

Name Index No.

School Candidate's Signature

232/3

Date

PHYSICS

Paper 3

(Practical)

July/August 2016

Time: 2½ Hours

NTIMA, NYAKI AND MUNICIPALITY CLUSTER EVALUATION 2016

PHYSICS
Paper 3
July/August 2016
Time: 2½ Hours

INSTRUCTIONS TO CANDIDATES

- * Write your name and index number in the spaces provided above.
- * Sign and write the date of examination in the spaces provided above.
- * Answer **ALL** the questions in the spaces provided.
- * 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.
- * Marks are given for a clear record of the observations made, their suitability, accuracy and the use made of them.
- * Candidates are advised to record their observations as soon as they are made.
- * All working must be clearly shown where necessary.
- * Mathematical tables and electronic calculators may be used.
- * 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

Question 1	A (a)	Ab (iii)	A (c)	A d(i)	d(ii)	B (a)	B f(i)	B f(ii)	B f(iii)	Total
Maximum score	1	5	5	3	2	1	1	2	1	20
Candidate's										

Question 2	a	b	d(ii)	e	f(i)	f(ii)	f(iii)	Total
Maximum score	1	1	5	5	3	2	3	20
Candidate's								

**GRAND
TOTAL**

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1. PART A

You are provided with the following :-

- a boiling tube
- a measuring cylinder
- a half metre rule
- water in a container
- a stand complete with boss and clamp
- vernier callipers (may be shared)

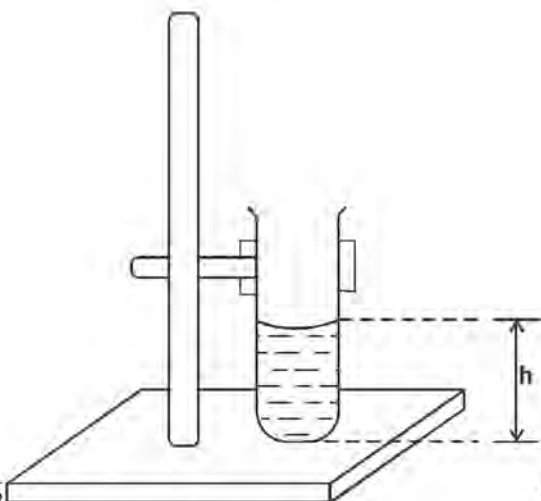
Proceed as follows :

- a) Using the vernier callipers measure the internal diameter, d , of the boiling tube.

$d = \dots\dots\dots$ cm.

(1 mark)

- b) i) Clamp the boiling tube vertically as shown in the figure 1 below.



- ii) Using the measuring the boiling tube. table 1 the height h , of water in the boiling tube.

cylinder pour 15cm^3 of water into Measure and record in

- iii) Repeat the procedure in b(ii) for other volumes of water, V , shown in the table.

Volume, V , of water (cm^3)	Height, h , of water (cm^3)
15	
20	
25	
30	
35	
40	

- c) Plot a graph of V (y-axis) against h on the grid provided.

(5 marks)

(5 marks)

d) i) From the graph determine the slope S and its units. (3 marks)

ii) Determine the value of constant k given that $4S = kd^2$. (2 marks)

PART B

You are provided with the following :

- a glass block
- a plain sheet of paper
- five optical pins
- a half metre rule

Proceed as follows :

a) Measure the length, l , of the glass block.

$l = \dots\dots\dots$ cm (1 mark)

b) Place the glass block on the plain sheet of paper and trace its outline.

c) Place a pin P_1 firmly at the middle of one end of the glass block as shown in figure 2 below.

d) With your eye at the opposite end of the block, place pins P_2 and P_3 so that they are in line with the image I of pin P_1 as shown in figure 2. Similarly locate the image I using pins P_4 and P_5 .

