

$$m = 2 \text{ kg} \quad I_o = 0.7 \text{ m} \quad \omega = \frac{\omega_o}{5} \quad I = \frac{6}{5} I_o$$

$$g = 10 \text{ ms}^{-2} \quad k = 5mg$$

$$\text{PE at A} = (\text{KE at B}) + (\text{elastic PE at B})$$

$$mgI = \frac{1}{2}mv^2 + \frac{1}{2}k\omega^2$$

$$\frac{6}{5}mgI_o = \frac{1}{2}mv^2 + \frac{5}{2}mg\left(\frac{\omega_o}{5}\right)^2$$

$$\frac{6}{5}gL_o = \frac{v^2}{2} + \frac{gL_o^2}{10}$$

multiplying both sides by 10

$$12gL_o = 5v^2 + gL_o^2$$

$$5v^2 = 12gL_o + gL_o^2$$

$$v = \sqrt{\frac{12gL_o + gL_o^2}{5}}$$

$$= \sqrt{\frac{(12 \times 10 \times 0.7) + (10 \times 0.7 \times 0.7)}{5}}$$

$$= 4.2166$$

Ans. maximum speed of mass is  $4.2 \text{ ms}^{-1}$  (1 d.p.)