CHRISTIAN SOCIAL SERVICES COMMISSION
An Ecumenical Body of Tanzania Episcopal Conference and Christian Council of Tanzania
P.O. Box 9433, Dar es Salaam, Tanzania

CSSC-SOUTHERN ZONE FORM FOUR JOINT EXAMINATION

ACTUAL PRACTICAL A

031/2B **PHYSICS 2B MARKING SCHEME** **August , 2025**

1.

(g) Table of results

l (cm)	Time t (sec)	Period $T\left(\frac{t}{10}\right)$ sec	$T^2(sec)^2$
140	24.22	2.422	5.8661
120	22.38	2.238	5.0086
100	20.28	2.028	4.1280
80	18.31	1.831	3.3526
60	15.84	1.584	2.5091
40	12.91	1.291	1.6667

1½ marks
1½ marks
1½ marks
1½ marks
1½ marks
1½ marks
Total (6 marks)

h (i) The graph of $T^2(sec^2)$ against $l(cm)$

(ii) $$\text{Slope} = \frac{\Delta T^2 sec^2}{\Delta l(cm)}$$ (½ mk)

$$= \frac{(5.6-2)}{(133-48)}$$

$$= 0.0423$$

$$\simeq 0.045\ s^2/cm$$

∴ The slope is $0.045\ s^2/cm$ (1 mk)

1.

h (iii) From $T^2 = \left(2\pi\sqrt{\frac{L}{g}}\right)^2$ (½ mark)

$T^2 = 4\pi^2 \frac{L}{g}$

$T^2 = \frac{4\pi^2}{g} L$

$y = m x$

Slope $= \frac{4\pi^2}{g}$

$g = \frac{4\pi^2}{\text{slope}}$

$= \frac{4\pi^2}{0.045^2/\text{cm}}$

$= 986.96 (\text{s}^2/\text{cm})^{-1}$

$= 9.8696 \text{ m/s}^2$ (1 mark)

∴ The value of g is 9.87 m/s^2

The physical meaning of g means the acceleration due to gravity of a free falling body. (1 mark)

(iv)

Sources of errors

- Air resistance
- Large displacement of angle (½ mark @) Any two
- Time reaction

Precautions

- Avoid windy areas (close doors and windows if any)
- The angle of displacement should be as small as possible (½ mark @)
- Proper timing of stop watch when counting oscillations Any two

1.

(h) (v) Two effects of g.

* It determines the weight of an object on the earth's surface which varies with the distance from the Earth's centre. (1mk)
* It causes object to fall towards the Earth's centre. eg water flows down the slope due to gravity. (1mk)

2.

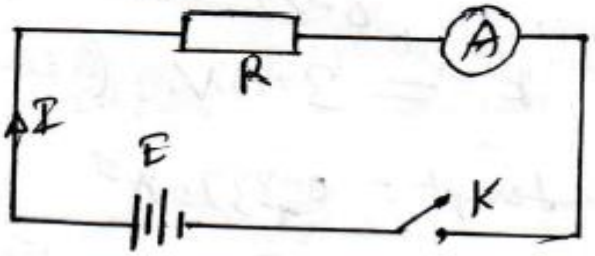
(c) Table of results

R(Ω)	I(A)	1/I (A^{-1})
1	1·5	0·67
2	1	1·00
3	0·8	1·25
4	0·6	1·67
5	0·5	2·00

5mk(c)

Total 10 mks

(d)



(1mk)

(e) The graph of 1/I (A^{-1}) against R

See the graph behind.

2.

(f) The graph is straight line with positive ~~inter~~ $\frac{1}{I}$ Intercept. (@ 1mark)

(g)

From $E = I(R+r)$

$$\frac{1}{I} = \frac{R}{E} + \frac{r}{E}$$

$$\frac{1}{I} = R\left(\frac{1}{E}\right) + \frac{r}{E}$$

$$y = mx + c$$

(i) Then slope $= \frac{1}{E}$

$E = 1/\text{slope}$

$$\text{slop} = \frac{\Delta \frac{1}{I}(A^{-1})}{\Delta R(\Omega)}$$ (@1mark)

$$= \frac{(1.875 - 0.75)}{(4.65 - 1.25)}$$

$$= 0.33\ \Omega^{-1}A^{-1}$$

(ii) Then $E = \frac{1}{0.33}\ A\Omega$

$E = 3.0\ V.$ (@1mark)

(iii) Intercept $= 0.3375\ A^{-1}$

$$= \frac{r}{E}$$ (@½mark)

$r = \text{Intercept} \times E$

$= 0.3375\ A^{-1} \times 3.0\ A\Omega$ (@1mark)

