SUPAJET
JOINT EVALUATION TEST

Name: …… Index Number: ……

Candidate's Signature ……..

Date ……

232/3
PHYSICS
PAPER 3
PRACTICAL
JULY - 2013
TIME – 2 ½ HRS.

INSTRUCTIONS.

- Answer ALL the questions in the spaces provided in the question paper.
- You are NOT allowed to start working with the apparatus for the first 15 minutes of the 2¼ hours allowed for this paper.
- This time is to enable you to read the question paper and make sure you have all the apparatus that you may need.
- Electronic calculators may be used
- All working must be clearly shown where necessary.

FOR EXAMINER'S USE ONLY.

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1	20	
2	20	
Total Score	**40**	

Q.1 You are provided with the following

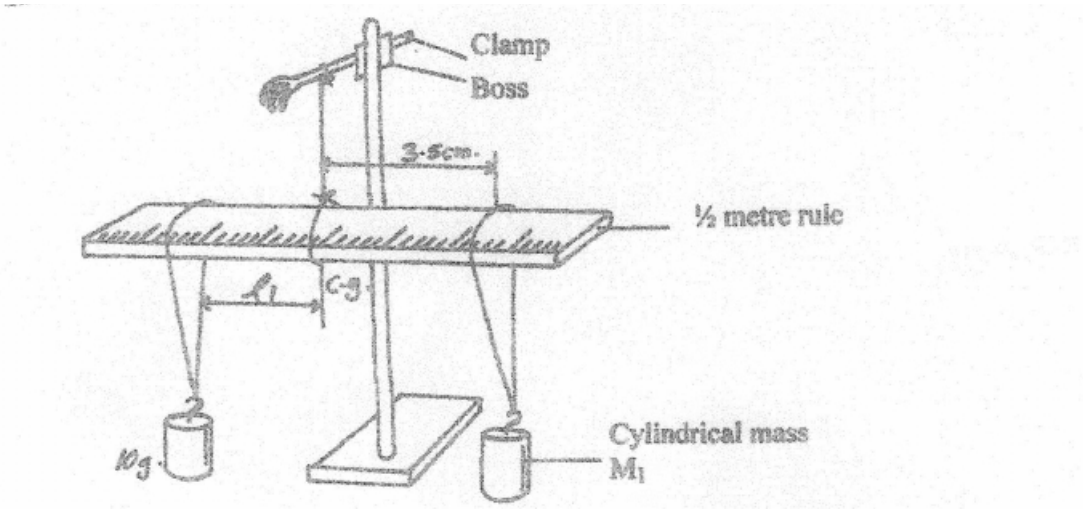
- One half meter rule
- One retort stand
- A boss and a clamp
- One 10g mass
- Six cylindrical masses with hooks labeled M_1 , M_2, M_3 , M_4 , M_5 and M_6
- One 100ml measuring cylinder
- Three pieces cotton thread
- One 400 ml beaker
- Water in a 500ml beaker

Proceed as follows

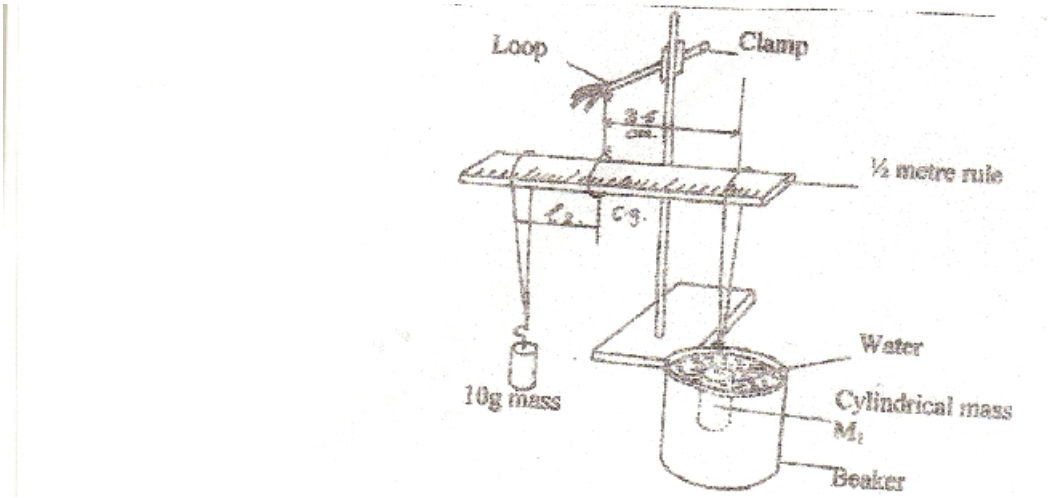
a.i. Suspend the half metre rule on the clamp using one of the pieces of thread. Balance the rule and note the position of its center of gravity. This point of suspension should be maintained throughout the experiment:

