FORM FOUR CLUSTER KCSE MODEL 3

PHYSICS PAPER 3 QUESTIONS

1.Question one

You are provided with the following:

-Water

-Liquid L

-Thread

-Measuring cylinder

-50g mass

-20g mass

-Tissue paper

-Metre rule

-Stand

-a voltmeter

-Two new dry cells and a cell holder

-Switch

-Resistor labelled R (4Ω)

-Wire mounted on a mm scale and labelled G.

-Micrometre screw gauge (to be shared)

-Six connecting wires with crocodile clips

PART A

Proceed as follows:

(a) Put some water in a measuring cylinder and record its volume, V. V= cm3

(b i) Tie the 20g mass with a string and lower it gently into the water in the measuring cylinder until it is fully immersed in the water. Read and record the new volume, VR and the volume of the water displaced, VD:

VR = cm3

VD =. cm3

ii) Determine the upthrust μ exerted by the water on the 20g mass using the values of volume obtained above (density of water = 1000kg/m3, g = 10NKg-1)

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(b) Tie the metre rule using string and suspend it on a retort stand as shown in figure 1. Adjust the string until the metre rule balances horizontally. Record the position of the centre of gravity of the metre rule. Make sure that the string remains at this point throughout the experiment.

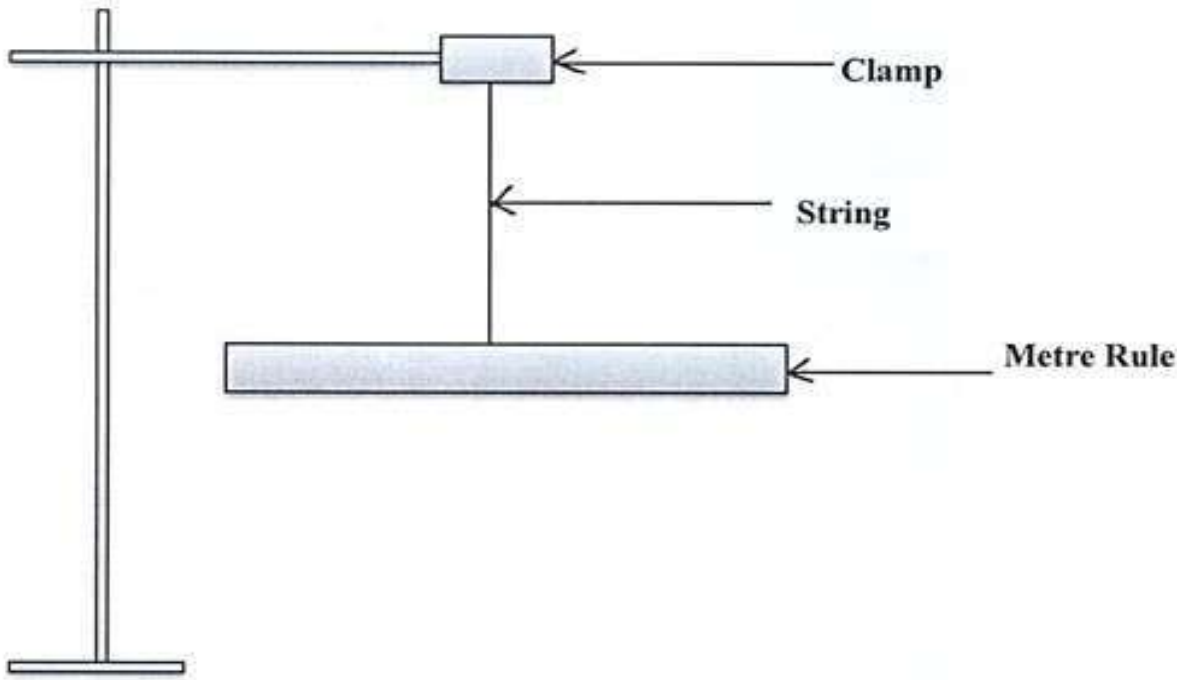

Figure 1

Position of centre of gravity =.....cm

(ii) Now tie the pendulum (20g mass) on the metre rule at 35 cm from the centre of gravity of the metre rule and a 50g mass on the opposite side as shown in figure 2:

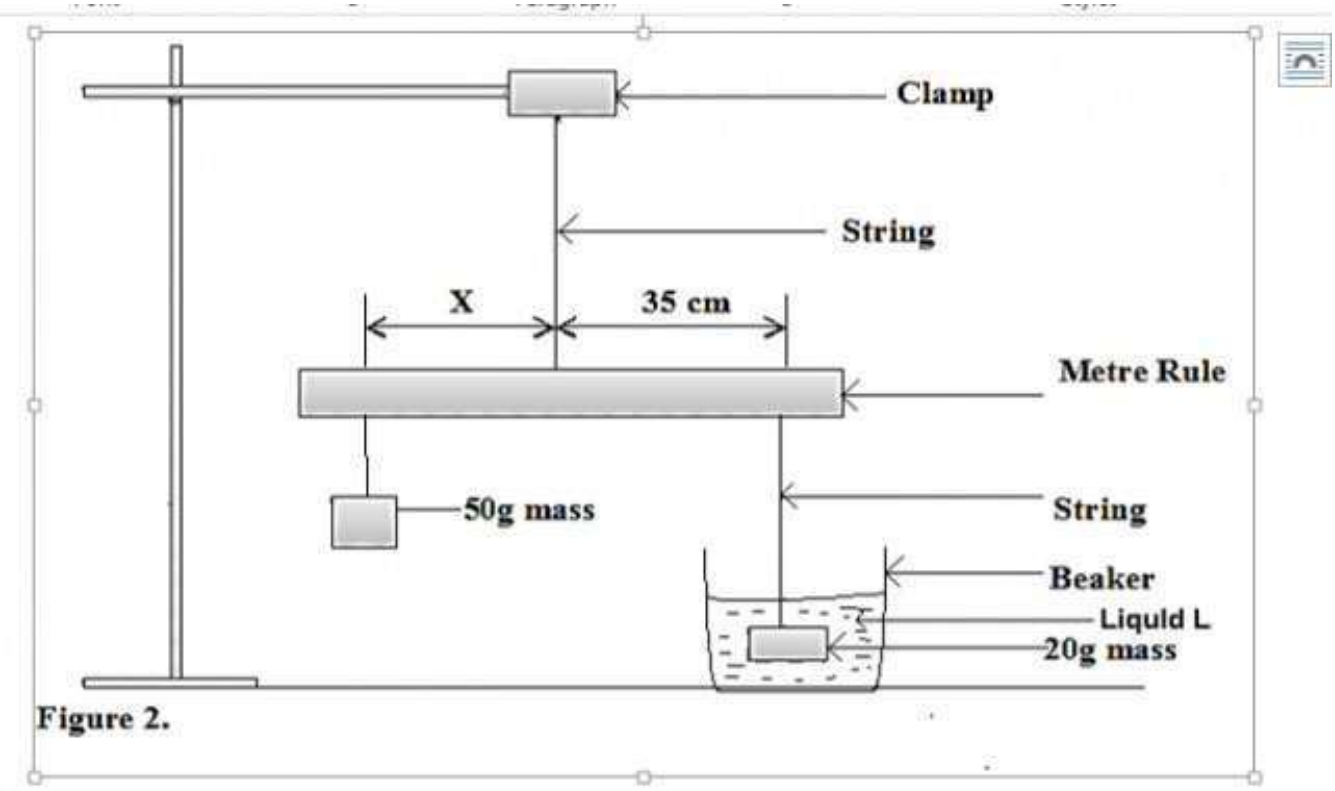

Figure 2.

Lower the 20g mass until it is completely immersed into liquid L provided in a beaker and adjust the position of the 50g mass until the metre rule balances horizontally. Read and record X, the distance of the 50g mass from the centre of gravity of the metre rule when the rule balances horizontally.

X =cm

(iii) Determine μL given that

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iv) Hence find the value of the constant P for the liquid if

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2.PART B:

Proceed as follows:

c)Record the length L0 of the wire labeled G.

i) L0 = ...

