CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHEN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM FOUR PRE-NATIONAL EXAMINATIONS AUGUST 2024

**PHYSICS 2B**

**ACTUAL PRACTICAL B**

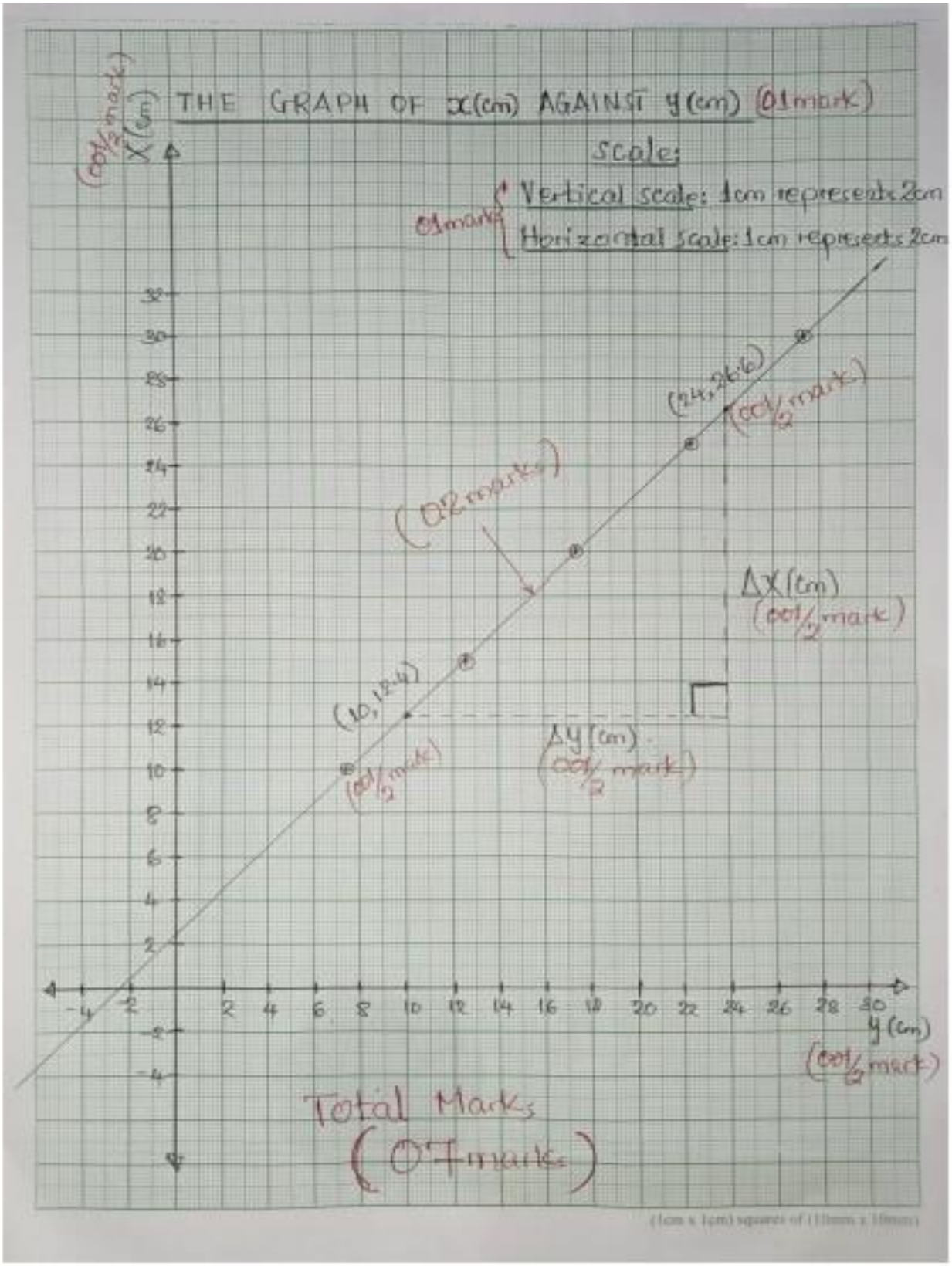
**MARKING SCHEME**

**1:**

(i) Table of results: **(10 Marks)**

| $x(cm)$ | $y\ (cm) \pm 0.5$ |
|---|---|
| 10 | 7.5 |
| 15 | 12.5 |
| 20 | 17.5 |
| 25 | 22.5 |
| 30 | 27.5 |