ii. Suspend the cylindrical mass M_1 at a distance of 3.5cm from center of gravity of the rule using a looped thread. Suspend the 10g mass to balance the mass.

(see figure 1). Record in table 1, L_1, the distance between the center of gravity of the rule and the balance point of the 10g mass



iii. Suspend M1 in water contained in the 400ml beaker. Adjust the position of the 10g mass to balance M1 (See figure 2)

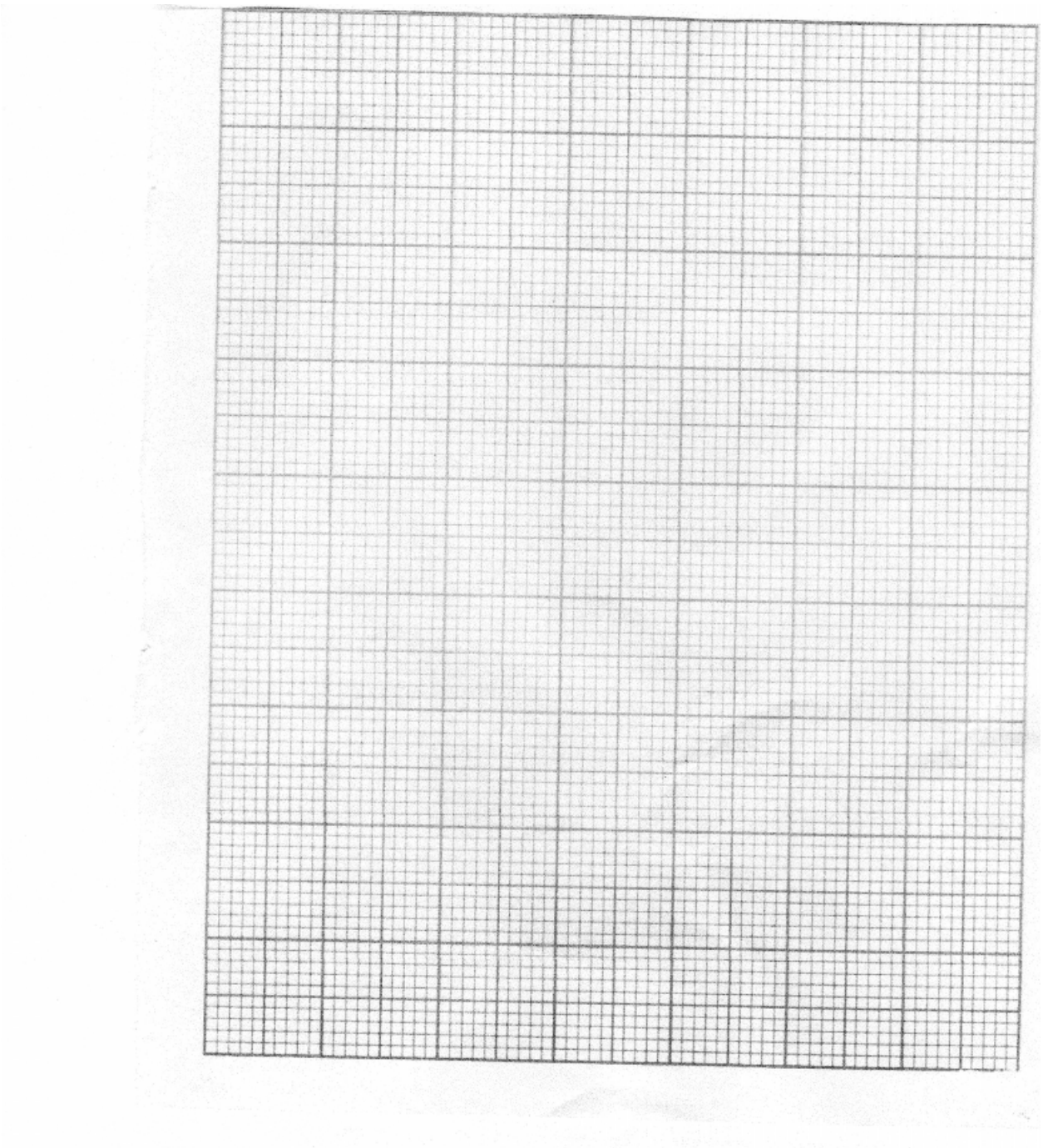


iv. Remove M_1 with the loop of thread and determine its volume using the 100ml measuring cylinder.
Record this volume, V in table 1

	M_1	M_2	M_3	M_4	M_5	M_6
Vol V(cm^3)						
L_1 (cm)						
L_2 (cm)						
($L_1 - L_2$) (cm)						

b. Repeat the procedures a (ii) to a (iv) for the other cylindrical masses and complete the table. (7mks)

i. On the grid provided, plot the graph of volume (y – axis) against ($L_1 - L_2$) (5mks)



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

