5.3.3 Physics Paper 3 (232/3)

1 (a) $f_1 = 20\,cm \quad \pm 2cm$ (1)

(c) $f_2 = 15cm \quad \pm 2cm$ (1)

(f)

d(cm)	65	67	69	71	73	77	80	
V(cm)	37.5	33.8	31.1	29.1	27.5	25.2	24.0	±2

(6 marks)

(g) (i) Graph (6 correctly plotted points)

Labelling axes (1)
Plot (2 marks)
Curve/line on at least 4 correctly plotted points (1 mark)

(ii) I. Value of V $= 30 \pm 1$ (1 mark)

II. Slope $s = \dfrac{35 - 20}{81.25 - 63.75}$

$= -0.86$

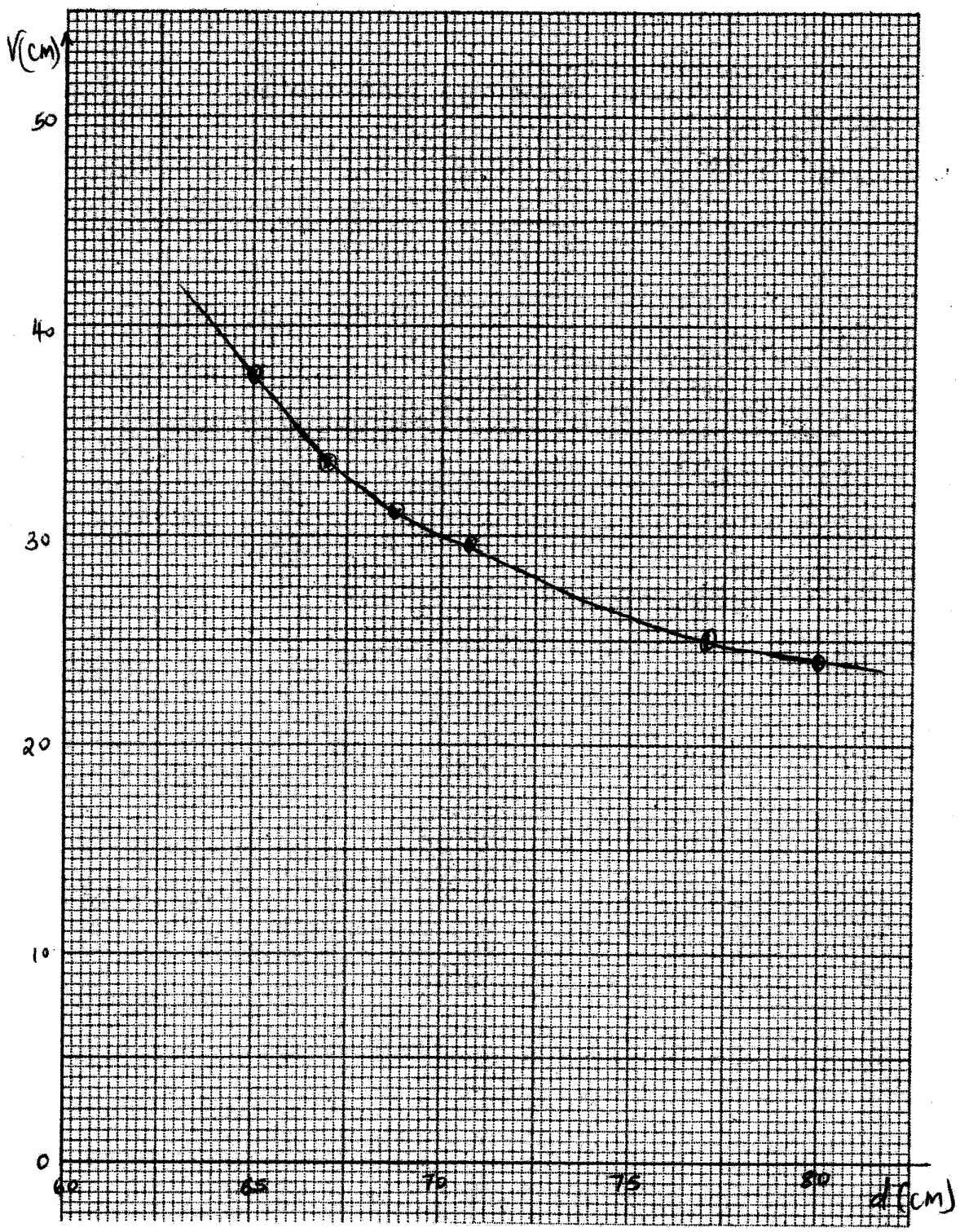
$\simeq -0.9$

No curve/line no slope (3 marks)

(iii) $K = \dfrac{-225}{(d-55)^2} = \dfrac{-225}{225} = -1$ (2 marks)

(iv) $M = \dfrac{S}{K} = \dfrac{-0.9}{-1} = 0.9$ (2 marks)

Graph 1



2. (b) (i) Maximum Voltmeter reading = 4.4 Volts (1 mark)

(ii) Voltmeter reading V_B = 3.7 Volts (1 mark)

(iii) In (i) p.d. measured is across both. (1 mark)
diode and resistor, while in (ii) p.d. is across diode only. (1 marks)

(c) V_B = 0.8 Volts. (1 mark)

(d)

V_A/V	V_B/V	$I = \frac{V_A - V_B}{1000}$ A
1.5	1.2	0.3×10^{-3}
2.0	1.7	0.3×10^{-3}
2.5	2.1	0.4×10^{-3}
3.0	2.5	0.5×10^{-3}
3.5	2.9	0.6×10^{-3}
4.0	3.4	0.6×10^{-3}

Column I = 1 mark

Values of V_B = 5 marks

Total for table = 6 marks

(e)

Axes labelled	1 mark
Scale (simple & uniform)	1 mark
Plotting	3 marks
Curve (line)	1 mark

(5 marks)

(f) I = 0.45mA, V_B = 2.3 volts

$$\therefore R = \frac{V_B}{I} = \frac{2.3}{0.45 \times 10^{-3}}$$

$$= 5.1 \times 10^3$$

$$= 5.1\,k\Omega$$

(3 marks)

GRAPH 2