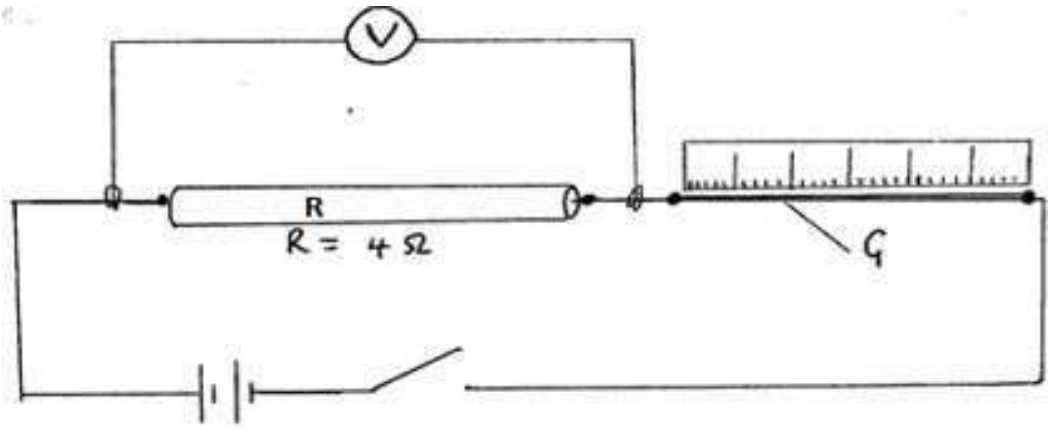
Using the micrometre screw gauge provided measure the diameter of the wire labelled G at two different points and determine the average diameter, d of the wire. ii) The diameter d1 =

..... mm, d2 = mm

5.iii)The average diameter d = mm

iv)Determine the radius r of the wire in meters. Radius r = m

d)Set up the apparatus as shown in the circuit diagram in figure 3



i)Use the voltmeter provided to measure and record VR, the potential difference (pd) across R and the Vg, the Potential difference across G when the switch is closed.

VR = Volts

Vg = volts

Open the switch.

ii) Use the value of resistance R provided and the value of VR in b (i) above. Calculate the current I flowing through R when the switch was closed. I = amperes

iii) Determine the constant H given that

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3.Question two.

You are provided with the following:

-A 400ml glass beaker

-A Bunsen burner

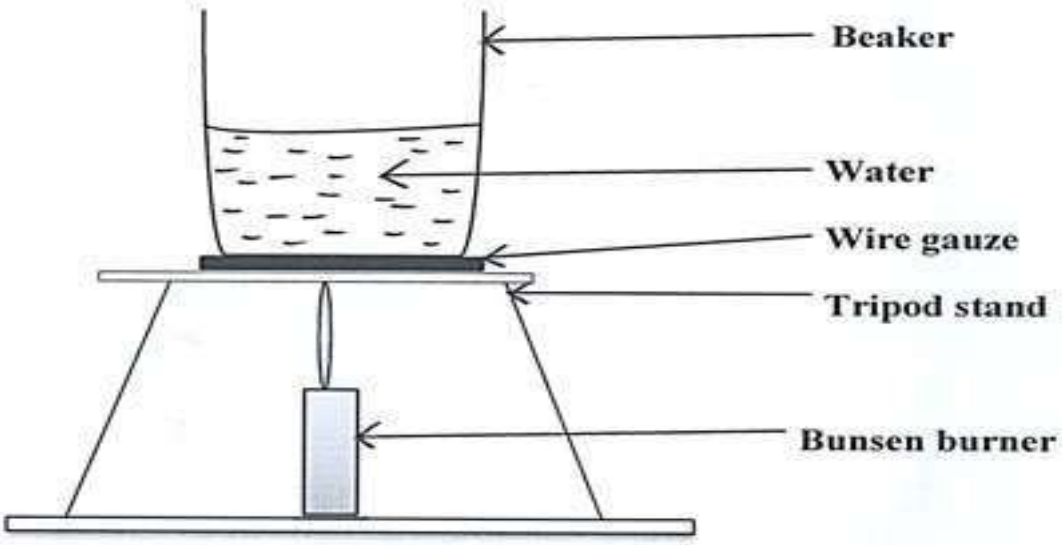
-A thermometer

-A stop watch

-A tripod stand and a 100ml measuring

-A wire gauze

-A source of heat. Set up the apparatus as shown in figure 1 below.



Using the measuring cylinder, measure 100cm3 of water and put it into the beaker. Take the initial temperature, T0 of the water.

