

Potential Energy Pg 140

#1)

$$k = 5.2 \frac{\text{N}}{\text{m}}$$

$$\text{Formula: } PE_{\text{elastic}} = \frac{1}{2} k x^2$$

$$x_i = 2.45 \text{ m}$$

$$x_f = 3.57 \text{ m}$$

$$PE = \left(\frac{1}{2} \cdot 5.2 \right) \cdot (3.57 - 2.45)^2$$

$$[PE = 3.26 \text{ J}]$$

PE = ?

#2)

$$x_i = 0.115 \text{ m}$$

$$k = 51.0 \text{ N/m}$$

$$x_f = 0.150 \text{ m}$$

$$PE_e = \frac{1}{2} k \cdot \Delta x^2$$

$$= \left(\frac{1}{2} \cdot 51.0 \text{ N/m} \right) \cdot (0.150 \text{ m} - 0.115 \text{ m})^2$$

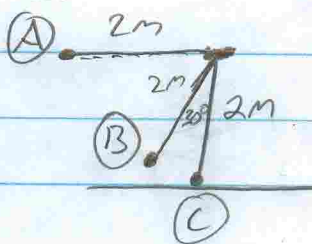
$$= (25.5 \text{ N/m}) \cdot (0.035)^2$$

$$[= 0.031 \text{ J}]$$

#3) $m = 40 \text{ kg}$

$$h = 2.00 \text{ m}$$

$$PE_g = \underline{\quad ? \quad} \text{ J}$$

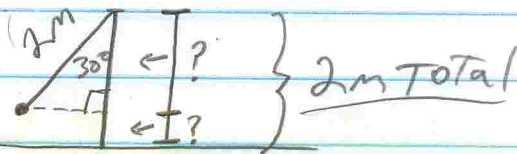


(A) & B $PE_{\text{grav}} = m \cdot g \cdot h$

$$(40 \text{ kg}) (9.81 \text{ m/s}^2) (2 \text{ m}) = 785 \text{ J}$$

#3 cont

(B)



Use Trig.

$$\cos \theta = \frac{a}{h}$$

$$\cos 30^\circ = \frac{x}{2m}$$

$$2m \cos 30^\circ = 1.73$$

$2m - 1.73m = 0.27m$ is the height from ground.

Find PE_{grav}

$$PE_{\text{grav}} = m \cdot g \cdot h$$

$$PE_{\text{grav}} = (40 \text{ kg}) (9.81 \text{ m/s}^2) (0.27 \text{ m}) = 105.95$$

(C)

$$PE_{\text{grav}} = m \cdot g \cdot h$$
$$= (40 \text{ kg}) (9.81 \text{ m/s}^2) (0 \text{ m})$$

$$PE_{\text{grav}} = 0 \text{ J}$$