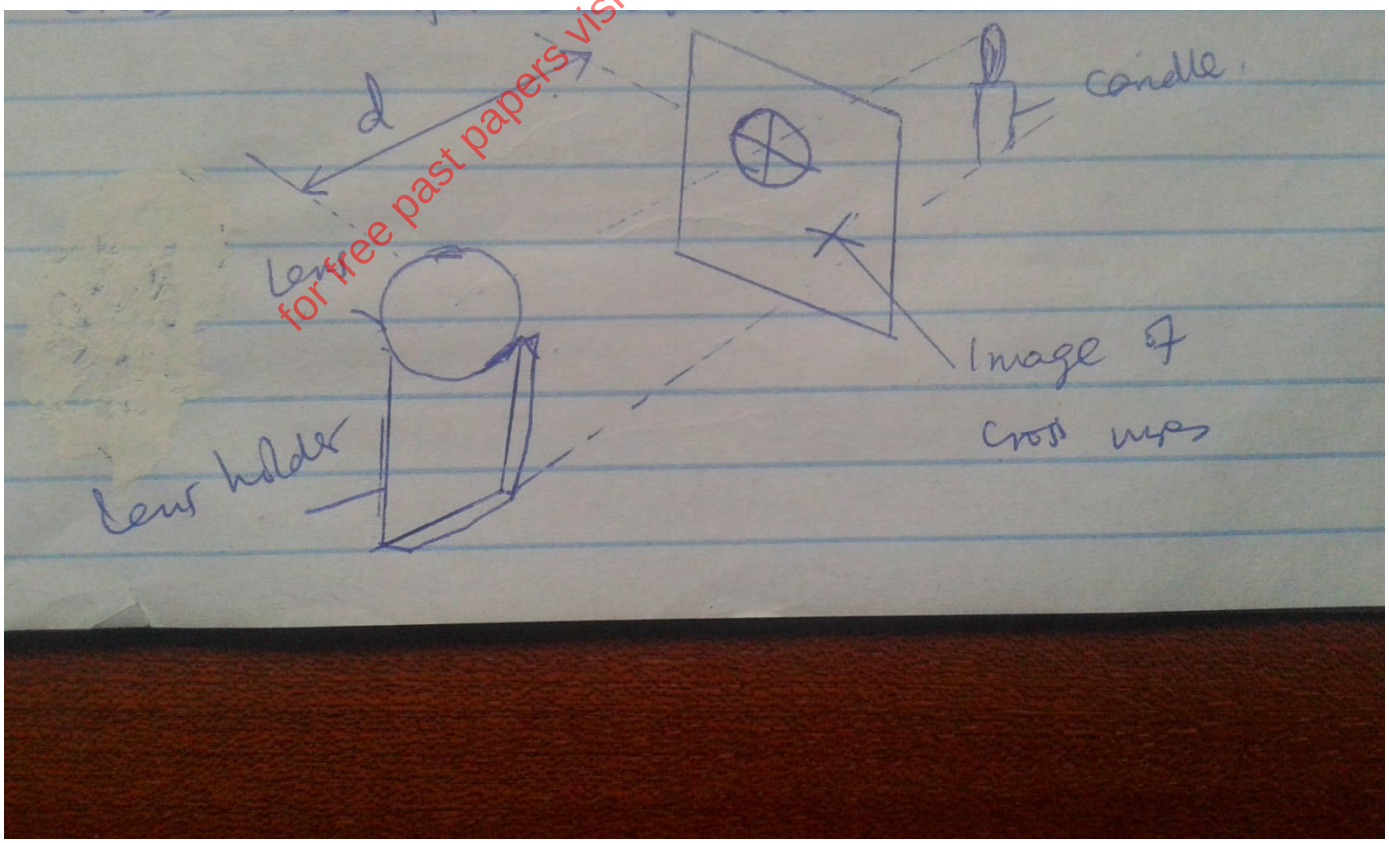
f) Arrange the lighted candle, the lens and the screen as shown in the figure below. Adjust the position of the screen until a sharp inverted image of the candle is formed on the screen.



i. Measure the image distance V. V = ……cm (1mk)

ii. Determine the focal length f of the lens using the formula; fu = uv – fv. (1 mk)

g) Now arrange the lighted candle, the screen with the cross wires and the lens as shown below. (Ensure that the centre of the lens, the cross wires and the candle flame lie in the same horizontal line). The candle flame should be placed close to the cross wires for better illumination.



i. Adjust the position of the lens until a sharp image of the cross wires is formed on the screen next to the cross-wires (*hint: you may have to rotate the lens slightly about a vertical axis so that the image of the cross wires falls on the screen next to the cross wires and not on the cross wires).* Measure the distance d, between the lens and the screen.

d = ……cm (1 mk)

ii. Evaluate:

I. $L = \frac{d\,f}{f - d}$ (1 mk)

II. $y = \frac{L}{2f} + 1$ (1 mk)

QUESTION TWO

You are provided with the following:

- An ammeter
- A voltmeter
- Two cells (size D)
- A switch
- A cell holder
- A wire labeled L mounted on a millimeter scale
- A micrometer screw gauge (to be shared)
- Six connecting wires at least four with crocodile clips