iii. Given the equation of the graph as

$$V = \frac{21}{5K} \quad L_1 - L_2$$

Where K is a constant, Determine the value of K (3mks)

d. Design a set up and use it to determine the mass of the half-meter rule without using the cylindrical masses. Draw the set up and show your working. (3mks)

Mass of the half metre rule = ……

Q.2. You are provided with the following:

- a voltmeter
- two new dry cells and a cell holder
- a switch
- a resistor labeled R (4Ω)
- a wire mounted on a mm scale and labeled G.
- a micrometer screw gauge (to be shared)
- six connecting wires with six crocodile clips

Proceed as follows:

a. Record the length L_0 of the wire labeled G

L_0 = ……

Use the micrometer screw gauge provided to measure the diameter of the wire labeled G at two different points and determine the average diameter, d.

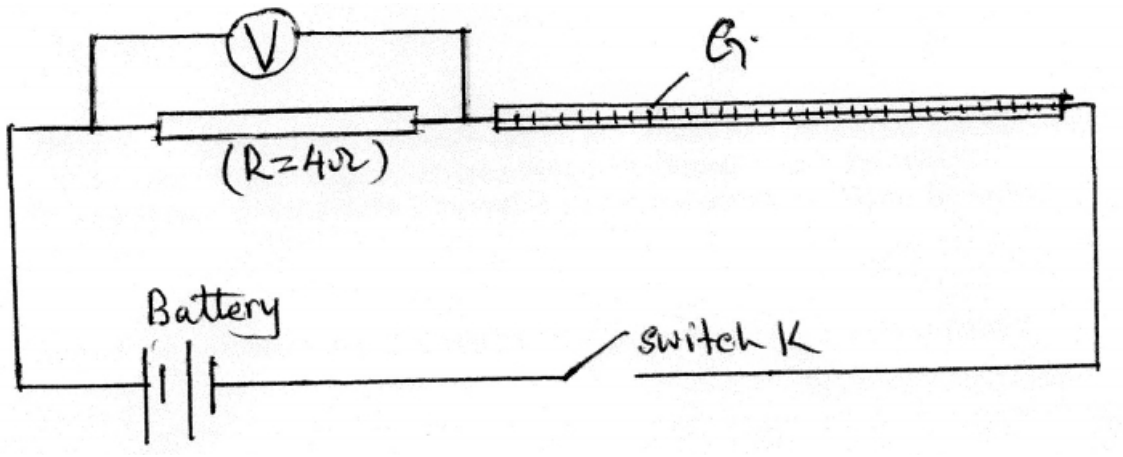
The diameter d_1 = ……mm, d_2 = ……mm (1mk)

