

PHYSICS PAPER 3

ANSWERS

KCSE 2012

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- 1 (a) $f_1 = 20\text{ cm} \pm 2\text{ cm}$ (1)
- (c) $f_2 = 15\text{ cm} \pm 2\text{ cm}$ (1)

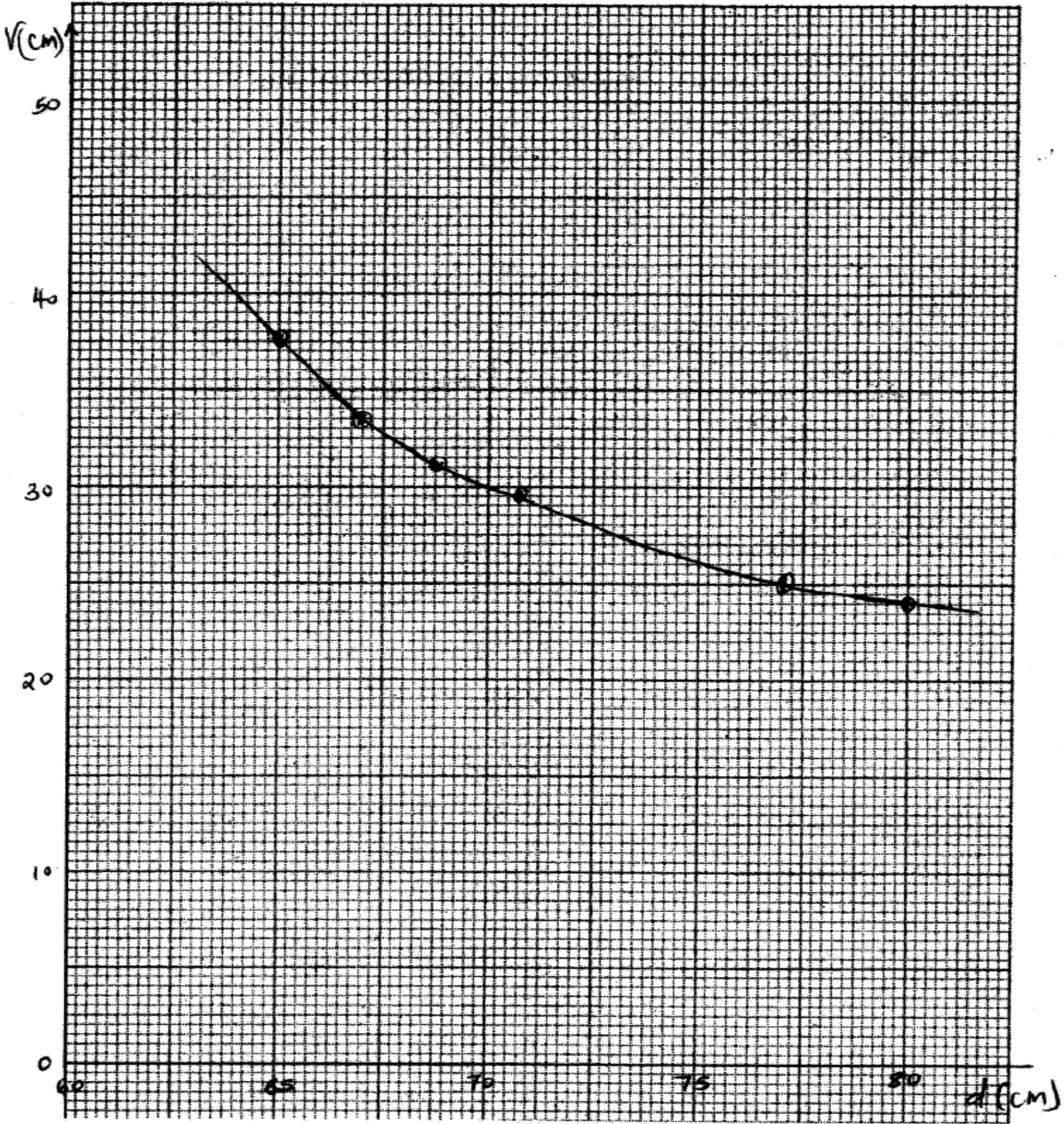
(f)

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 $s = \frac{35 - 20}{81.25 - 63.75}$
- $= -0.86$
- $\simeq -0.9$
- No curve/line no slope (3 marks)
- (iii) $K = \frac{-225}{(d-55)^2} = \frac{-225}{225} = -1$ (2 marks)
- (iv) $M = \frac{S}{K} = \frac{-0.9}{-1} = 0.9$ (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	$I = \frac{V_A - V_B}{1000} \text{ A}$
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) $I = 0.45\text{mA}$, $V_B = 2.3$ volts

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

$$= 5.1 \times 10^3$$

$$= 5.1 \text{ k}\Omega$$

(3 marks)

Graph 2