(a) T0……

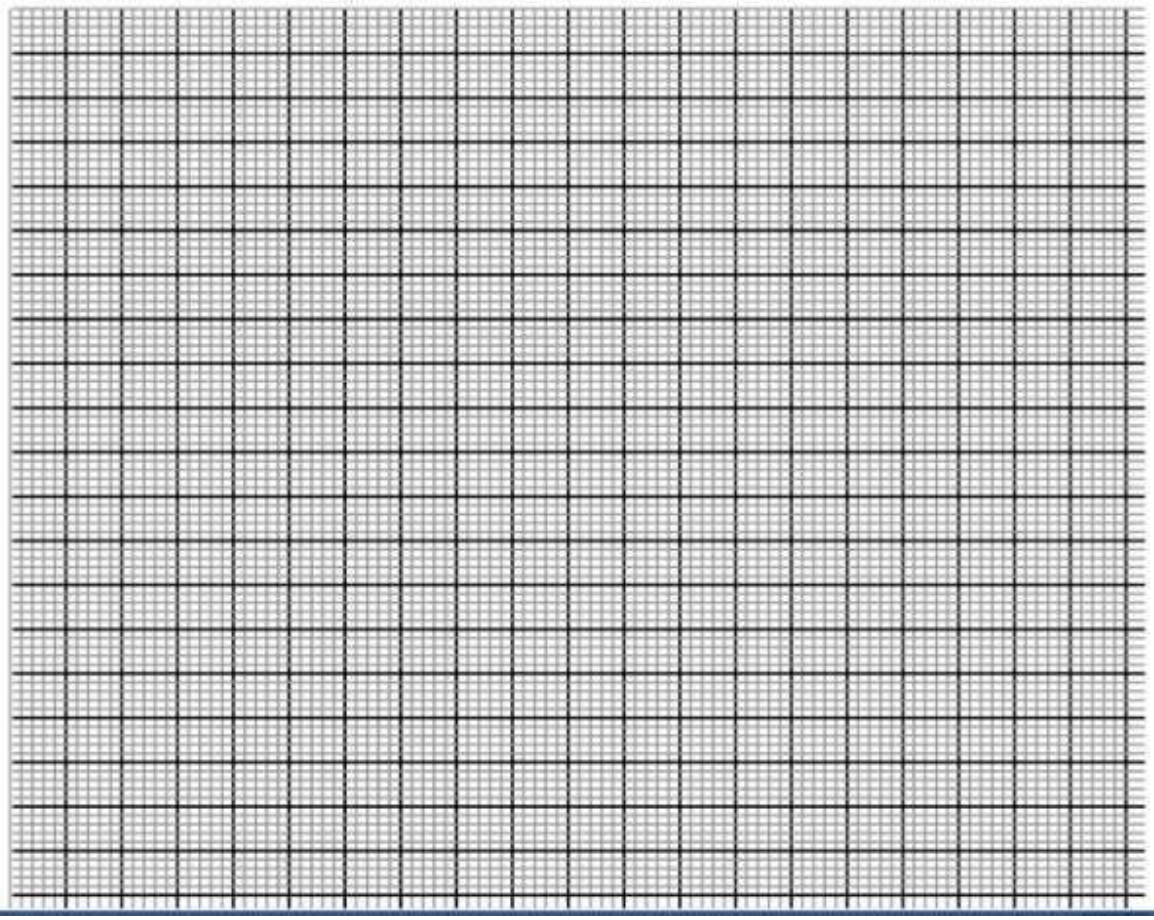
(b)Now heat the water to a temperature of 90 0C and then put off the burner. Place the thermometer into the water in the beaker and start the stop watch when the temperature of the water has dropped to 65 0C. Take the temperature T of water every two minutes. Record your results in the table 1 below.

Table 1:

Time (t) (min)	2	4	6	8	10	12	14
Temperature T°C							
$(T - T_0)°C$							
Log $(T - T_0)$							

(7marks)

(c) Plot a graph of Log $(T - T_0)$ against time (t). (5marks)



(d)If the equation for the graph is given by Log (T-T0) = Kt + Log N, where K is the cooling constant for the liquid. Use the graph to find:

i) K .....

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ii) Value of N .....

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..... e)The heat lost by the water as it cools is given by $H = \frac{VC(N - T_0)}{1000}$ where C is the specific heat capacity of water (C= 4.2KJKg-1 K-1), V is the volume of water used and To is the initial temperature of water calculate the heat lost

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