

232/3
PHYSICS
PAPER 3
PRACTICAL
JULY/AUGUST 2014

KATHONZWENI SUB-COUNTY FORM 4 PRE-TRIAL EXAMINATION
Kenya Certificate of Secondary Education
PHYSICS
PAPER 3
CONFIDENTIAL

INSTRUCTIONS TO SCHOOLS

Each student will require the following

Question 1

- A torch bulb
- A bulb holder
- Ammeter (0 – 5A)
- Voltmeter (0 -5V)
- A switch
- 8 connecting wires (4 with crocodile clips)
- A mounted wire (SWG 28) on a metre rule
- 2 new dry cells (1.5V) each
- A cell holder

Question 2

- A screen with cross wires at the centre
- A white screen
- A biconvex lens of focal length 20cm
- A match box
- A metre rule
- One candle stick
- A lens holder

Name _____ Index No. _____

Candidates signature _____

Date _____

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PHYSICS
PAPER 3
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2 ½ HOURS

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2 ½ HOURS

INSTRUCTIONS TO CANDIDATES

- Answer all the questions in the spaces provided on the question 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 commencing your work
- Marks are given for a clear record of the observations actually made for their suitability accuracy and for the use made of them.
- Candidates are advised to record their observations as soon as they are made
- Mathematical tables and calculators may be used.

FOR EXAMINER'S USE ONLY

Question 1

Maximum score	20
Candidates score	

Question 2

Maximum score	20
Candidates score	

Candidate's total	
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This paper consists of 6 printed pages

Turn Over

1. You are provided with the following apparatus
- Torch bulb fixed in a bulb holder
 - Ammeter (0 -5A)
 - Voltmeter (0-5V)
 - Switch (s)
 - 8 connecting wires (4 with crocodile clips)
 - A mounted wire 100cm long
 - Two cells
 - A cell holder

Set up the apparatus as shown below

A B A Bulb V

Proceed as follows.

(a) With the crocodile clip at A (i.e. L = 100cm) take both voltmeter (V) and Ammeter (A) readings. Record these values in the table provided below.

(b) Repeat the procedure in (a) above for L = 80cm, 60cm, 40cm, 20cm and 0cm respectively

(c) Use the value obtained to complete the table below.

Length, L, (cm)	100	80	60	40	20	0
Current, I (A)						
Voltage (V)						
V^2 (V^2)						
$V/I = R$ (Ω)						

(7mk)

(d) On the grid provided, plot a graph of V^2 (y – axis) against R

(5mks)

(e) Determine the slope of the graph at the point when

(i) $R = 7$

(3mks)

(ii) $R = 4$

(3mks)

(f) Give the physical quantity represented by the slope of the graph at any given point.

(2mks)

Question 2

You are provided with the following

- A screen with cross wires at the centre
- A white screen
- A lens and a lens holder
- A candle
- A match box
- A metre rule

Proceed as follows

(a) Arrange the lens and the white screen as shown in the diagram below

Lens holder d screen

Adjust the distance of the screen from the lens until a sharp image of a distant object is formed on the screen. Measure and record the distance, d (cm) (2mks)

(b) Place the metre rule on a horizontal table so that the millimeter scale faces upwards, place the candle at one end of the metre rule and the screen with cross wires at the zero cm mark.

Arrange the lens and the white screen as shown

Candle cross wires lens white screen a b

(i) Adjust the lens so that the distance a is 30cm

(ii) Adjust also the position of the white screen to obtain a sharp image of the cross wires and record the value of distance b in the table.

(iii) Repeat steps b (i) and b (ii) above for values of $a = 35\text{cm}, 40\text{cm}, 45\text{cm}$ and 50cm each time recording the corresponding value of b in the table.

a (cm)	30	35	40	45	50
b (cm)					
a + b (cm)					
ab (cm ²)					

(7mks)

(c) Plot a graph of $a + b$ (y – axis) against ab .

NB. Your scale on all the axes do not need to start from zero.

(5mks)

(d) Determine the slope, s of the graph

(3mks)

(e) If the equation of the graph is

$$f\left(\frac{a+b}{ab}\right) = 1$$

Use the graph to find the value of f .

(3mks)

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MARKING SCHEME

1.

Length, L, (cm)	100	80	60	40	20	0
Current, I (A)	0.12	0.14	0.16	0.17	0.18	0.22
Voltage (V)	0.25	0.40	0.50	0.60	0.85	1.65
V ² (V ²)	0.0625	0.16	0.25	0.36	0.7225	2.7225
V _I = R (Ω)	2.083	2.857	3.125	3.529	4.722	7.5

I values ± 0.02

All correct 2marks

at least 4 correct 1 mark

V value ± 0.05

All correct 2 marks

at least 4 correct 1 mark

V² – All correct 2 marks

At least 4 marks

R – All correct 1 mark

(e) (i) Rt R = 7

$$S = \frac{2.68 - 1.4}{7.5 - 6.0}$$

correct intervals – 1 mark

evaluation – 1 mark

Accuracy – ½ mark

$$\frac{1.28}{1.5}$$

$$= 0.853 \text{ W} \pm 0.1$$

unit – ½ mark

(ii) At R = 4

$$S = \frac{1.08 - 0.1}{6 - 2.7}$$

correct intervals – 1 mark

evaluation – 1 mark

accuracy - ½ mark

$$\frac{0.98}{3.3}$$

$$= 0.297 \text{ W} \pm 0.1$$

unit – ½ mark

(f) Power of the bulb (2 marks)

