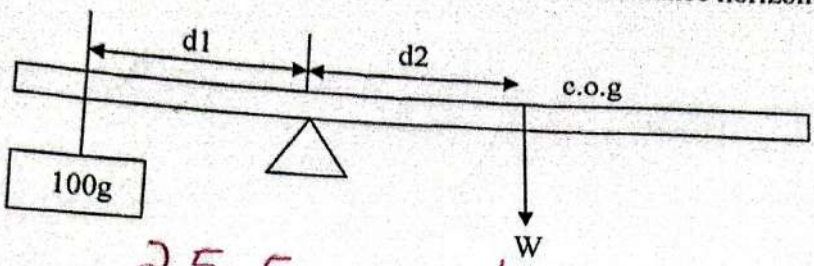
. a piece of celtape.
. a wedge.
Determine

i) Arrange the apparatus as shown, with the pivot at 30cm. Let the metre rule balance horizontally.



d_1 = 25.5 ± 1.0 ..... (1mk)

d_2 = 20.0 ± 1.0 ..... (1mk) 5a-d

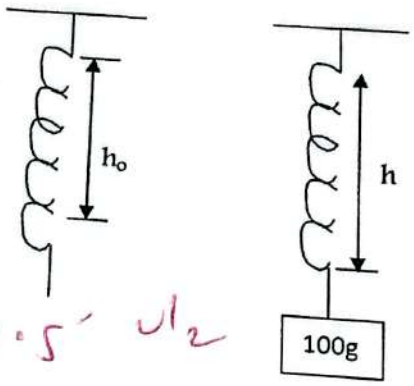
Use your measurements to determine the weight, W of the metre rule. (1mk)

$1N \times d_1 = W \times d_2$

$W = \frac{1 \times d_1}{d_2}$ - correct substitution ✓1

- Correct evaluation ✓

ii) The spring constant K using the 100g mass



h_o = 5.5 ± 0.5 ✓½ .....cm(length of the spring) (½ mk)

h = 9.0 ± 0.5 ✓½ .....cm (length of the spring holding 100g mass)(½ mk)

Hence determine the spring constant K(1mk)

Given that $k = \frac{m}{h - h_0}$ (where m is the mass in grams)

$K = \frac{M}{h - h_0}$ - Correct substitution ✓

= Correct evaluation ✓

4 sf / exact

Question 2

Part A

You are provided with the following apparatus

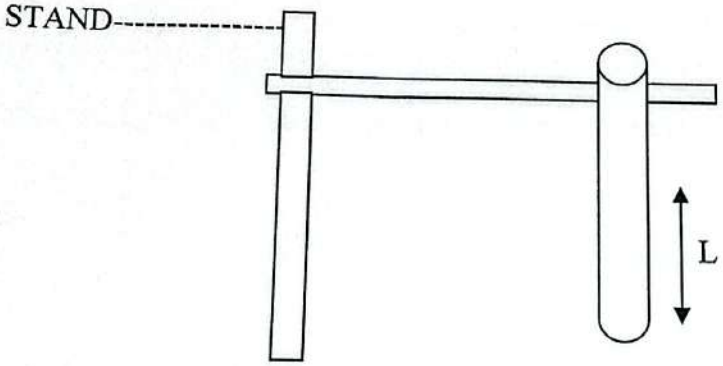
- One test tube
- One 10ml measuring cylinder
- A piece of string
- A ½ metre rule and electronic beam balance.
- One retort stand
- One boss and a clamp
- A plasticine

(a) Proceed with the experiment as follows

(i) Record the mass 'm' of the test tube indicated on the side by a sticker label

M=.....12.1 —— 16.2.....g (1mark)

(ii) Clamp the boiling tube vertically with its base resting on a flat surface. Pour $2cm^3$ of water from the measuring cylinder into the boiling tube.



Record the volume, V, and the length 'L' of the water column in the test tube in the table below. Repeat with values of $V=2cm^3$ and $V=8cm^3$ (2marks)

Volume V (cm^3)	Length L (cm)
2	L_1= 1.4 ±0.1
4	L_2= 3.0 ±0.1

(iii)Measure the length L_o, of the test tube

L_O=.....12.4 ± 0.1.....cm (1mark)

(iii) Wind the cotton thread round the test tube. The turns should touch one anoth but must not overlap. Count the number of turns and record.

n=.....6 exact..... turns (1mark)

(v)Unwind the cotton thread of N turns and measure its length

L_T=.....30.1 ± 1.0.....cm (1mark)

(vi) Calculate the quantity V of the glass material of which the test tube is made using the formula

$\frac{V}{LO} = \frac{0.08LT^2}{n}$ (3marks)

$V = \left(\frac{0.08 L_T^2}{n}\right) L_o$

- Correct substitution
- Correct evaluation
- 4sf/exact
- ignore unit

(C)Roll the plasticine to form a spherical ball that can freely enter the test- tube measure its mass and record.