(ii) Graph (**Total Marks 07 Marks**)



(iii) $\boldsymbol{slope\ (s)} = \frac{\Delta x\ (cm)}{\Delta\ y\ (cm)} \leftarrow \frac{01}{2}\boldsymbol{mark}$

$$s = \frac{x_2 - x_1}{y_2 - y_1} \leftarrow \frac{01}{2}\boldsymbol{mark}$$

$$s = \frac{26.6 - 12.4}{24 - 10} \leftarrow \frac{01}{2}\boldsymbol{mark}$$

$$s = \frac{14.2}{14} \leftarrow \frac{01}{2}\boldsymbol{mark}$$

$$s = 1.01 \approx 1$$

$$\underline{\therefore \boldsymbol{The\ slope\ (s) = 1}} \leftarrow \boldsymbol{01\ mark}$$

(iii) **From the principle of moments:**

$$\sum C\ .Ms = \sum A\ .C.Ms \leftarrow \frac{01}{2}\boldsymbol{mark}$$

$$100x = 50a + my \leftarrow \frac{01}{2}\boldsymbol{mark}$$

$$\therefore\ \boldsymbol{x = (\frac{m}{100})\ y + \frac{a}{2}}\quad \boldsymbol{or}\quad \boldsymbol{x = \left(\frac{m}{100}\right) + 2.5}\quad \leftarrow \boldsymbol{02\ mark}$$

(iv) **From the equation above:**

$$\begin{array}{ccccccc} \boldsymbol{x} & = & \left(\frac{\boldsymbol{m}}{\boldsymbol{100}}\right) & y & + & 2.5 & \\ \downarrow & & \downarrow & \downarrow & & \downarrow & \\ y & = & m & x & + & c & \leftarrow \frac{01}{2}\boldsymbol{mark} \end{array}$$

Slope (s) = $\frac{m}{100}$

$$1 = \frac{m}{100} \leftarrow \frac{01}{2}\boldsymbol{mark}$$

By crossing multiplication.

m = 100g

**∴The unknown mass (m) = 100g** $\leftarrow \boldsymbol{01\ mark}$

2. (f) Table of results

| Potential difference (v) | 0.08 | 0.10 | 0.11 | 0.12 | 0.14 | 0.16 |
|---|---|---|---|---|---|---|
| Length (cm) | 10 | 20 | 30 | 40 | 50 | 60 |

**@ 01 mark Total 06marks**

(g) The slope, S, from the graph

Slope = $\frac{\Delta V(vot)}{\Delta L\ (cm)}$ **01 mark**

Point to from the graph A (48, 0.14) and B (24, 0.10)

Slope $= \frac{0.14 - 0.1\ (\text{v})}{48 - 24\ (\text{cm})} = 1.6 \text{ x } 10^{-3}\ \text{v/cm}$ **01 mark**

**The Slope, S, of the graph is $1.6\times10^{-3}$ V/cm** **01 mark**

(h) The nature of the graph was straight line. **01 mark**

(i) Thus R α L

R=KL and slope=V/L **01 mark**

Also from ohms law; v=IR

$$I = \frac{V}{R} = \frac{V}{KL} = \frac{V}{L} X \frac{1}{K} = \text{Slope } X \frac{1}{K}$$

Slope=IK

Thus the slope of the line represent current I, I was current and R was resistance. **01 mark**