Proceed as follows

a) Using a micrometer screw gauge, measure and record the diameter d of the wire L

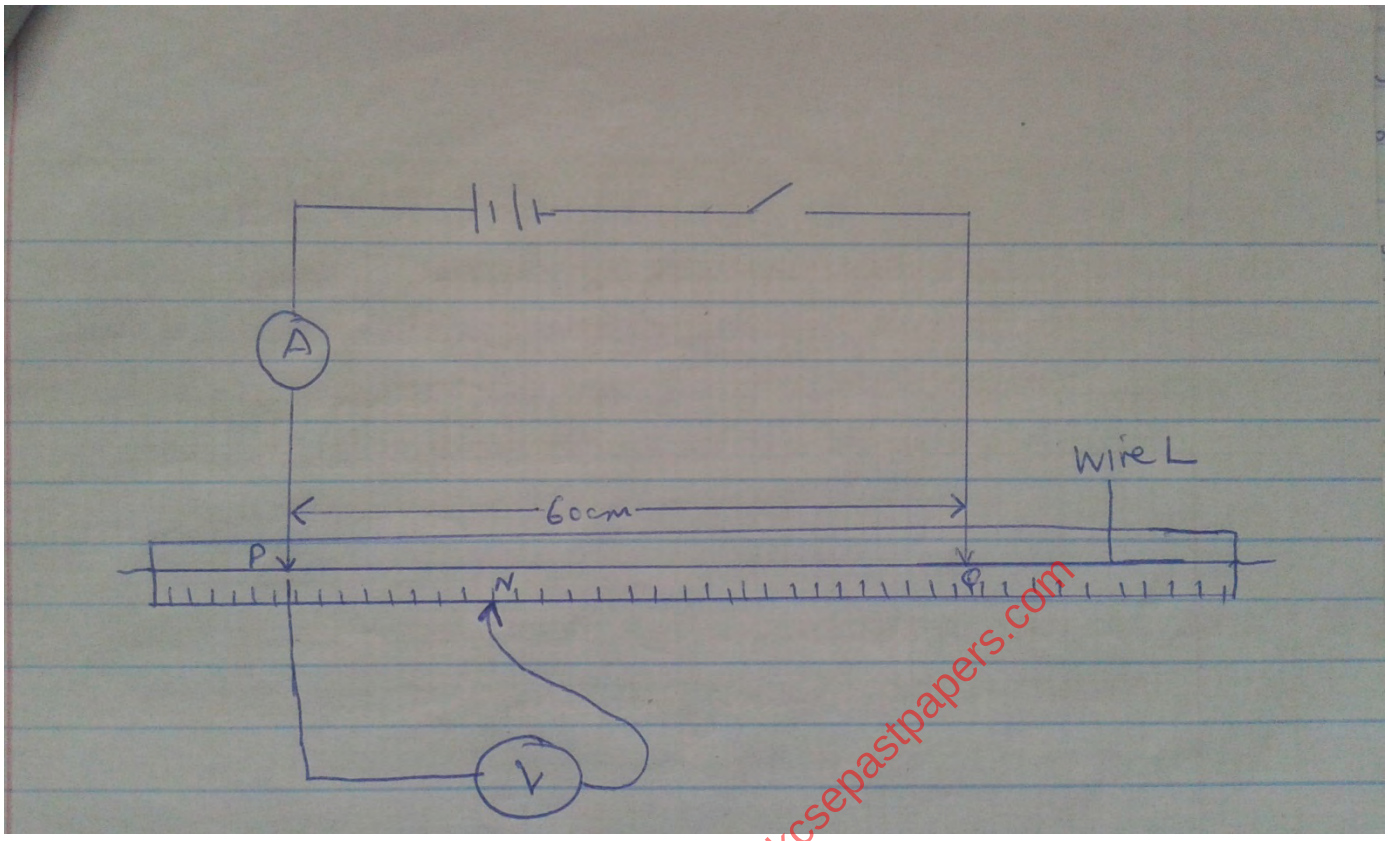
d = ……..mm (1 mk)

d = ……m (1 mk)

b) Place the two cells in series in the cell holder and use the voltmeter to measure the total electromotive force (emf.) E_0 of the battery.

E_0 = ……V (1 mk)

c) Starting with the switch open, connect the circuit as shown in the figure below. P and Q are points on the wire L such that PQ = 60cm. (*PQ should remain 60cm throughout the experiment).* N is a point on the wire such that PN = 0.1m.



d) (i) Close the switch and record the current I. I = ……A (1 mk)

(ii) Measure and record the potential difference across PN for the other values of PN shown in table 2 and complete the table. (The current is expected to remain constant). Hint: the switch should be closed only when reading the voltmeter. (8 mks)

Table 2

Length PN (m)	0.1	0.2	0.3	0.4	0.5	0.6
Pd (V)						
Resistance (V/I) Ω						

e) On the grid provided, plot a graph of resistance (y-axis) against length. (5 mks)
***(* ATTACH GRAPH PAPER*)**

f) Determine the constant K given that;

$K = \frac{E_0 - V_n}{I}$ where V_n is the Pd at PN = 0.45m (3 mks)