

4.5.3 Physics Paper 3 (232/3)

QUESTION ONE PART A

(a) (i) $D = 0.38 \text{ mm} \pm 0.02$ (1 mark)

(ii) $d = 0.28 \text{ mm} \pm 0.05$ (1 mark)

(b) $C_1 = \frac{D}{d} = \frac{0.38}{0.28} = 1.357$ (1 mark)

(c) $l_1 = 38.5 \text{ cm}$ (1 mark)

$l_2 = 61.5 \text{ cm}$ (1 mark)

$(l_1 < l_2)$

$$\frac{R_p}{9} = \frac{38.5}{61.5}$$

$$\therefore R_p = 5.63 \Omega$$

(2 marks)

$$C_2 = \sqrt{\frac{9}{5.63}}$$

$$= 1.264$$

(2 marks)

(ii) C_1 and C_2 are nearly equal (to the nearest whole number).

(1 mark)

QUESTION ONE PART B

$$V = 3.1 \text{ volts} \pm 0.1$$

$$I_0 = \frac{V}{R} = \frac{3.1}{4.7 \times 10^3} \text{ A}$$

$$= 0.659 \text{ mA}$$

(3 marks)

$$I_1 = 0.63 \text{ mA}$$

For $\frac{I_1}{2}$

$$t_1 = 3.9 \text{ s}$$

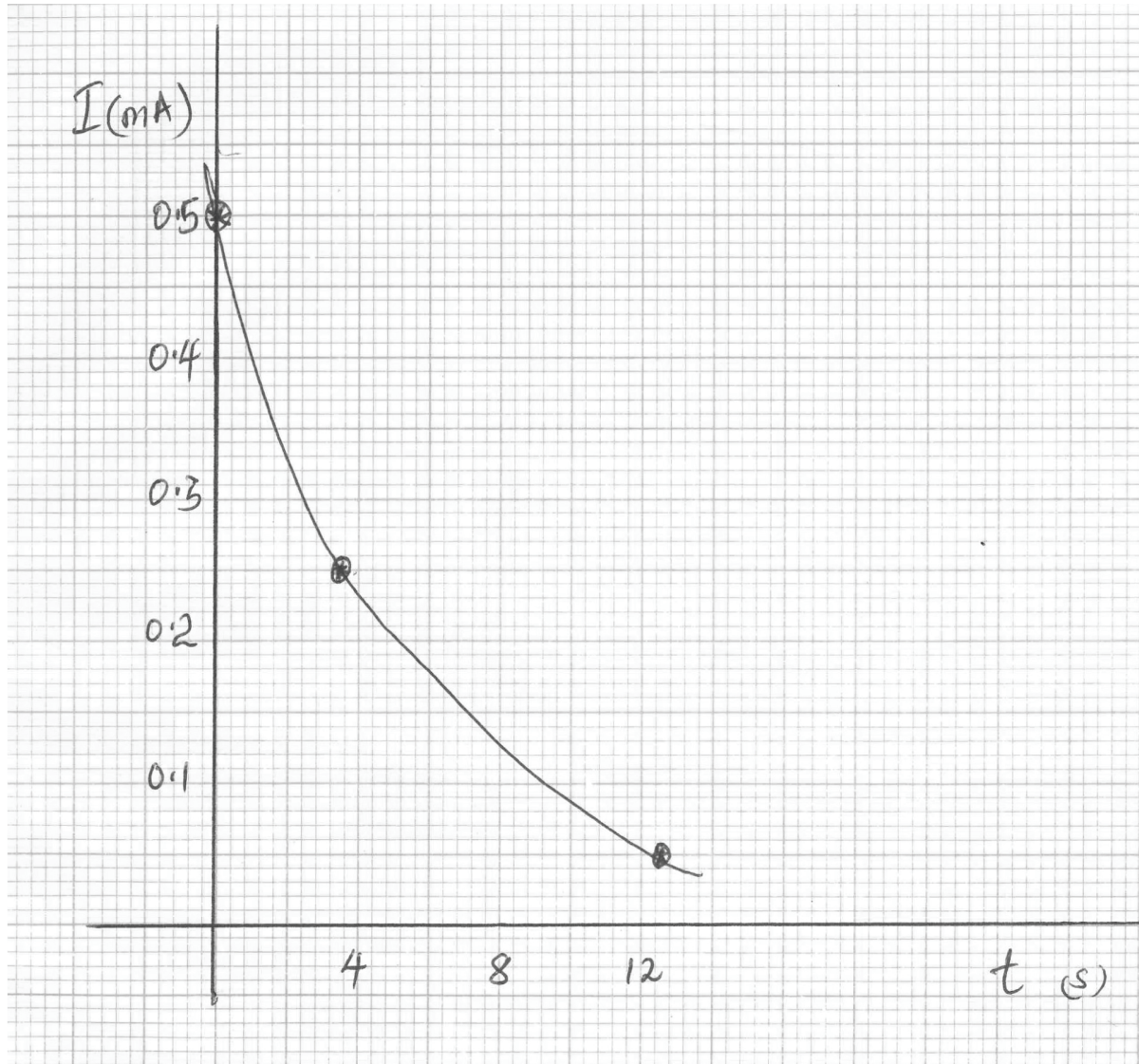
(1 mark)

