CONFIDENTIAL
GATUNDU SUB COUNTY JOINT EXAMS.

PHYSICS PRACTICAL 232/3
MOCKS EXAMS JULY 2014

Each should have the following;
Apparatus

Question 1

- Drawing/Optical pins
- Thumb tucks.
- white sheet of paper
- soft board
- rectangular glass block
- Salt solution in a 500ml beaker
- Two identical cylindrical 100g mass
- Two pieces of thread
- A resort strand
- A Meter rule
- A knife edge

QUESTION 2

- A voltmeter (0-5.0V)
- An ammeter (0-1.0V)
- A Nichrome Resistor wire SWG 28, mounted on a mm scale(AB)
- A switch
- A cell holder
- Two new dry cells.
- Six pieces of connecting wires
- Four Crocodile clips.
- Micrometer Screw Gauge (To be Shared)

NAME: ……..…CLASS:…..…ADM NO:……

SIGNATURE:……INDEX NO:……

232/3
PHYSICS
PAPER 3
JULY /AUGUST 2014

GATUNDU JOINT EXAMINATION - 2014
Kenya Certificate of Education
Physics Paper 3

Instructions to candidates

- **This paper consists of two Questions 1 and 2.**
- **Answer all the questions in the two Questions in the spaces provided.**
- **Electronic calculators, mathematical tables may be used.**
- **All numerical answers should be expressed in the decimal notations.**

QUESTION	MAX MARKS	CANDIDATE'S SCORE
1	20	
2	20	
TOTAL	40	

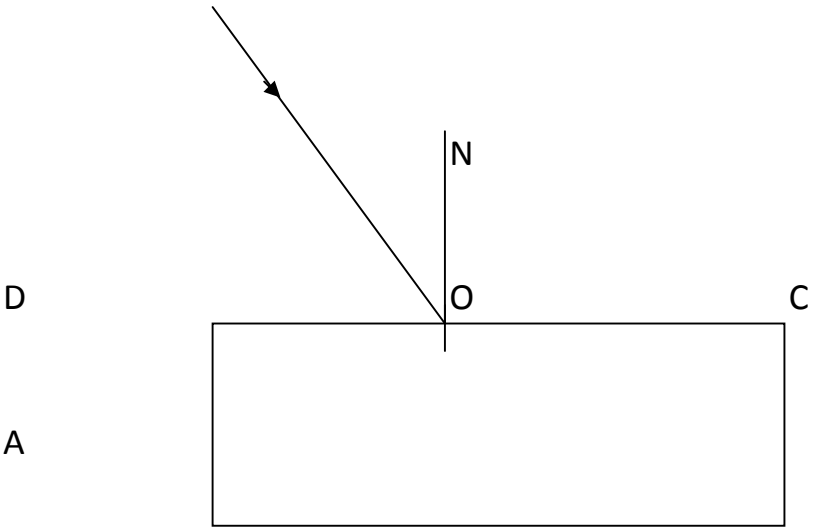
Question 1PART (A)

Apparatus

- Four Opticalpins
- Four thumb tucks
- A Plain sheet of paper,
- A soft board
- A rectangular glass block