Average diameter d = …….. mm (1mk)

Determine the radius r of the wire in metres.

Radius r = …… m (1mk)

b. Set up the apparatus as shown in the circuit diagram in the figure below.



i. Use the voltmeter provided to measure the p.d V_R across R and the p.d, V_G across G when the switch is closed.

V_R = …… Volts (1mk)

V_G = …… Volts (1mk)

Open the switch

ii. Use the value of R provided and the value of V_R in b (i) above to calculate the current I flowing through R when the switch was closed.

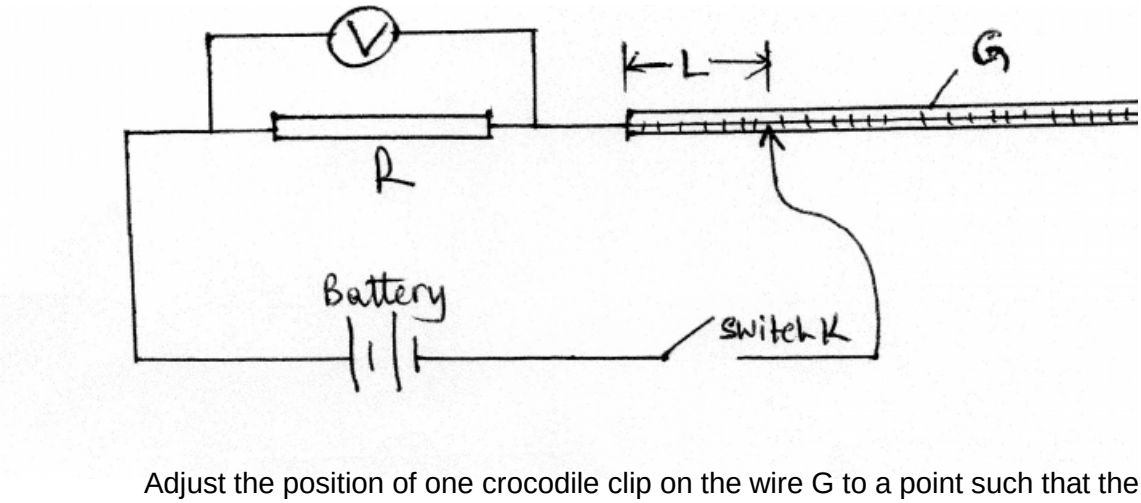
I = ……Amperes (1mk)

iii. Determine the constant H given that

$$H = \frac{100V_G}{IxL_0}$$

H = …… Ωm^{-1} (1mk)

c. Connect the voltmeter across R as shown in the figure below.



Adjust the position of one crocodile clip on the wire G to a point such that the length L of the wire in the circuit is 5cm (see the figure above). Close the switch.
Read and record in the table 2 the value for the p.d across R. Open the switch.

