

MARKING SCHEME

FORM 4 TERM 1
232/3
PHYSICS PAPER 3
(a)

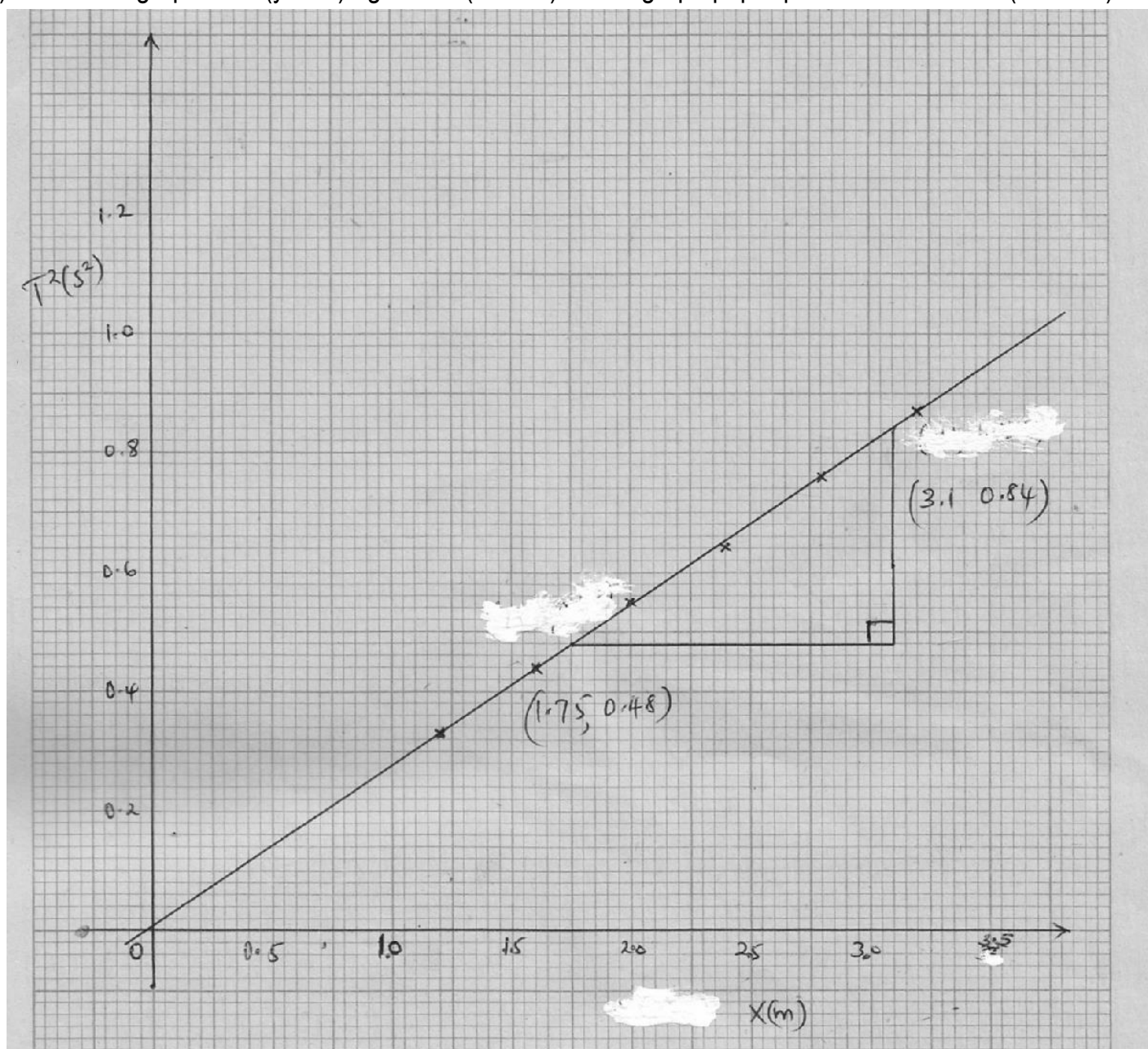
Table 1

Length X cm	32	28	24	20	16	12	
Time t for 10 oscillations (s)	9.32	8.72	8.00	7.40	6.62	5.75	✓✓2
Period $T = \frac{t}{10}$ (s)	0.932	0.872	0.8	0.74	0.662	0.575	✓✓2
T^2 (S ²)	0.87	0.76	0.64	0.55	0.44	0.33	✓1

