

$$28 \quad W_s = ? \quad k = 100 \text{ N/m} \quad X_o = 5 \text{ m} \quad X_f = 0$$

$$W_s = \frac{1}{2} k X_o^2 - \frac{1}{2} k X_f^2 = \frac{1}{2} k (X_o^2 - X_f^2)$$

$$= \frac{1}{2} (100) (5^2 - 0^2)$$

$$W_s = 1250 \text{ J}$$

27. To find k :

$$F = 360\text{ N} \quad x = 4\text{ cm}$$

$$F = kx$$
$$360 = k(0.04)$$

$$\underline{k = 9000\text{ N/m}}$$

$$W_s = ? \quad W_s = \frac{1}{2}kx_o^2 - \frac{1}{2}kx_f^2$$

$$a) \quad x_o = 0.05 \quad x_f = 0.03$$

$$W_s = \frac{1}{2}(9000)(0.05^2 - 0.03^2) = \underline{7.2\text{ J}}$$

$$b) \quad W_s = \frac{1}{2}(9000)(0.05^2 - (-0.03)^2) = \underline{7.2\text{ J}}$$

$$\text{c) } W = \frac{1}{2}(9000)(0.05^2 - (-0.05)^2) \\ = 0$$

$$\text{d) } W = \frac{1}{2}(9000)(0.05^2 - (-0.09)^2) \\ = -25.2 \text{ J}$$

32. $W_s = ?$ $k = 8000 \text{ N/m}$ (from graph)

$$W_s = \frac{1}{2} k x_o^2 - \frac{1}{2} k x_f^2$$

a) $= \frac{1}{2} (8000) (0.08^2 - 0.05^2)$

$$W_s = 15.6 \text{ J}$$

b) $W_s = ?$ $x_o = +8 \text{ cm}$ $x_f = -5 \text{ cm}$

$$W_s = \frac{1}{2} k x_o^2 - \frac{1}{2} k x_f^2 = \frac{1}{2} k (x_o^2 - x_f^2)$$

$$= \frac{1}{2} (8000) ((0.08)^2 - (-0.05)^2)$$

$$W_s = 15.6 \text{ J}$$

c) $W_s = ?$ $x_o = 8 \text{ cm}$ $x_f = -8 \text{ cm}$

$$W_s = \frac{1}{2} (8000) (0.08^2 - (-0.08)^2)$$

$$W_s = 0$$

d) $W_s = ?$ $x_o = 8 \text{ cm}$ $x_f = -10 \text{ cm}$

$$W_s = \frac{1}{2} (8000) (0.08^2 - (-0.10)^2)$$

$$W_s = -14.14 \text{ J}$$