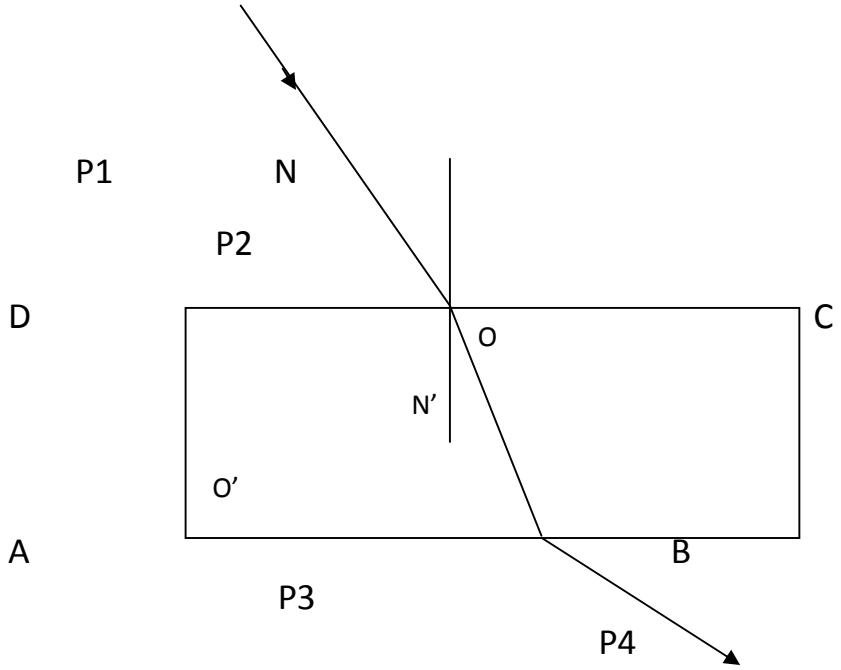
PROCEDURE

1. Fix the plain white paper on soft board using drawing pins.
2. Place a rectangular glass block on the paper and trace its outline ABCD.
3. Remove the glass block and draw a normal, say at point O.
4. Draw a line making an angle of 30^0 with the normal as the incident ray.



5 Replace the glass block carefully to its original position.
6 Fix two pins p1 and p2 on the line as apart as possible.

7 Looking through the glass block and through face AB fix two pins p3 and p4 so that they are exactly in line with the images p1 and p2 as seen through the glass.



8 Mark the positions of p3 and p4.

9 Join p3 and p4 and produce the line to meet face AB of the block at O

10 Join O and O'

(i) Measure angle N'O O' (B) = …… (1mk)

(ii) Given that k= $\frac{\sin 30^0}{\sin B}$

Calculate the value of k (2mks)

What does the value k represent? (1mk)

PART B

You are provided with the following apparatus

- Salt solution in a 500ml beaker
- Two identical cylindrical 100g mass
- Two pieces of thread
- A resort strand
- A Meter rule
- A knife edge

(a)Determine the volume V of one of the masses using the apparatus provided

Record V

V=……cm^3 (2 marks)

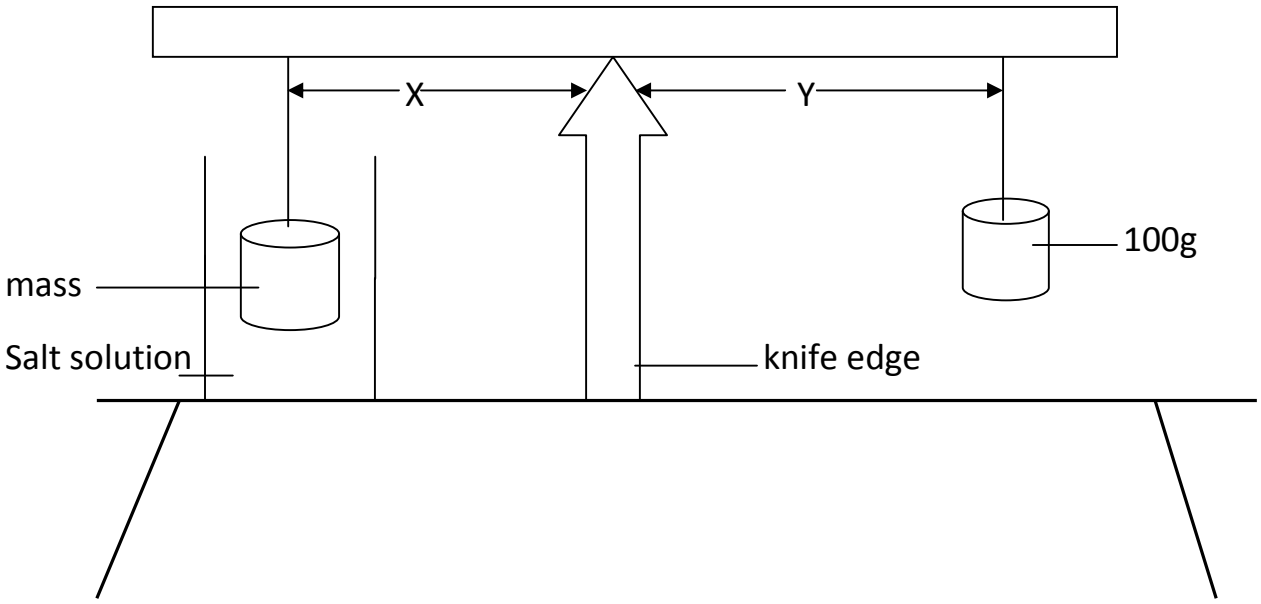
Explain how you determined the volume V (2 marks)

(b)(i) Determine the centre of gravity of the metre rule and record it

G=…… cm mark (1 mark)

(ii)Arrange the apparatus as shown in the diagram below such that X=5cm from the pivot. With the 100g mass completely immersed in water, hang the other 100g mass on the meter rule and adjust its position until the system is in equilibrium as shown in the diagram.