(any 4 to 6 correct values, 2 marks, 2 to 4 values, 1 mark, less than 2 values, no mark)

(b) Plot a graph of T^2 (y-axis) against X (metres) on the graph paper provided.

(5 marks)



Scale = 1 mark

Axes with units = 1 mark

Plots = 2 marks

Line = 1 mark

(c) i)

$$\text{slope} = \frac{0.84 - 0.48(\text{s}^2)}{3.1 - 1.75(\text{m})} \checkmark$$

$$\text{slope} = \frac{0.36}{1.35} \checkmark$$

$$\text{slope} = 2.67 \text{s}^2/\text{m} \checkmark$$

(3 marks)

ii) Obtain the value of K in the equation $S = \frac{8\pi}{3k}$ (2marks)

$$2.67 \text{ s}^2/\text{m} = \frac{8 \times 3.142}{3k} \quad \checkmark$$

$$3k = \frac{8 \times 3.142}{2.67}$$

$$k = \frac{8 \times 3.142}{3 \times 2.67}$$

$$k = 3.1381 \text{ m/s}^2 \quad \checkmark$$

PART B

(d)

(3 marks)

Table 2

$t_1(\text{s})$	$t_2(\text{s})$	$t_3(\text{s})$	Average $t(\text{s})$ $t = \left(\frac{t_1 + t_2 + t_3}{3} \right)$	$T = \frac{t}{5}(\text{s})$
3.68 $\checkmark \frac{1}{2}$	3.75 $\checkmark \frac{1}{2}$	3.81 $\checkmark \frac{1}{2}$	$\frac{3.68 + 3.75 + 3.81}{3}$	$T = \frac{3.747}{3}$ $= 0.7494$

(e)

(2 marks)

$$P = \frac{40 \times 0.12(\text{m})}{0.7494^2} \quad \checkmark$$

$$P = 8.547 \text{ m/s}^2 \quad \checkmark$$

QUESTION TWO

$$h = 6.3 \text{ cm} \quad \checkmark$$

(1 Marks)

$$R = \sqrt{\frac{100}{h}}$$

$$R = \sqrt{\frac{100}{6.3}} = 3.98 \text{ cm} \quad \checkmark$$

(1 Marks)

(i)

