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

FORM FOUR PRE – NATIONAL EXAMINATION AUGUST 2025

PHYSICS 2A
MARKING SCHEME

1. (i)Table of results

Length L(cm)	10	20	30	40	50
Number of oscillations (*n*)	20	20	20	20	20
Timet (sec)	14	19	24	27	30
$t^2(s^2)$	196	361	576	729	900

02markseachcolumntotalmarks10

(ii) Graph draw on graphpaper.

(iii) From the graph, slope $= \frac{\Delta t^2 LS^2}{\Delta Lcm}$ **01mark**

$= \frac{780-220}{45-10}$ **00 ½ marks**

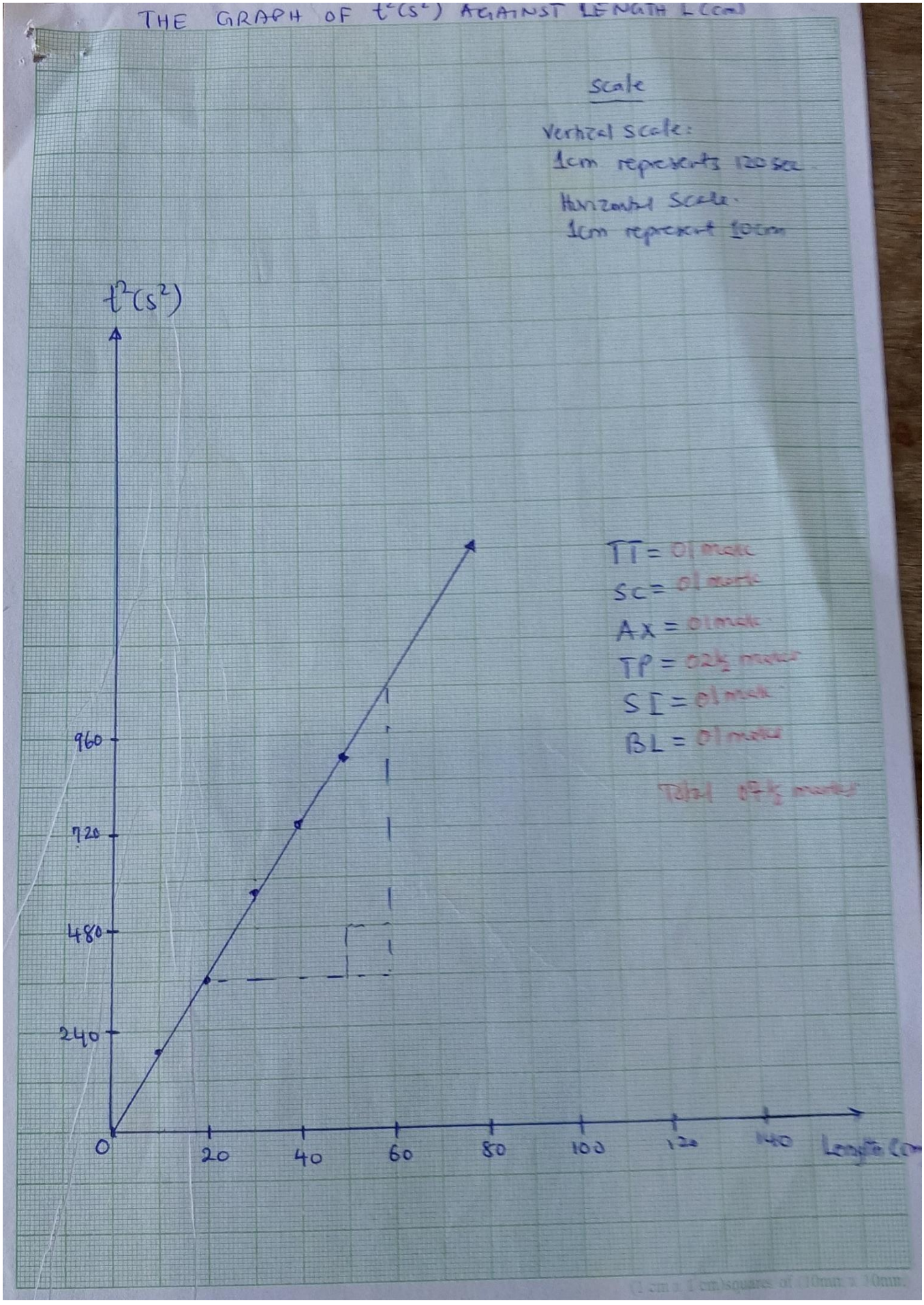
$=16S^2/m=1600S^2/m$ **01 mark**

(iv) From$t^2 = \frac{4\pi^2 n^2 L}{Z} + C, m = \frac{4\pi^2 n^2 L}{Z}$,z=$\frac{4\pi^2 n^2 L}{m}, z = \frac{4\pi^2 \times 20^2}{1620} = 9.8696 m/s^2$ **01mark**

$Z = t^2 \frac{4\pi^2 \times 20^2}{1620} = 9.8696\ m/s^2$ **[02marks]**

