

1. (a) **Table 1**

Hole	1	2	3	4	5	6
Distance L(M)						
Time for 10 oscillations						
Periodic time T (S)						
$T^2(S^2)$						
$T^2L (S^2M)$						
$L^2 (M^2)$						
	1½	1½	1½	1½	1½	1½

Total (9mks)

(b) Expected graph



(c) (i)
$$\text{Slope} = \frac{\Delta T^2 L}{\Delta L^2}$$
 (2mks)

Student must show triangle for finding gradient on the graph.

(ii) Y-intercept (1mk)

(d) Value of K: Use the student values in c(i) and c(ii) above. (3mks)

2. (a) $f_o = 10\text{cm}$ **Table 2**

L(cm)	2	3	4	5	6	7	8	9
$\chi(\text{cm})$								
$\frac{1}{L} (\text{cm}^{-1})$								
	½	½	½	½	½	½	½	½

Total (4 marks)

- Values of χ must be upto 1d.p.

(b) Expected graph.

(c) $Gradient = \frac{\Delta \chi}{\Delta \frac{1}{L}}$ (Triangle must be shown on the graph) (3mks)

(d) $\chi = \frac{f^2}{L} + \frac{L(f + \ell)}{L}$
 f^2 is the gradient
Hence $f = \sqrt{\text{Slope}}$
Slope from the graph ✓③

PART B

(ii) $E = 1.5 \pm 0.1\text{v}$ ✓①

(iii) $V = 1.4 \pm 0.1\text{V}$ ✓①

$I = 0.12\text{A} \pm 0.01\text{A}$ ✓①

(iv) $E - V = Ir$

$0.1 = 0.12 \times r$ ✓①

$r = \frac{0.1}{0.12} = 0.83\Omega$ ✓①