G



Repeat the procedure above with the following values of X and fill the table

NB. During each experiment ensure that the position of the pivot does not change

X(cm)	5	10	15	20	25	30
Y(cm)						

(2 marks

(c) Plot a graph of Y against X (4 marks)

(d) Determine the slope ‘S’ of the graph (2 marks)

(e) Given that $S = \frac{f}{w}$

Where f is the apparent weight of the mass in the liquid L and w is the actual mass, calculate the value

f=…… (1 mark)

U=…… (1 mark)

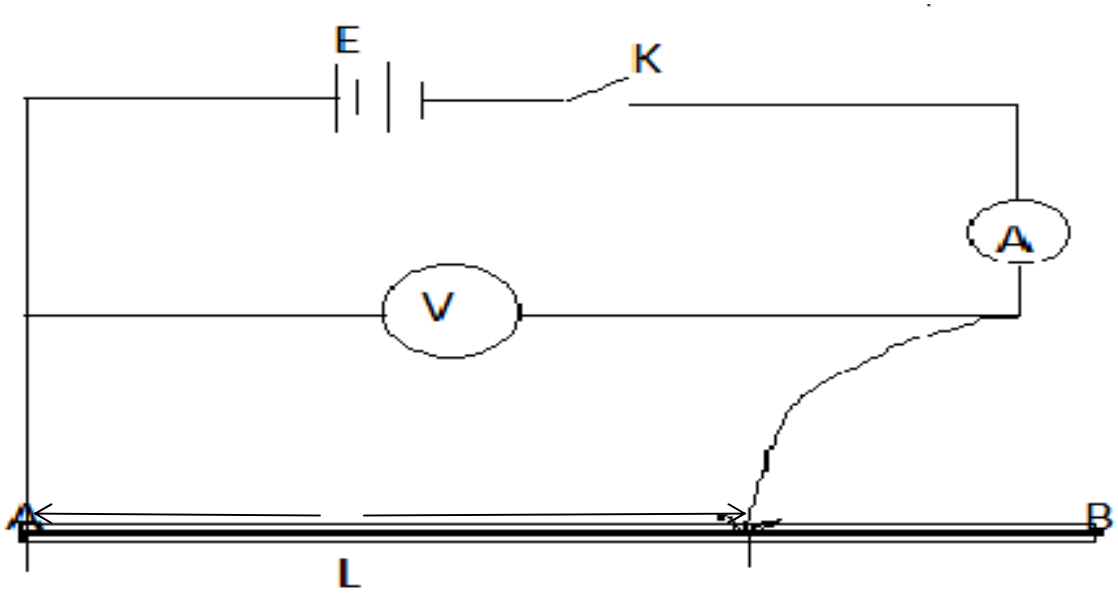
(f)Hence determine the density p of liquid L (2marks)

QUESTION TWO: PART A

You are provided with the following apparatus;

- A voltmeter
- An ammeter
- A Resistor wire mounted on a mm scale(AB)
- A switch
- Two dry cells and cells holder.
- Six pieces of connecting wires
- Micrometer screw gauge (shared)

Set up the apparatus as in the circuit diagram below; fig2.0



PROCEED AS FOLLOWS;

a) With the switch closed and the length (L=AB) of the resistor wire AB adjusted to 100.0 cm, record the Voltmeter reading (V) and the Ammeter reading (I)

$\mathbf{V_0}$= _____V

$\mathbf{I_0}$= _____A (1mk)

Hence calculate R given by $R_0 = \frac{V_0}{I_0}$ (1mk)

b) Adjust the Voltmeter reading to obtain values given in the Table of Results below by varying the length (L) of the Resistor wire. Read and record the corresponding Ammeter Readings given in the Table 2.0 below.