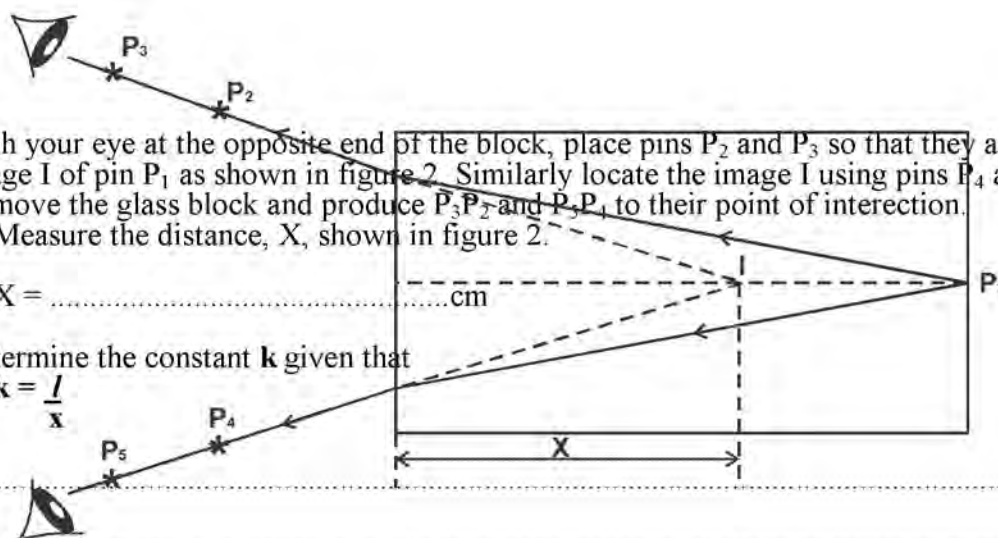
e) Remove the glass block and produce P_3P_2 and P_5P_4 to their point of intersection.

f) i) Measure the distance, X , shown in figure 2.

$X = \dots\dots\dots$ cm (1 mark)

ii) Determine the constant k given that

$k = \frac{l}{x}$ (2 marks)



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 iii) What does constant **k** represent ? (1 mark)

2. You are provided with the following :
- an ammeter
 - a voltmeter
 - a wire mounted on a mm scale
 - a switch
 - two cells (size D)
 - a cell holder
 - a micrometer screw gauge (may be shared)
 - six connecting wires at least four with crocodile clips.

Proceed as follows

- a) Using the micrometer screw gauge, measure and record the diameter d of the mounted wire. (1 mark)

$d = \dots\dots\dots \text{mm}$

$d = \dots\dots\dots \text{m}$

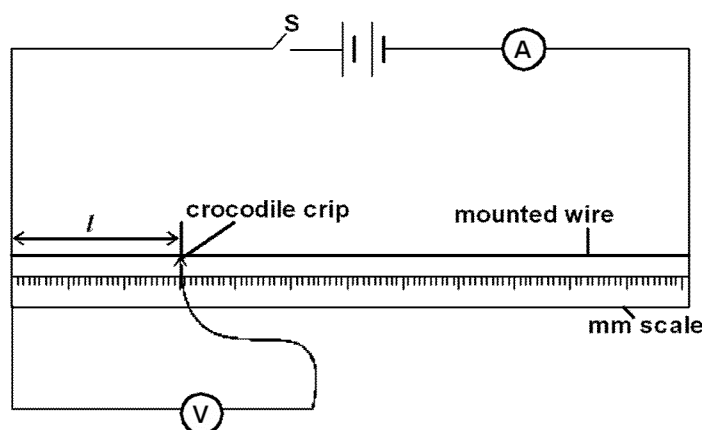
- b) Place the two cells in series in the cell holder and use the voltmeter to measure the electromotive force (e.m.f) E of the battery.

$E = \dots\dots\dots \text{V}$ (1 mark)

Set up the apparatus as shown in the circuit in figure 3 below.

- c) Starting with the switch open, connect a crocodile clip on the mounted wire such that $l = 30\text{cm}$ (0.3m)
- d) i) Close the switch and record in table 2 the voltmeter and ammeter readings.
- ii) Repeat the procedure in d(i) for other values of l shown in the table. Complete the table.