$= 1.02$

$\simeq 1\ \Omega$

∴ The emf is 3V and internal resistance of 1Ω

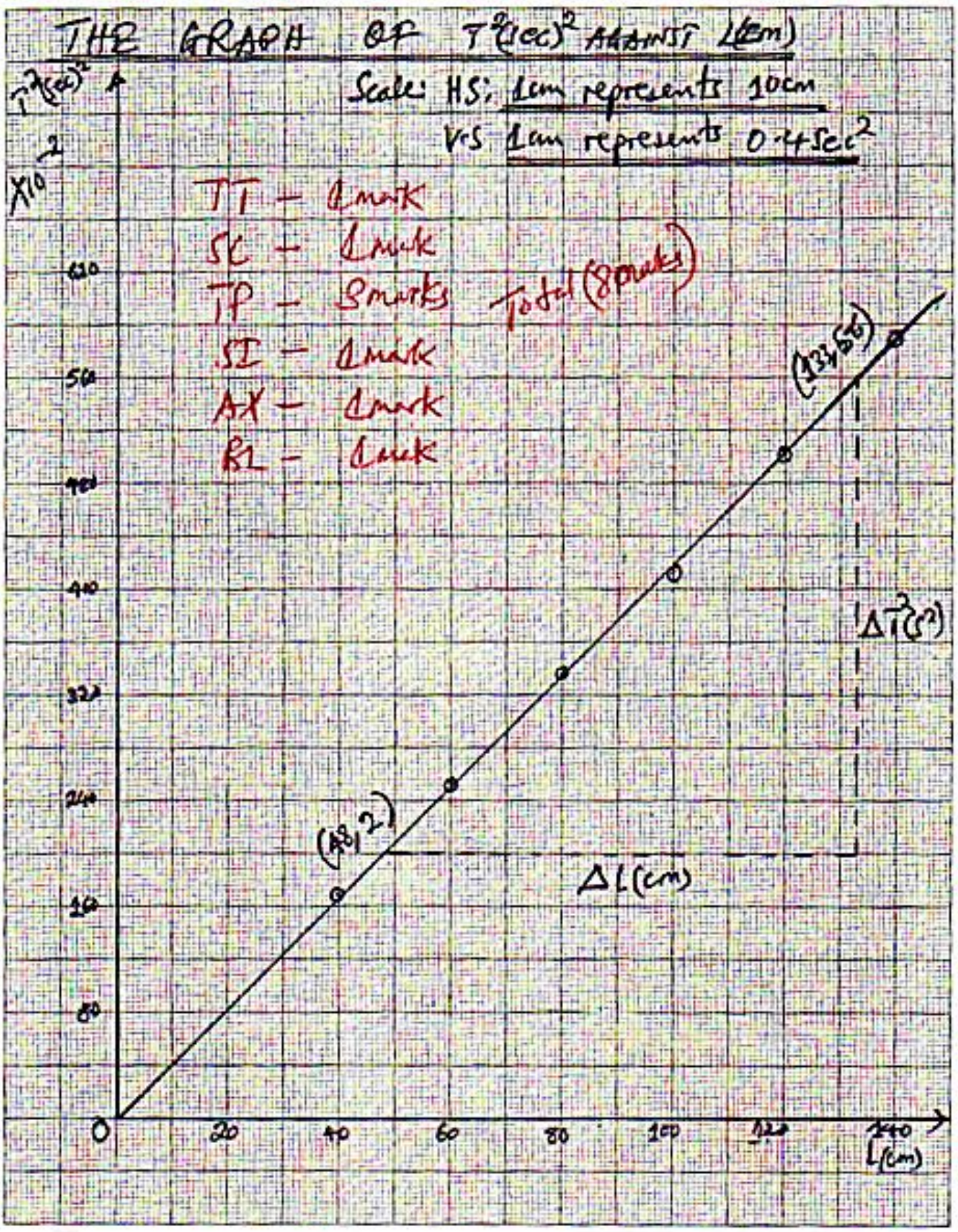
2.