c) Complete filling the table 2.0 below. (5mks)

TABLE OF RESULTS. 2.0

V (volts)	**1.0**	**1.2**	**1.4**	**1.6**	**1.8**	**1.9**
I(A)						
$R = \frac{V}{I}$ **(Ohms)**						
$\frac{1}{I}(A^{-1})$						

d) Plot the graph of $\frac{1}{I}(A^{-1})$ against **R** (Ohms). (5mks)

e) Determine the slope of the graph. (2mks)

f) From the graph determine the e.m.f (E) of the battery, given that E=V+Ir. (2mks)

g) From the graph determine the value of r. (1mk)

PART B

(i) Using the micrometer screw gauge, measure the diameter of the resistor wire AB.

d= _____ mm

Radius= _____ m (1mk)

(ii)Determine the value of α, given by

$\alpha = \frac{A\mathbf{R_0}}{L}$ where A is cross-sectional area of the resistor wire AB in m^2

And L is the length of the wire AB=1m. (2mks)

PHYSICS PRACTICAL MARKING GUIDE

GATUNDU SUB COUNTY JOINT EXAM JULY 2014.

Solution to question 1

PART (A)

B=19.0^{O}

K=Sin30^{0}/Sin19^{0}

K=1.52

Refractive index

PART (B)