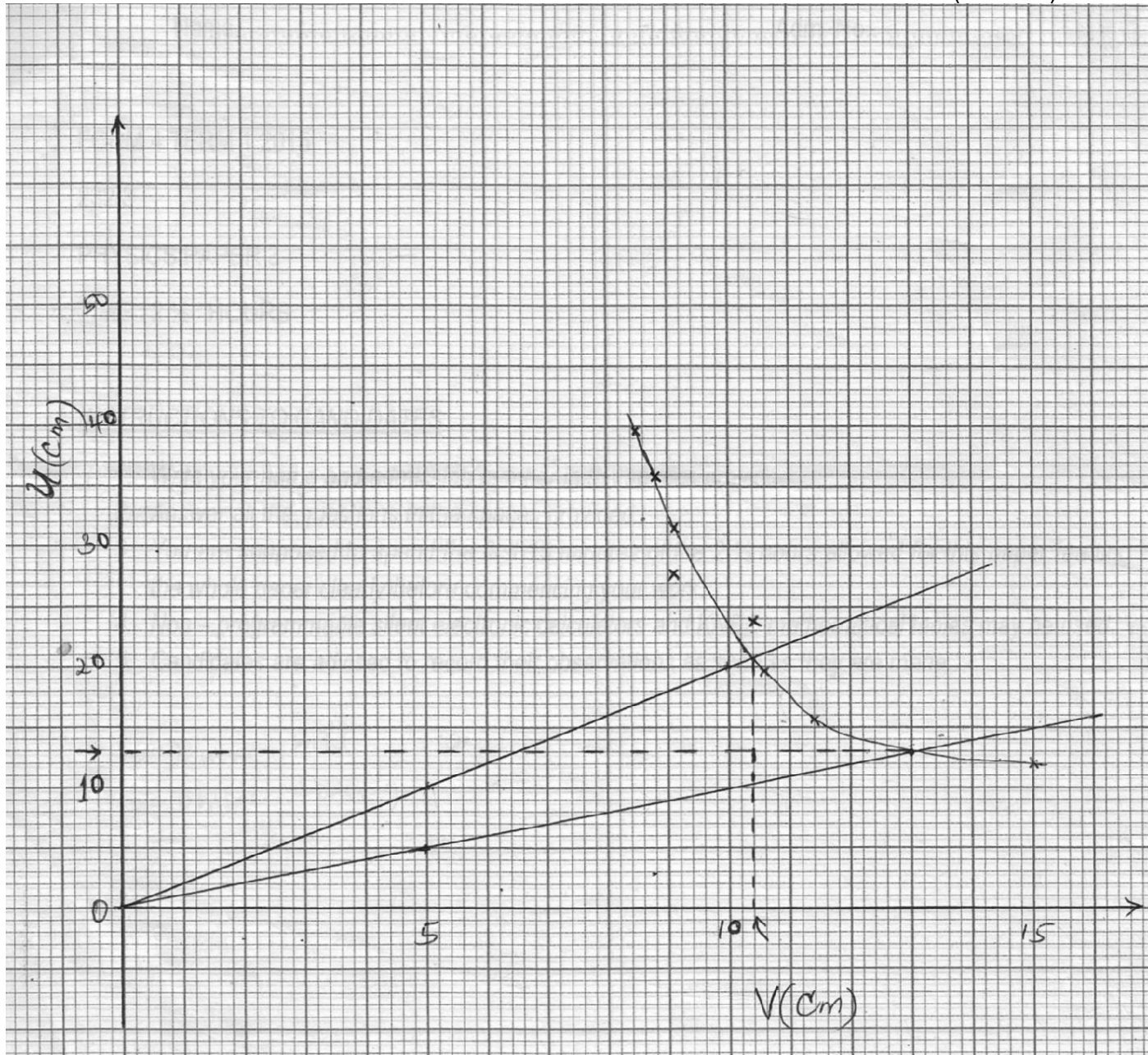
(8 marks)

	10R	9R	8R	7R	6R	5R	4R	3R
U (cm)	39.8	35.9	31.9	27.9	23.9	19.9	15.9	12.0
V (cm)	8.5	8.8	9.1	9.1	10.4	10.6	11.4	15.0

NB: Any other appropriate value of u and v depending on the value of R obtained can be awarded.

-each correct value = $\frac{1}{2}$ mark

(5 marks)



Scale = 1 mark

Axes with units = 1 mark

Plots = 2 marks

Smooth Curve = 1 mark

i) From the graph determine

'V' the value of V for which $v=u$

(1 Mark)

'V' = 13cm ✓

a) 'U' the value of U for which $u=2v$

(1 Mark)

$$\mathbf{'U' = 10.4cm} \checkmark$$

ii) **Determine** the effective focal length of the 'lens' from the formulae $f = \frac{u' + v'}{5}$

(2 Marks)

$$\mathbf{f = \frac{10.4 + 13.0}{5}} \checkmark$$

$$\mathbf{= \frac{23.4}{5}}$$

$$\mathbf{f = 4.68cm} \checkmark$$

iii) Hence determine the value of $\frac{R}{f}$

(1 Mark)

$$\frac{R}{f} = \frac{3.98cm}{4.68cm} = 0.85 \checkmark$$