

39. $m = 0.9 \text{ kg}$ $V_0 = 7 \text{ m/s}$ $X_0 = 4.5 \text{ m}$
 $K_0 = \frac{1}{2} m V_0^2 = \frac{1}{2} (0.9) (7)^2 = 22.05 \text{ J}$
 $U_0 = 15 \text{ J}$ $U_0 + K_0 = U_f + K_f$
 $E_{\text{mech}} = 37.05 \text{ J}$

at $x = 1 \text{ m}$ $U = 35 \text{ J}$ so $K = 2.05 \text{ J}$

$V = ?$

$2.05 = \frac{1}{2} (0.9) (V_1)^2$ $V_1 =$

$V_1 = 2.13 \text{ m/s}$

b) $F(x=3) = ?$

$$F = -\frac{dU}{dx} = -(-10) = 10 \text{ N}$$

d) can't reach $x=7\text{m}$ (would need 45J)

turns where $v=0$ so $U=37.05\text{J}$

from 5 to 6 $U = 30x - 135$

$$37.05 = 30x - 135$$

$$172.05 = 30x \quad x = 5.74\text{m}$$

e + f) $F = ?$ between 5 + 6 m

$$F = -\frac{dU}{dx} = -30 \text{ J/m}$$

$$= -30 \text{ N}$$