M_o=.....1.5 ± 0.2.....g

M_o=.....0.0015.....Kg (1mark)

(d) Empty the test tube and put $\frac{1}{2}$ of water from the measuring cylinder into the test tube. Measure and record the length , L_3.

L_3=.....3.9 ± 0.2..... cm (1marks)

(e) Carefully slide the ball into the test tube and record the new length, L_4

L_4=.....4.5 ± 0.2.....cm (1mks)

(g) Determine the density, of the plasticine ball given that

$d = \frac{Mo}{L_3 - L_4}$ (3marks).

$\rho = \frac{M_o}{L_4 - L_3}$

- Correct substitution
- Correct evaluation
- 4 sf/exact
- Unit tied to mark g/cm³

PART B

You are provided with:

a metre rule

a 100g mass

e) From $Vr = (E - V)\,R$, determine the value of r. (2mks)

$$V_r = (E - V)R$$

$$r = \frac{(E - V)R}{V}$$

- Correct substitution ✓

- Correct evaluation ✓
  4 sf / exact

Ignore units

PART B

Now rearrange and Proceed as follows;

a) using the micrometer screw gauge determine the diameter D of the wire PQ

0.30mm

D = ... 0.30/1000 = 0.000030 ..... m (1mk)

accuracy digit remains

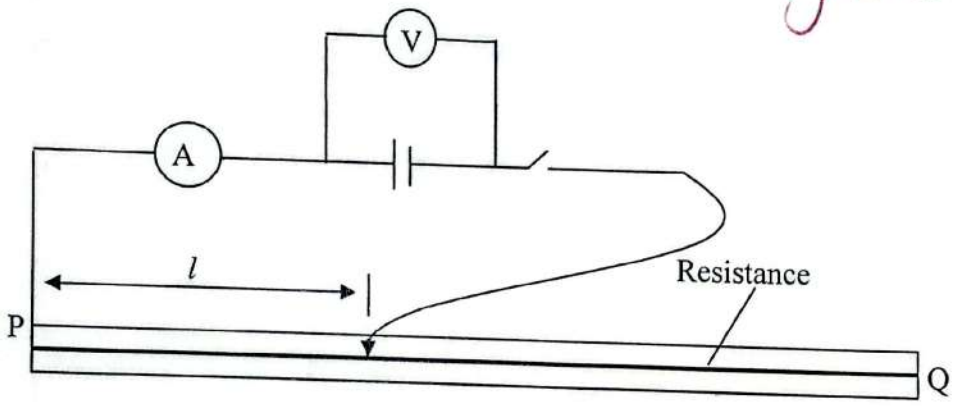
Determine the cross sectional area A of the wire given that,

$A = \frac{\pi D^2}{4}$ (2mks)

$A = \frac{\pi \times D_{(a)}^2}{4}$

- Correct substitution ✓1
- Correct evaluation (4 s.f / exact) ✓1 ignore units

b) set up the circuit as shown below



c) With the switch open record the reading of the voltmeter E.

E ..... 1.5V ..... volts ± 0.1V (1mk)

With the jockey at Q i.e L= 100cm, record the voltmeter reading (V) and the ammeter reading (I)

V = 1.45 ..... volts ± 0.05V (1/2 mk)

I = ... 0.08 ..... Amperes 0.02 (1/2 mk)

d) Determine R, given that, $R = \frac{V}{I}$ (1 mk)

$R = \frac{V}{I}$

- Correct substitution ✓1/2
- Correct evaluation 4 sf/exact ✓1/2
- Units (or) tied to the mark