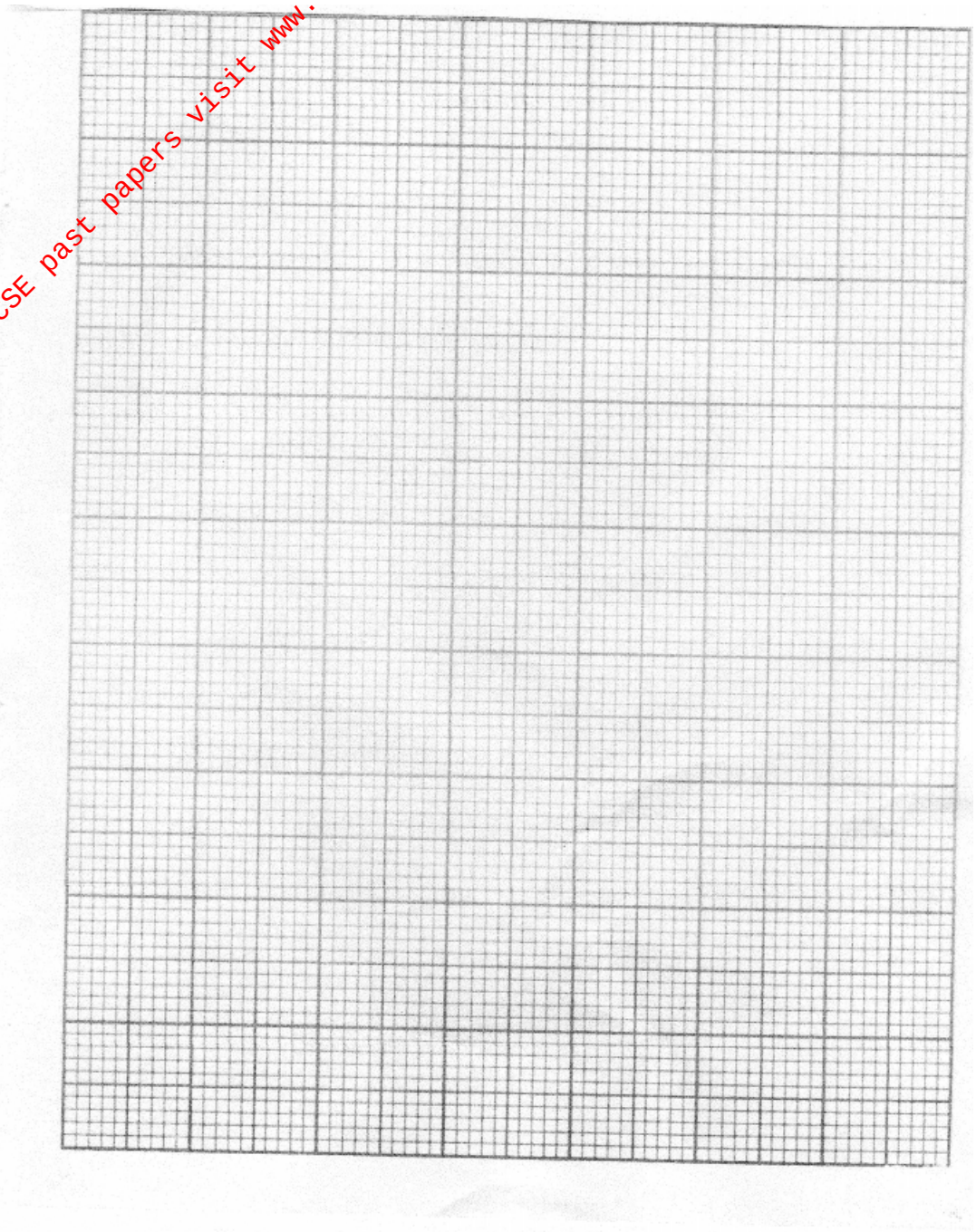
d. Repeat the procedure in (c) above for the other values of L shown in table 2.

Table 2

Distance L (cm)	0	5	10	20	30	40	60	70
p.d V across R (V)								

(3mks)

e.i. On the grid provided plot the graph of V (y-axis) against L (5mks)



(ii) From the graph determine L_1, the value of L when $V = \frac{V_0}{2}$ where V_0 is the p.d where L = 0 (2mks)

f. Determine the constant D for the wire given that (2mks)

$$D = \frac{R}{L_1} \times \frac{300}{V_0}$$

g. Determine the constant p given that

$$P = \frac{\pi r^2}{2}(D + H)$$ where **r** is the radius of the wire in metres. (2mks)