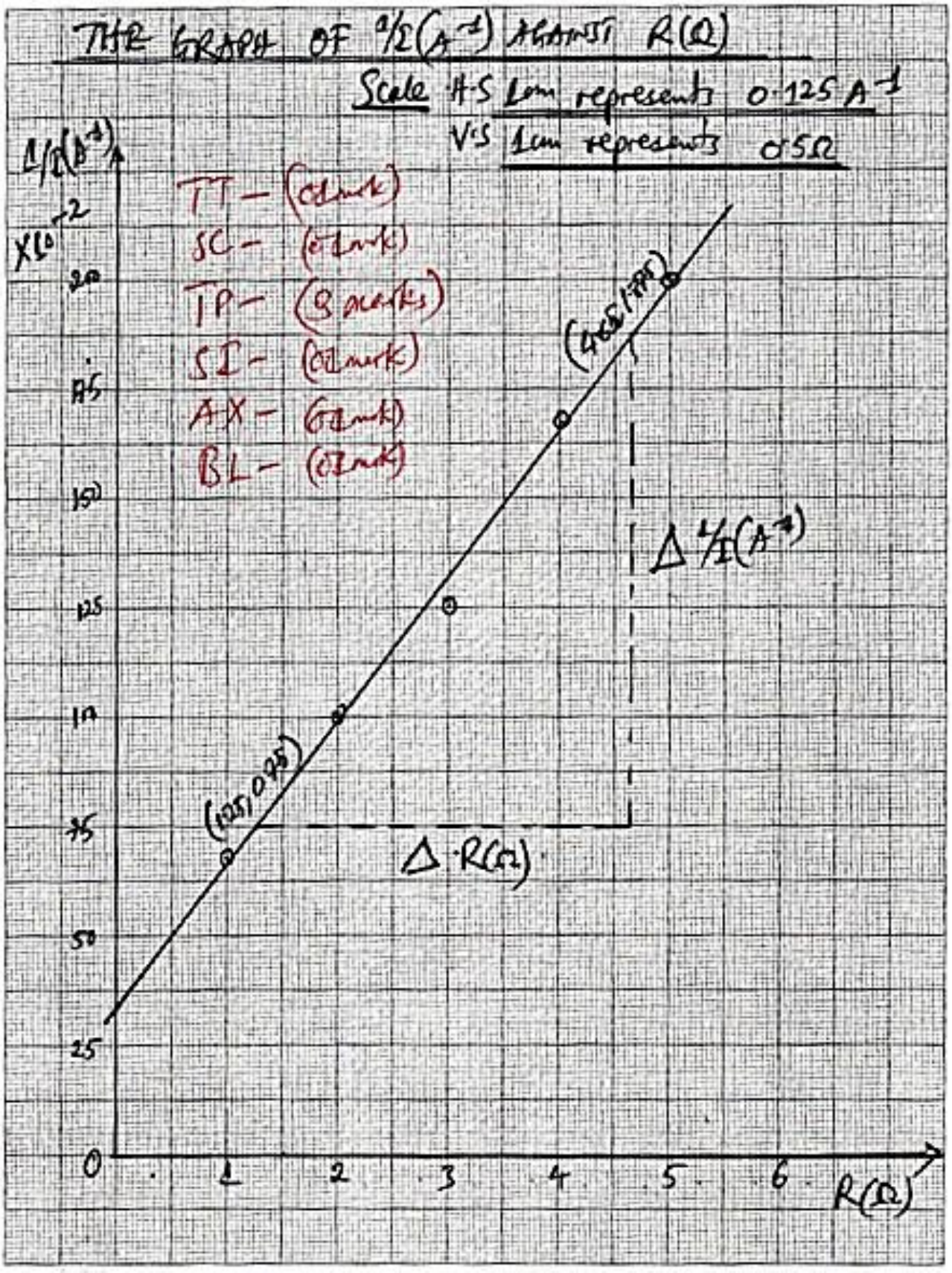
(i) Loose connection (2½ mark) Any one
(ii) Leaving switch on for a long time

Way of minimizing

(i) Make sure all connection are tight (½ mark) Any one
(ii) Readings should be taken fast and immediately to avoid running out of the battery.

(c) The aim of the experiment is to determine the emf and internal resistance of the cell. (1 mark)


THE GRAPH OF T²(sec)² AGAINST L(cm)
Scale: HS; 1cm represents 10cm
VS 1cm represents 0.4sec²
T²(sec)²
X10⁻²
TT – 1mark
SC – 1mark
TP – 3marks
SI – 1mark
AX – 1mark
RL – 1mark
Total (8marks)
(133.56)
(48.12)
ΔT²(s²)
ΔL(cm)
0
20
40
60
80
100
120
140
L(cm)


THE GRAPH OF 1/I(A⁻¹) AGAINST R(Ω)
Scale 4·5 1cm represents 0·125 A⁻¹
V·S 1cm represents 0·5Ω
1/I(A⁻¹)
X10⁻²
TT – (2 marks)
SC – (2 marks)
TP – (3 marks)
SI – (2 marks)
AX – (2 marks)
BL – (2 marks)
(4·5, 1·75)
(1·25, 0·25)
Δ 1/I(A⁻¹)
Δ R(Ω)
0
1
2
3
4
5
6
R(Ω)