(v) Significance of z
- (i) It help to pull everything towards the centre of the earth.
- (ii) It help people to work.
- (iii) Ithelptoknowthedepthoftheoceanandheightofthemountain.**Onlyonepoint (1mark)**

(vi) The aim of experiment is to determine acceleration due to gravity.**[01mark]**

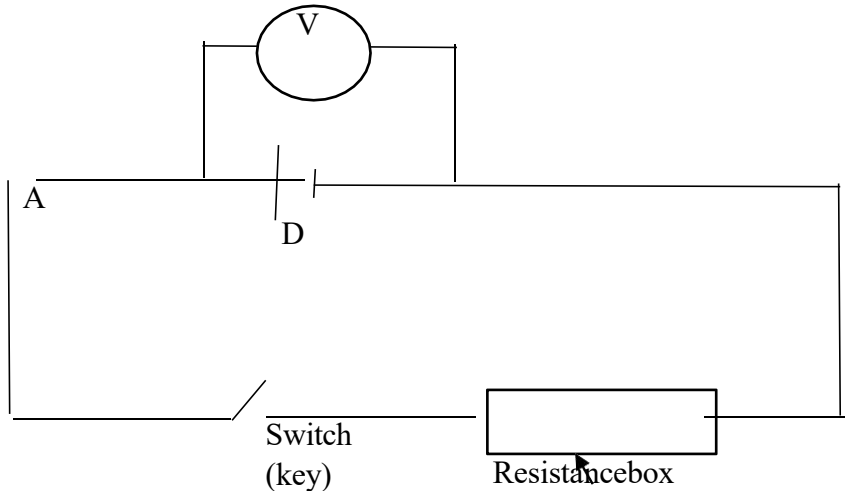

THE GRAPH OF $t^2(s^2)$ AGAINST LENGTH L(cm)
Scale
Vertical scale:
1cm represents 120 sec
Horizontal Scale:
1cm represent 10cm
$t^2(s^2)$
960
720
480
240
0
20
40
60
80
100
120
140
TT = 01 mark
Sc = 01 mark
Ax = 01 mark
TP = 02½ marks
SI = 01 mark
BL = 01 mark
Total 07½ marks

2. (a)tableof results

ResistanceR(ohm)	V(VOLT)	A(SI)
1	0.98 (0.55– 1.4)	1.00
2	1.20	0.60
3	1.28	0.43
4	1.30	0.33
5	1.35	0.27

@row 1mark= (05 marks)

(b)Thecircuit diagram



[02marks]