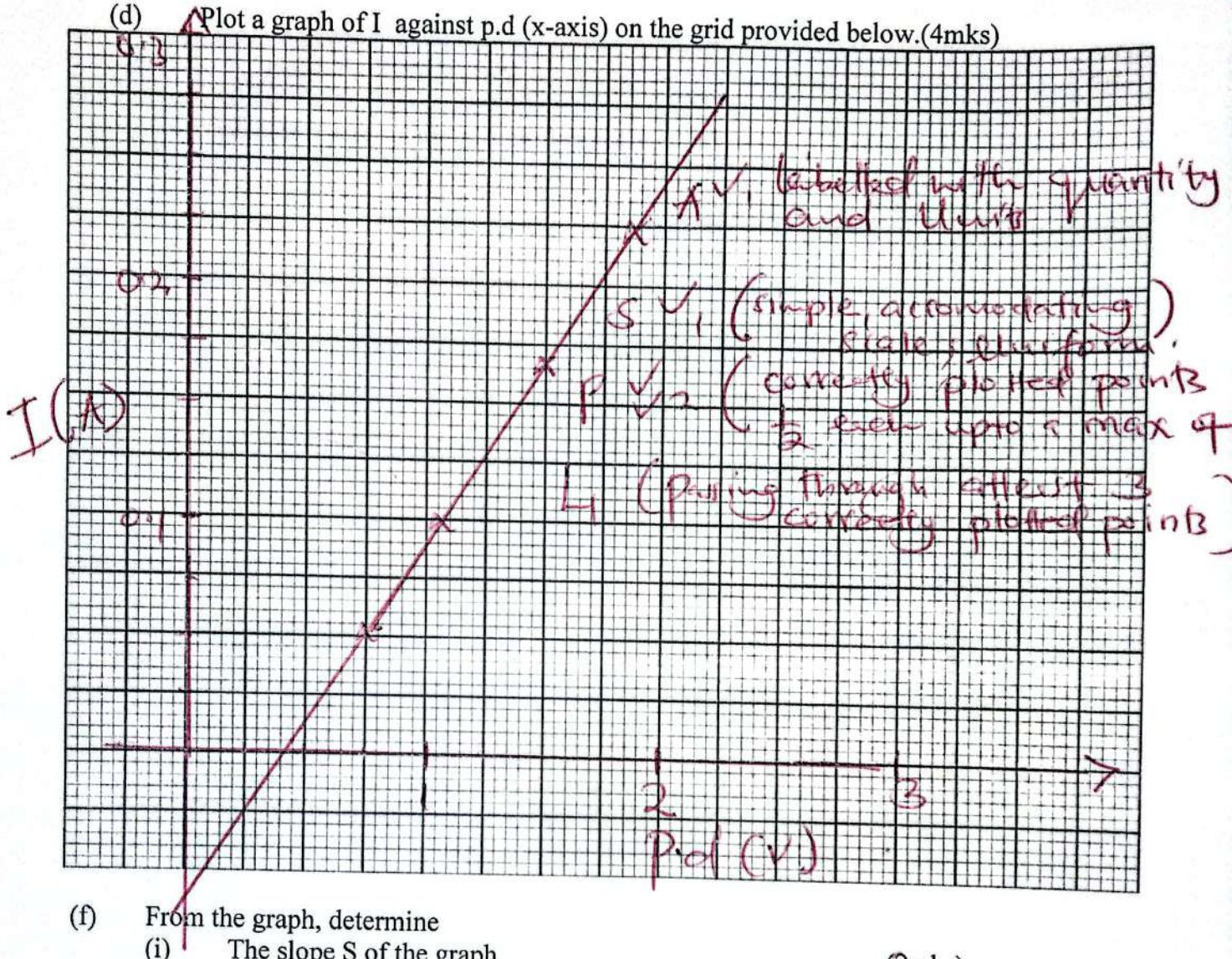
No unit/wrong units ⇒ 0

Atleast 1dp

Table 1

L (m)	0.0	0.2	0.4	0.6	0.8	
I (A)	0.28	0.20	0.16	0.12	0.11	±0.02
P.d (V)	2.4	1.7	1.4	1.1	1.05	±0.2

(d) Plot a graph of I against p.d (x-axis) on the grid provided below.(4mks)



(f) From the graph, determine

(i) The slope S of the graph. (2mks)

$\frac{\Delta y}{\Delta x}$ ✓1 ✓1

- Correct evaluation
- 4 sf / exact ✓
- Ignore Units ✓1

NAME.....CLASS:.....ADM.....

CANDIDATE'S SIGN.....

DATE.....

232/3
PHYSICS
PAPER 3
(PRACTICAL)
JULY/AUGUST, 2023
TIME: 2½ HOURS

MARKING SCHEME

END OF TERM TWO 2023 EXAMINATION

Kenya Certificate of Secondary Education
PHYSICS
PAPER 3
(PRACTICAL)
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INSTRUCTIONS TO CANDIDATES:

1. *Write your **name** and **index number** in spaces provided **above**.*
2. ***Sign** and write the date of examination in spaces provided **above**.*
3. *Answer **all** the questions in spaces provided in the question paper.*
4. *You are supposed to spend the first 15 minutes of 2½ hours allowed for this paper reading the whole paper carefully before commencing the work.*
5. *Marks are given for clear record of the observations actually made, their suitability, accuracy and the use made of them.*
6. *Candidates are advised to record their observations as soon as they are made.*
7. *Non-programmable silent electronic calculators Mathematical table may be used.*

FOR EXAMINER'S USE ONLY

Question 1

Section	A	B
Maximum score		
Candidate's score		

Question 2

Section	A	B
Maximum score		
Candidate's score		