

$$m = 2\text{kg} \quad l_0 = 0.7\text{m} \quad e = \frac{l_0}{5} \quad l = \frac{6}{5} l_0$$

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

PE at A = (KE at B) + (elastic PE at B)

$$mgl = \frac{1}{2}mv^2 + \frac{1}{2}ke^2$$

$$\frac{6}{5}mgl_0 = \frac{1}{2}mv^2 + \frac{5}{2}mg\left(\frac{l_0}{5}\right)^2$$

$$\frac{6}{5}gl_0 = \frac{v^2}{2} + \frac{gl_0^2}{10}$$

multiplying both sides by 10

$$12gl_0 = 5v^2 + gl_0^2$$

$$5v^2 = 12gl_0 + gl_0^2$$

$$v = \sqrt{\frac{12gl_0 + gl_0^2}{5}}$$

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

$$= 4.2166$$

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