(c)From E = I(R+r)
E = IR+Ir
E = V+Ir
V = E–Ir **[01 ½marks]**

(c)(i) From the graph E is the vertical intercept which is E= 1.48V. **03marks**

(ii) Internal resistance = -Slope of the graph

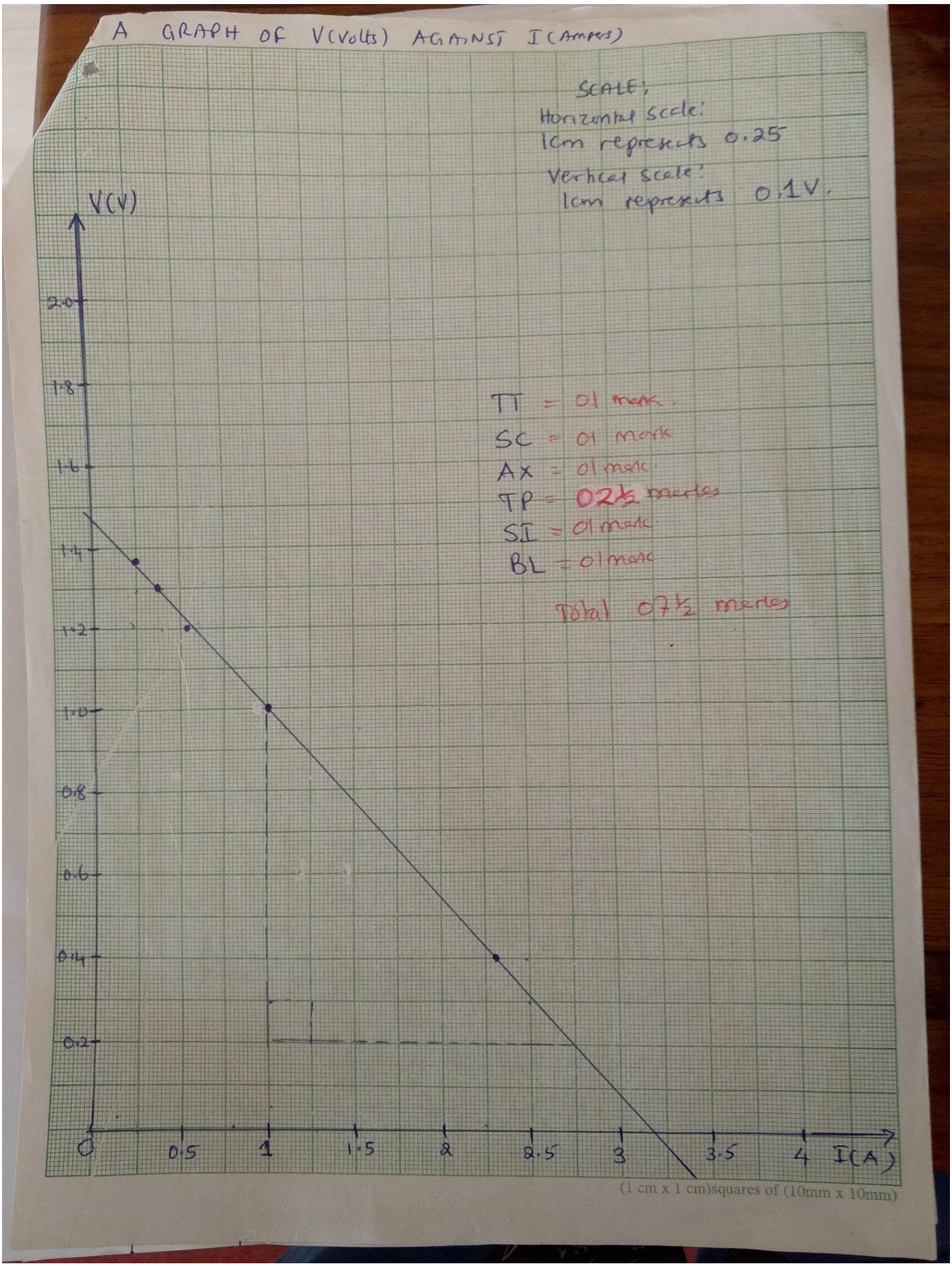
= $-\frac{-\Delta V(V)}{\Delta I(A)}$ **01mark**

= $\frac{-(1.3-0.4)v}{(0.375-2.25)A}$

= $\frac{0.9}{-1.875}\ ohm$ **(01mark)**

= **0.48 ohm** **0.45-0.55** **(01mark)**

(iii) The maximum current the cell can deliver to the circuit is the horizontal axis intercept is I=3.075A (2.22-3.33) **(03marks)**


A GRAPH OF V(Volts) AGAINST I(Amps)
SCALE;
Horizontal scale:
1cm represents 0.25
Vertical scale:
1cm represents 0.1V.
V(V)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
0.5
1
1.5
2
2.5
3
3.5
4
I(A)
TT = 01 mark
SC = 01 mark
AX = 01 mark
TP = 02½ marks
SI = 01 mark
BL = 01 mark
Total 07½ marks
(1 cm x 1 cm)squares of (10mm x 10mm)