Table 2



e) On the grid provided, plot a graph of resistance (y-axis) against length. (5 marks)

f) From the graph, determine :

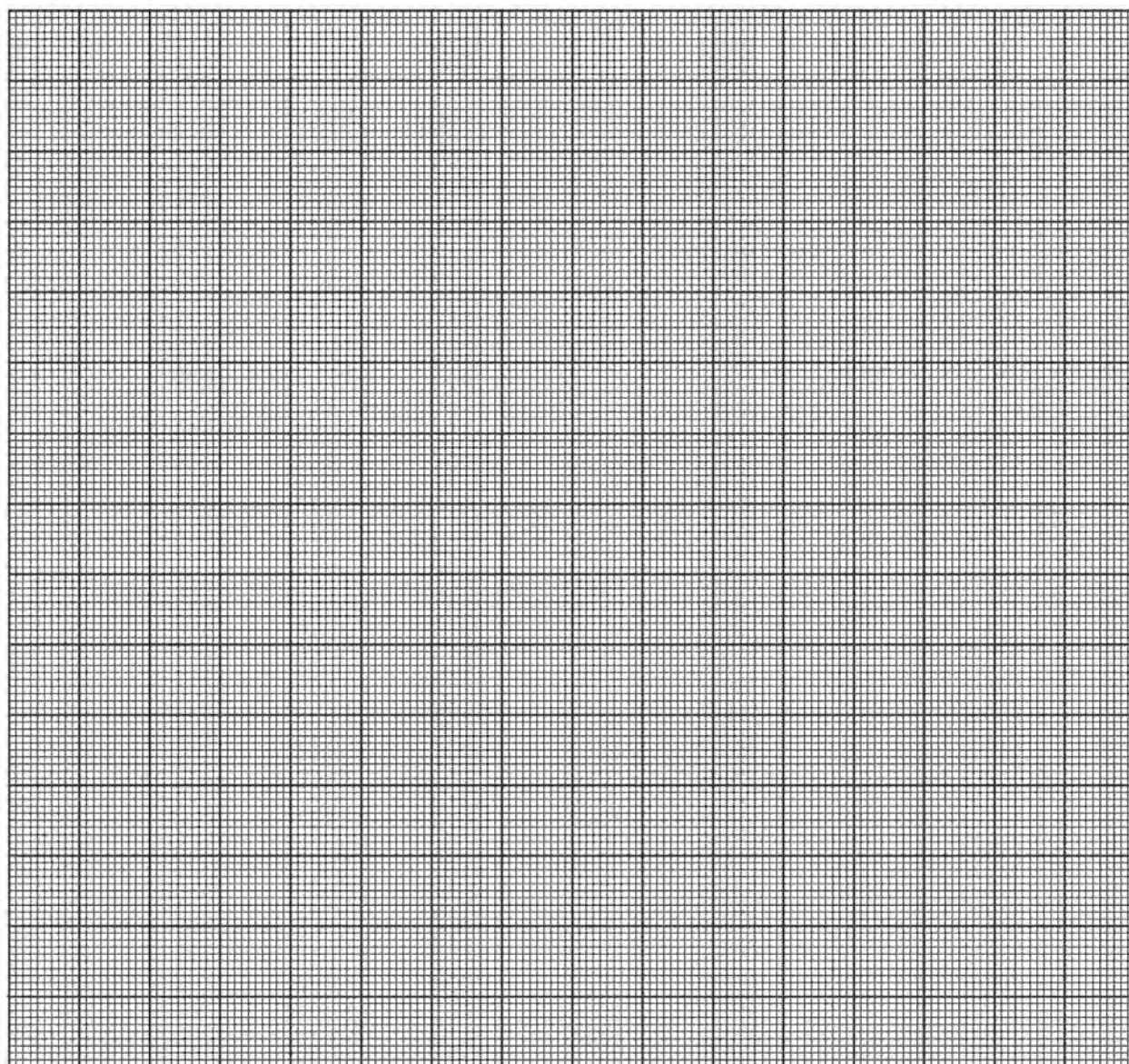
i) the slope S and its units. (3 marks)

l (m)	V (volts)	I (A)	$R = \frac{V}{I} (\Omega)$
0.3			
0.4			
0.5			
0.6			
0.7			
0.9			

ii) the constant q and its units given that

$$q = \frac{\pi d^2 S}{4}$$

(2 marks)



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iii) Determine the constant r and its units given that :

$$r = \frac{E - V}{I}$$

where V and I are values of current and p.d. at $l = 0.9\text{m}$.

(3 marks)

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