

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)
NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)



FORM FOUR PRE-NATIONAL EXAMINATIONS AUGUST 2024

PHYSICS 2A
ACTUAL PRACTICAL A
MARKING SCHEME

1. Solution

$$L_0 = 49.8\text{cm}$$

(b) i. Table of results

$x(\text{cm})$	$y(\text{cm})$
5	35.2
10	36.5
15	38.5
20	40.2
25	41.8
30	43.4
40	47

ii. Slope

$$s = \frac{\Delta y(\text{cm})}{\Delta x(\text{cm})}$$
$$s = \frac{45 - 34}{35 - 1.25}$$
$$s = \frac{11}{33.75}$$
$$s = 0.33$$

iii. To calculate M_0 we feed s in the expression

$$\frac{sM_0}{50} + s = 1$$
$$\frac{0.33M_0}{50} + 0.33 = 1$$
$$\frac{0.33M_0}{50} = 0.67$$
$$0.33M_0 = 50 \times 0.67$$
$$M_0 = \frac{33.5}{0.33}$$
$$M_0 = 101.5\text{g}$$

iv. The y-intercept $y_0=33.5\text{cm}$

v. To calculate the value of the constant K from the expression

$$K = \frac{y_0}{l_0}(K + 50)$$

$$K = \frac{33.5}{49.8}(K + 50)$$

$$K = 0.672(K + 50)$$

$$K = 0.672K + 33.6$$

$$K - 0.672K = 33.6$$

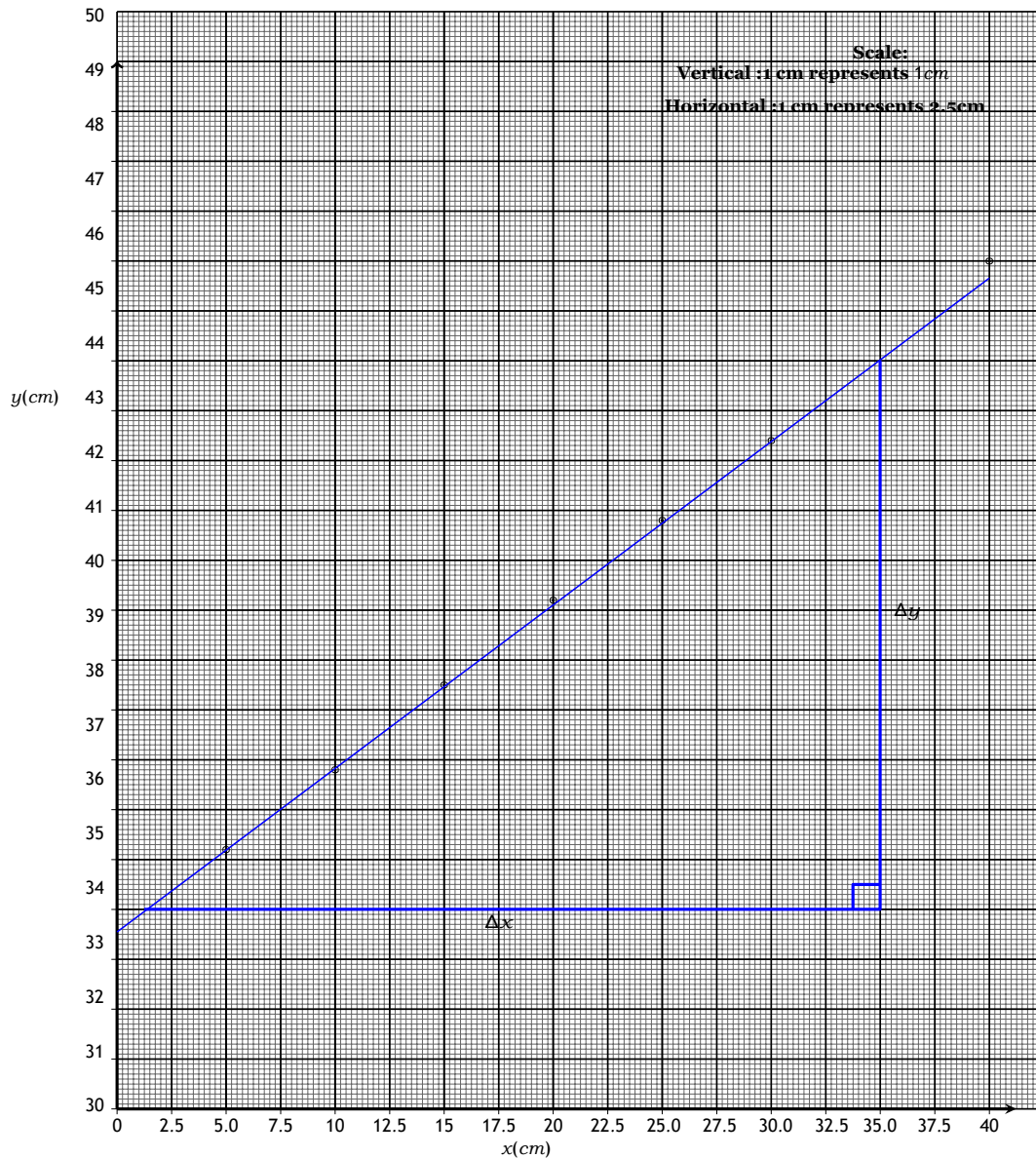
$$0.328K = 33.6$$

$$K = 102.4$$

vi. The physical meaning of the constant K is that it is the mass of the metre rule that is given to us

vii. Graph of experiment

Graph of $y(\text{cm})$ against $x(\text{cm})$



2. i. Table of results

R(Ω)	l_1 (cm)	l_2 cm	$\frac{l_1}{l_2}$
1	20.0	80.0	0.25
2	33.2	66.8	0.50
3	42.8	57.2	0.75
4	50.0	50.0	1.00
5	55.6	44.4	1.25

ii. Slope of the graph

$$S = \frac{\Delta R}{\Delta \frac{l_1}{l_2}}$$
$$S = \frac{4.5 - 0.5}{1.125 - 0.125}$$
$$S = \frac{4}{1}$$
$$S = 4\Omega$$

iii. $Q = 4\Omega$. The resistance of Q is therefore 4Ω .

iv. • Error due to loose connections of wires

- Parallax error due to reading from wrong position
- Loose connections of the fitting parts of the metre bridge
- Error caused as a result of the plugs not well fixed in gaps of the resistance box
- Zero error of the moving coil galvanometer.

v. The graph is as shown below

Graph of $R(\Omega)$ against $\frac{l_1}{l_2}$ (cm)