For $\frac{I_1}{10}$

$$t_2 = 13.5 \text{ s}$$

(1 mark)

I	0.5	0.25	0.05
t	0	3.6	12.5



(3 marks)

QUESTION TWO

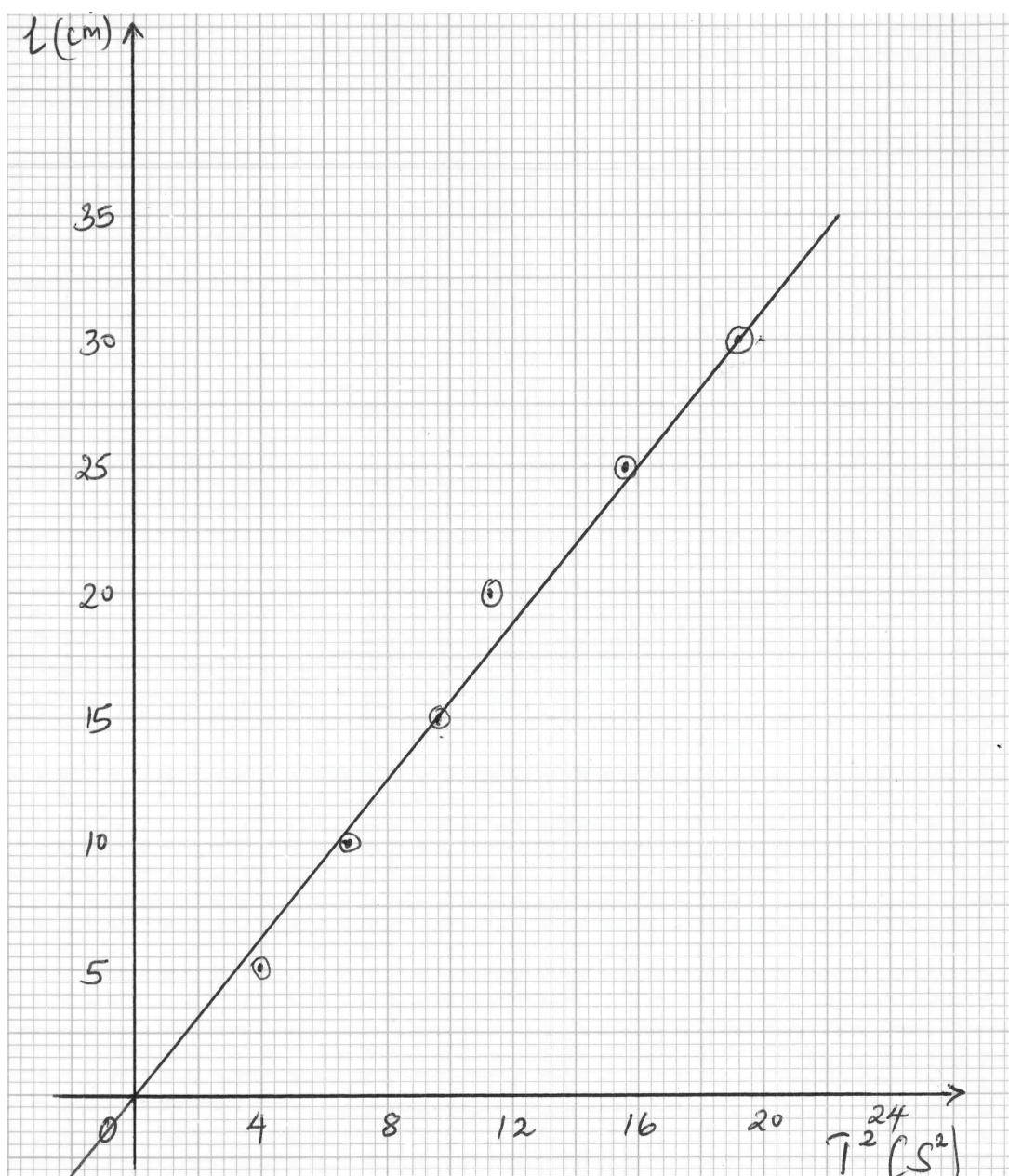
(d)

l (cm)	5	10	15	20	25	30
t (s)	20.1	26.3	31.2	33.0	39.6	43.4
T (s)	2.01	2.63	3.12	3.3	3.96	4.34
T^2 (S ²)	4.04	6.92	9.73	10.89	15.68	19.84

(6 marks)

(e) Graph.

(5 marks)



$$\begin{aligned}
 \text{(f) Gradient} &= \frac{20}{16} \text{ cm/s}^2 \\
 &= \frac{0.20}{16} \text{ cm/s}^2 \\
 &= 0.015625 \text{ ms}^{-2}
 \end{aligned}$$

(3 marks)

$$\text{(g) } l_N = 20 \text{ cm} = 0.2 \text{ m}$$

$$\text{(i) } t_N = 52.0$$

$$\text{(ii) } T_N = 5.2$$

$$\text{(iii) } T_N^2 = 27.04$$

(1 mark)

$$H = \frac{0.2}{27.04} = 0.007396$$

(1 mark)

$$\begin{aligned}
 \text{(iv) } \frac{H}{S} &= \frac{0.007396}{0.015625} \\
 &= 0.4737
 \end{aligned}$$

(2 marks)