2. (a) $d = 20.0\text{cm} \pm 0.5\text{cm}$ (2mks)

a (cm)	30	35	40	45	50
b (cm)	60.0	46.5	40.0	36.0	33.0
a + b (cm)	90.0	81.5	80.0	81.0	83.0
ab (cm ²)	1800	1627.5	1600	1620	1650

b values + 0.5cm

all correct 3 marks

at least 4 correct 2 marks

at least 2 correct 1 mark

a + b values

all correct 2mks

at least 3 correct 1 mark

ab values

all correct 2 marks

at least 3 correct 1 mark

$$(d) S = \frac{90 - 80}{1800 - 1600}$$

correct intervals 1mark

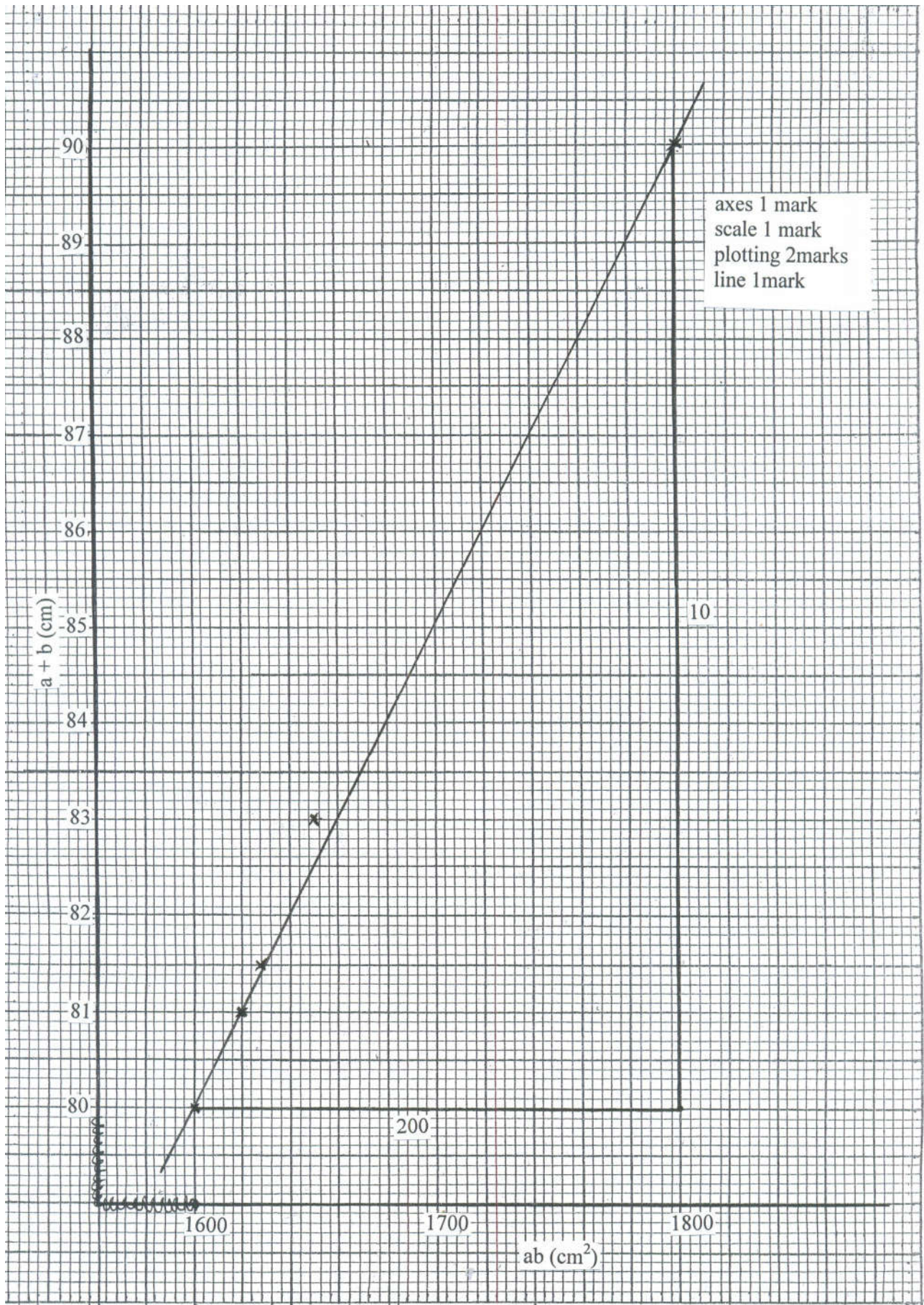
evaluation 1 mark

accuracy ½ mark

unit ½ mark

$$\frac{10}{200}$$

$$= 0.05\text{cm}^{-1} \pm 0.01$$



$$(e) f \frac{(a+b)}{ab} = 1$$

$$f(a+b) = ab$$

$$a+b = \frac{1}{f} ab$$

$$\frac{1}{f} = 0.05$$

$$f = \frac{1}{0.05}$$

$$f = 20\text{cm} \pm 1.0$$

realising that slope = $\frac{1}{f}$ 1 mark

evaluation 1 mark

accuracy $\frac{1}{2}$ mark

unit $\frac{1}{2}$ mark