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) $Slope = \frac{\Delta T^2 L}{\Delta L^2}$ (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) $f_o = 10cm$

Table 2

L(cm)	2	3	4	5	6	7	8	9
χ(cm)								
$\frac{1}{L}$ (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) $Gradient = \dfrac{\Delta\chi}{\Delta\, 1/L}$ (Triangle must be shown on the graph) (3mks)

(d) $\chi = \dfrac{f^2}{L} + \dfrac{L(f + \ell)}{L}$

f^2 is the gradient

Hence $f = \sqrt{Slope}$

Slope from the graph ✓③

PART B

(ii) E = 1.5 ± 0.1v ✓①

(iii) V = 1.4 ± 0.1V ✓①

I = 0.12A ± 0.01A ✓①

(iv) E – V = Ir

0.1 = 0.12 × r ✓①

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