3KNT FRATERNITY

PHYSICS PAPER THREE

1.QUESTION ONE.

You are provided with the following:

-Salt solution in a 250ml container.

-Two identical cylindrical 100g masses.

-A string.

-A meter rule.

-Knife edge.

-Two pieces of thread.

Procedure.

1.(a)Determine the volume of one the masses by using the apparatus provided. Record the volume ,V

V=……… () ( 1 mk)

Explain how you have determined the volume V (1mk)

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

Centre of gravity = ……. (1 mk)

b(ii)Arrange the apparatus as shown in diagram 1 below,show that the metre rule is at equilibrium,starting with x=100mm

Diagram 1.



Measure and record the length ,Y

Y=\_

C Repeat procedure a (ii) with the following values of X and fill table 1 below.

Table 1 (3mks)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X mm | 100 | 150 | 200 | 250 | 300 | 350 |
| Ymm |  |  |  |  |  |  |

(d)On the grid provided , plot a graph of Y (y axis) against X (5mks)

(e)Determine the gradient,N of the graph. (3mks)

(f)The gradient ,N given by the equation N=F/W,where F is the apparent weight of the mass in the salt solution and w is the actual weight of the mass.Calculate the value F and the upthrust U’

(i)F (1 mk)

(ii)U (2 mks)

(h) Hence determine the density,$s $ (2 mks)

QUESTION 2

PART A.

Your are provided with following apparatus;

-Ammeter (0-1A)

-Voltmeter (0-3v)

-2 dry cells.

-A resistance wire fixed on a metre rule ,labeled Y

- A resistance wire fixed on a metre rule ,labeled X

- A switch.

- Seven connecting wires,4 with crocodile clips.

-A cell holder ,to accommodate two dry cells.

-A micrometer screw gauge (to be shared)

Proceed as follows:

(i)Set up the circuit as shown in the diagram 2 below.

Diagram 2



(ii)Keeping both crocodile clips attached on the resistance wire QZ for a length l=0.2 m form Q,record the corresponding values of currents,I (A) and voltage V in table 2 below.

(iii)Repeat procedure (ii) for other lengths, L=0.4m,0.6m,0.8m and 1.0 m (4mks)

Table 2.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Length (l) (m) | 0.2 | 0.4 | 0.6 | 0.8 | 1.0 |
| Current,I (A) |  |  |  |  |  |
| Voltage,V (v) |  |  |  |  |  |

(a)Plot a graph of V (y-axis) against I on the grid provided below. (5mks)

(b)Calculate the slopes,S of the graph (3mks)

(c)Using the micrometer screw gauge provided,measure the diameter ,d of the resistance wire labeled X.

D= m (1mk)

(d)Calculate the quantity ,k of the wire from the equation.

K=sx$d^{2}$xII,giving its unit;where s the gradient in (b) above, (2mks)

 2

PART B

You are provided with the following:

1.A cross wire fixed on the screen

2.A candle.

3.A screen

4.A convex lens.

5.a convex mirror.

6.A metre rule.

(i)Determine the focal f ,of the lens by locating the image of a distant object.

F,= (1mk)

(ii)Place the lens at a distance of x=35 cm from the crosswire and move the screen A until a sharp image of the crosswire is focused on it as shown in the diagram 3(a) below

Diagram 3(a).



(iii)Without moving the lens and the screen A ,place a convex mirror as shown in diagram 3 (a) below and move it until a sharp image of the cross wire is formed on the screen B next to the cross wire.



(iv)Measure the distance ,d between the lens and the mirror and record on table below. ( 3 mks)

|  |  |  |  |
| --- | --- | --- | --- |
| Distance,x of lens from crosswire (cm) | Distance,Y (cm) | Distance X (cm) | y-d (cm) |
| 35 |  |  |  |
| 40 |  |  |  |

 (v)Repeat procedure (ii) to (iv) for the value of X=40 cm

(vi)Calculate the mean value of (y-d)

(vii)Calculate the quantity $f\_{2}$ of the convex mirror from the equation below,

$f\_{2}$=mean of (y-d)

 2 ( 1mk)