

MANGU HIGH SCHOOL

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Ouestion 1

You are provided with the following apparatus:

- Two dry cells and a cell holder
- A bulb (2.5V)
- A voltmeter (0-3V or 0-5v)
- An ammeter (0-2.5A)
- A mounted nichrome wire on millimeter scale
- A switch
- Seven connecting wires at least two with crocodiles clips
- A micrometer screw gauge

Proceed as follows

a) i) Ste up the circuit as shown in figure 1 below

Figure 1

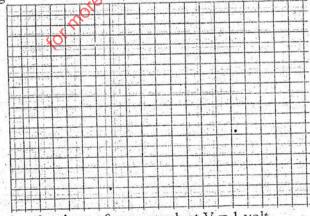
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With the crocodile clip at P take the voltmeter reading, V-and the ammeter reading, I. Record V and I. Repeat the reading for L = 80, 60, 40, 20 and 0 cm respectively. Complete the table 1 below

TABLE 1				j	SI	
Length L (cm)	100	-80	60	40	20	0
Voltage V (V)	3 7 7		2	<u> </u>		
Current I (A)			20			

(4 mks)

- What changes do you observe on the bulb as L decreases from P? (1 mk) iii)
- On the grid provided below, plot a graph of the ammeter reading (y-axis) against voltmeter iv) (5 mks) reading



Determine the slope of your graph at V = 1 volt

(3 mks)

- What physical quantity is represented by the steps of the Scaph at any Steen points (1 mis)
- b) i) Given the apparatus in (a) (i) above, draw a diagram of the circuit you would use to determine the current through the resistance wire and the potential difference across it.

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O Mai	ngu High School Physics - 3	3
ii)	Set up the circuit you have drawn. Record the ammeter reading, I and the vo	Itmeter reading
	V, when $L = 100$ cm	
	V =V	
-		2 mks)
iii)	Using a micrometer screw gauge, measure the diameter, d of the wire.	
	$d = \underline{\hspace{1cm}} m$	
	마는 - 10gm = 10gg = 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10	l mk)
41	Calculate the quantity, $p = 0.785 \frac{\left(\frac{V}{I}\right) \left(\frac{d'}{L}\right)}{\text{where L is one metre}}$	2 mks)
iv)	Calculate the quantity, $p = 0.785$ Where L is one metre	2 mrs)
3	위원 경기 시민이 그 중에 누르게 보고 있는데 바다 회사에 다 살아 가지 않다.	
	estion 2	
	is question has two parts A and B. Answer both parts	
	RT A	
YOU	u are provided with the following apparatus	
	• A clean boiling tube	
3.7	Some sand in a container	
	Half metre rule	
2	RT A u are provided with the following apparatus • A clean boiling tube • Some sand in a container • Half metre rule • Vernier calipers (to be shared) • 200ml beaker with clean water • Top pan balance • Tissue to wipe off water eed as follows:	
	• 200ml beaker with clean water	
	• Top pan balance	
1	• Tissue to wipe off water	Late And
Proce	eed as follows:	(1/ mls)
a)	1) Measure and record the external diameter, d, of the boning tube	(½ mk)
4	d =	adge of the
ii)	Measure and record the length, Light the tube, from the concave base to the	(1 mk)
9	tube (figure 2)	() mk)
0, 9	$L_1 = \dots $	
	tube (figure 2) $L_1 = \dots $ em	
1.	Holding the boiling tube upright, place it in water in the 200ml beaker. Add so	ome sand, a
-0)	little at a time until the tube floats freely upright in water. Measure and record	the length L2
	of the tube above the water level, as shown in figure 2	(2 mks)
	$L_2 = \dots $	
1	Remove the tube from the beaker and carefully wipe off the water from the ou	utside of the
0)	tube. Measure and record the mass, m, of the tube with its contents	
400	m =	(1 mk)
4)	Given that $p = 4m$ find the value of p, the density of water. Express	s your answer in
a)	$kgm^{-3} \qquad \frac{JId^2(L_1 - L_2)}{IId^2(L_1 - L_2)}$	(2 mks)
- 72.7	Kgm	
D A	ART B	
1 2	TAXABLE OF THE STATE OF THE STA	Parameter Barry H

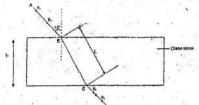
You are provided with the following apparatus

• A soft board

- 6 office pins
 A rectangular glass block
 Plain white paper

Proceed as follows:

- a) Fix a white sheet of paper on the soft board using the thumb pins
- b) Place the glass block, the largest face down, on the paper. Trace the outline of the glass block as shown in Figure 3



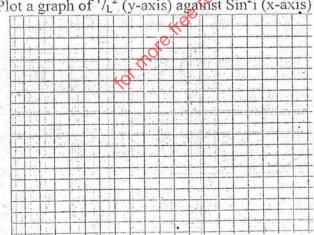
- Remove the glass block and construct a normal line at B. Construct an incident ray AB of an angle of incident = 15° . Stick two pins P_1 and P_2 on the line AB
- d) View the pins P₁ and P₂ through the glass block. Stick two other pins P₃ and On the other side of the block so that they appear to be in line with the images of object pins P1 and P2 in the slab as shown on the diagram
- e) Remove the glass block and draw the path of the ray ABCD. Measure the length, L (in mm), of the refracted ray BC
- Repeat for other values of the angles incident. Enter your results in the table 2 below

i	L (mm)	L2 (mm ²)	1/L2 (mm ⁻²)	Sin ² i
150	100		i si	
25°	Test Carrier To	15.05	1 .5	
35°	1 100 3 4		OO!	A 7- 1
45 ⁰			087	
55°	Talenta y	K TOURS AND THE	.00	

(5 mks)

g) Plot a graph of 1/L2 (y-axis) against Sin2i (x-axis)

(5 mks)



h) Determine the slope of the graph

(2 mks)

Measure and record the breadth, b, (in mm) of the uppermost face of the block

 $= \frac{1}{b^2} - \frac{1}{n^2 b^2} \sin^2 l,$

, use the graph to find the value for n, the refractive Given that index of the material of the glass block