v=12.27cm^{3}

Measure the diameter of the cylindrical mass

Measure the height of the mass

Apply formula v=πr^{2}h

(b) G= 49.5cm mark

(ii) y = 45mm

x cm	5	10	15	20	25	30
y cm	4.5	8.5	13	17.3	21.5	25.8

1. graph is a straight line

   Labelingaxis 1mk

   Appropriate scale 1mk
   Plotting4-6pts 2mks
   Plotting 2-3pts. 1mk

Straightline 1mk

(d)$\frac{22.4- 4.5}{26-5}$

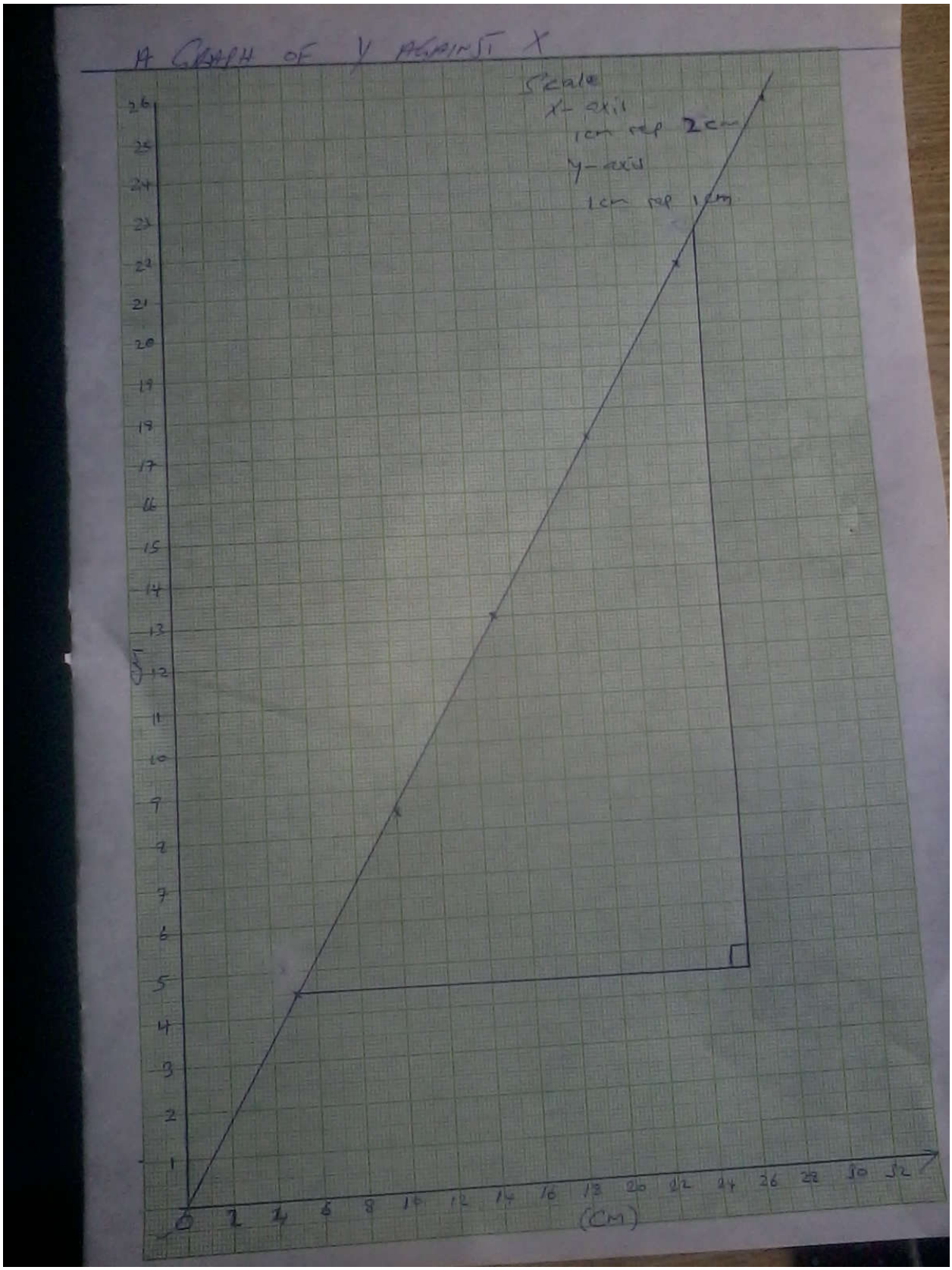
(d) Slope=0.852

(e) F= 0.852× 100
= 8.52g
upthrust is equal to the apparent loss in weight
=100-8.52
=0.9148N

(f) Density= mass $\frac{\text{of liquid displaced}}{\text{Volume displaced}}$

$=\frac{91.48}{12.27}$

= 7.456g/cm^3


A GRAPH OF V AGAINST X
Scale
x-axis
1cm rep 2cm
y-axis
1cm rep 1cm
(CM)

QUESTION TWO: PART A

(a) V_0= **2.2+ or -0.2**V (1/2mk)

I_0=**1.7+ or -0.2**A (1/2mk)

Hence calculate R given by $R_0 = \frac{V_0}{I_0}$

$= \frac{2.2}{1.7}$ (1/2mk)

=12.94Ω (1/2mk)

TABLE OF RESULTS. 2.0

V (volts)	1.0	1.2	1.4	1.6	1.8	1.9	
I(A)	0.35	0.31	0.28	0.24	0.20	0.18	**+ or -0.05A** 1/2mk x6
R = V/I (Ohms)	2.857	3.871	5	6.667	9	10.56	5/6—1mk 3/4--1/2mk 0/2 0mk
$\frac{1}{I}$ (A^{-1})	2.857	3.226	3.571	4.167	5	5.556	5/6—1mk 3/4--1/2mk 0/2 0mk

d)graph of $\frac{1}{I}$ (A^{-1}) against **R** (Ohms). (5mks)

AXES/UNITS…….1mk
SCALE……1mk
PLOTTING……1/2x4=2mks
LINE-Must has a positive slope….1mk

e) Determine the slope of the graph. (2mks)

Students values—NB..NO LINE NO SLOPE

f) From the graph determine the e.m.f (E) of the battery, given that E=V+Ir.

EXPRESSING $1/E = \frac{1}{E}R + r/E$ (1/2mk)

Implying Slope=1/E (1/2mk)

E.M.F=2.928V (1/2mk

ACCURACY 2.8-3.2V (1/2mk)

g) From the graph determine the value of r. (1mk)

EXPRESSION

r/E=y intercept..(1/2mk)

Student answer…(1/2mk)

PART B

(i) Using the micrometer screw gauge, measure the diameter of the resistor wire AB.