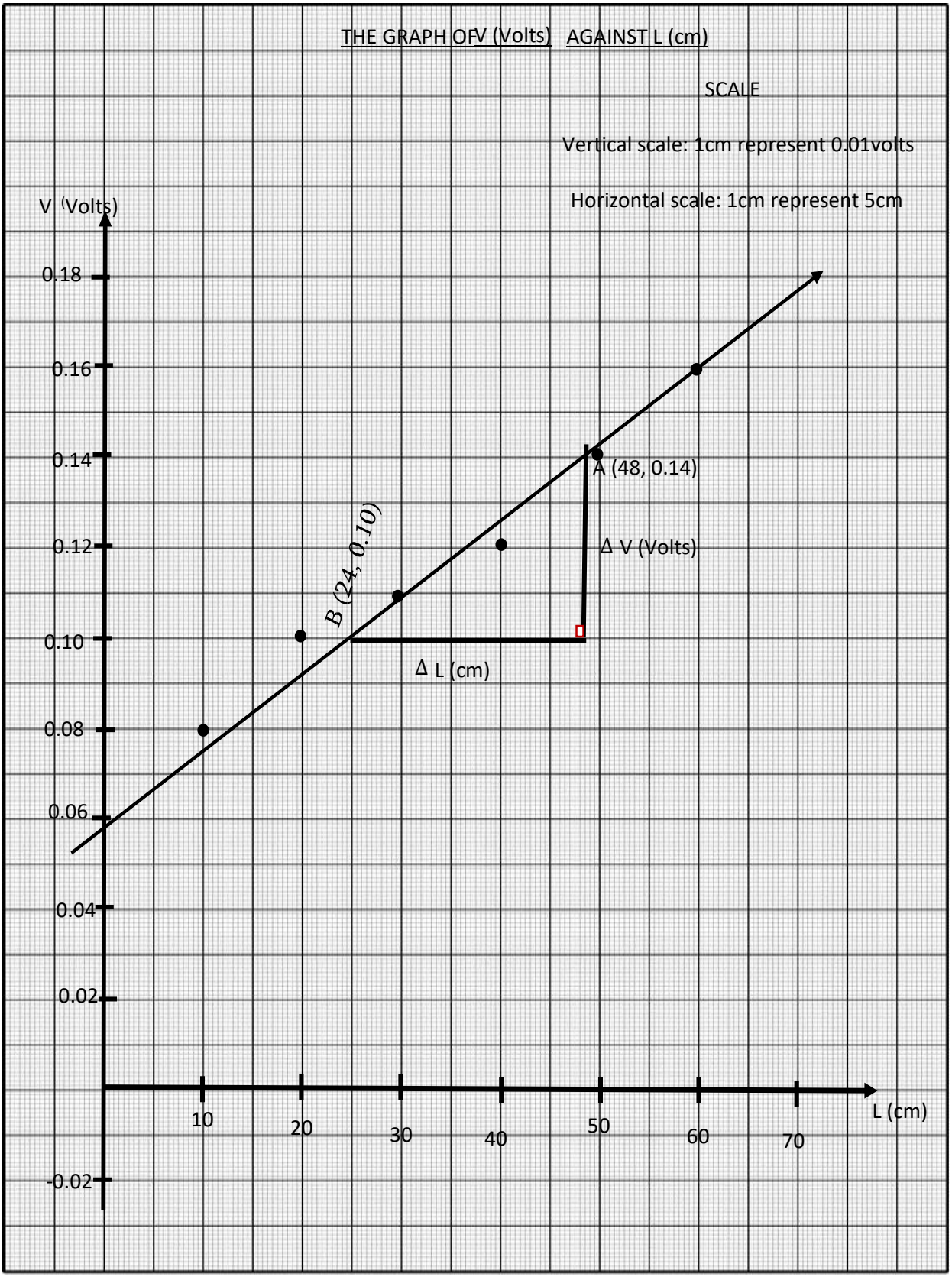
(k) The aim of this experiment was to show that ohm's law could be expressed in terms of length of conductor, the method used was potential divider. **02 mark**

(L) Two expected sources of errors were;

(i)Loose connections, this can be reduced by securing all connection of the circuit. **02 mark**

(ii)Sliding a jockey contact continuously over the wire of potentiometer instead of touching it at various positions until the required voltage is obtained. **02 mark**

2.


THE GRAPH OF V (Volts) AGAINST L (cm)
SCALE
Vertical scale: 1cm represent 0.01volts
Horizontal scale: 1cm represent 5cm
V (Volts)
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
-0.02
A (48, 0.14)
B (24, 0.10)
Δ V (Volts)
Δ L (cm)
10
20
30
40
50
60
70
L (cm)