d= 0.30 + or -0.05mm 2dp A MUST 1/2mk

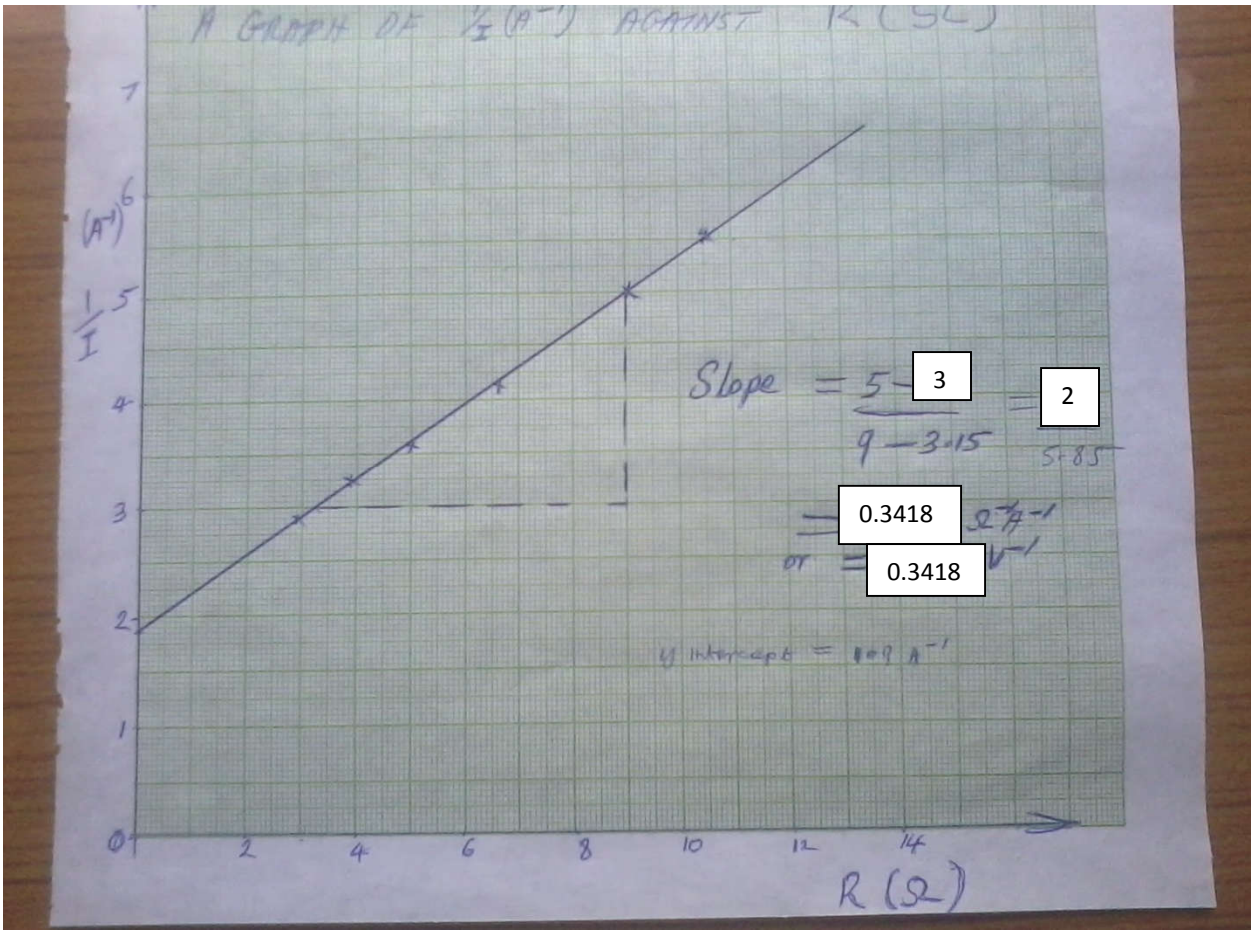
Radius= 0.0030 m 1/2mk

(ii)Determine the value of α, given by

$\alpha = \frac{AR_0}{L}$-where A is cross-sectional area of the resistor wire AB in m^2

And L is the length of the wire AB=1m.

ACCURACY $0.8 – 1.2 \times 10^{-6} \Omega m$(1/2mk)


A GRAPH OF 1/I (A⁻¹) AGAINST R (Ω)
1/I (A⁻¹)
R (Ω)
Slope = 5 − 3 / 9 − 3.15 = 2 / 5.85
= 0.3418 Ω⁻¹A⁻¹
or = 0.3418 V⁻¹
y intercept = 0.9 A⁻¹