

③ ① $2 \frac{m}{s}$
 40 m $\mu=0$
 F_N
 F_{fK} F_g
 d
 $h=0$
 $F_g = 1,000 \text{ N}$
 $g = 10 \frac{m}{s^2}$
 10 m
 $\mu_k = 0.50$
 $F_g = m \cdot g$
 $m = 100 \text{ kg}$

a) $V_2 = ?$
 b) $V_3 = ?$

HW: #2 b) and c)
#3 a)

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a) C of ①-②
 $ME_1 + W = ME_2$
 $KE_1 + PE_{g1} = KE_2$
 $\frac{1}{2} m V_1^2 + m g h_1 = \frac{1}{2} m V_2^2$
 $\frac{1}{2} (100) (2^2) + (100) (10) (40) = \frac{1}{2} (100) V_2^2$
 $V_2 = 28.4 \frac{m}{s}$

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b) (of E ①-③)

$$ME_1 + W_{2-3} = ME_3$$

$$KE_1 + PE_{g,1} + \underbrace{F_{F_k} \cdot d_{23} \cdot \cos \theta}_{\mu_k \cdot F_N (10) \cos(180^\circ)} = KE_3$$

$$\frac{1}{2} m V_1^2 + m g h_1 + \mu_k \cdot F_N (10) \cos(180^\circ) = \frac{1}{2} m V_3^2$$

$$\frac{1}{2} (100) (2^2) + (100)(10)(40) + 0.5 \cdot F_g (10) (-1) = \frac{1}{2} (100) V_3^2$$

$$200 + 40,000 - 5 \cdot (1000) = 50 V_3^2$$

$$\boxed{V_3 = 26.5 \frac{m}{s}}$$

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①① (of E ①-③)

$$a) KE_1 + PE_{g,1} + W_{2-3} = KE_3$$

$$\frac{1}{2} m V_1^2 + m g h_1 + W_{2-3} = \frac{1}{2} m V_3^2$$

$$\frac{1}{2} (140) (12^2) + (140)(10)(50) + W_{2-3} = \frac{1}{2} (140) (2^2)$$

$$\boxed{W_{2-3} = -79,800 \text{ J}}$$

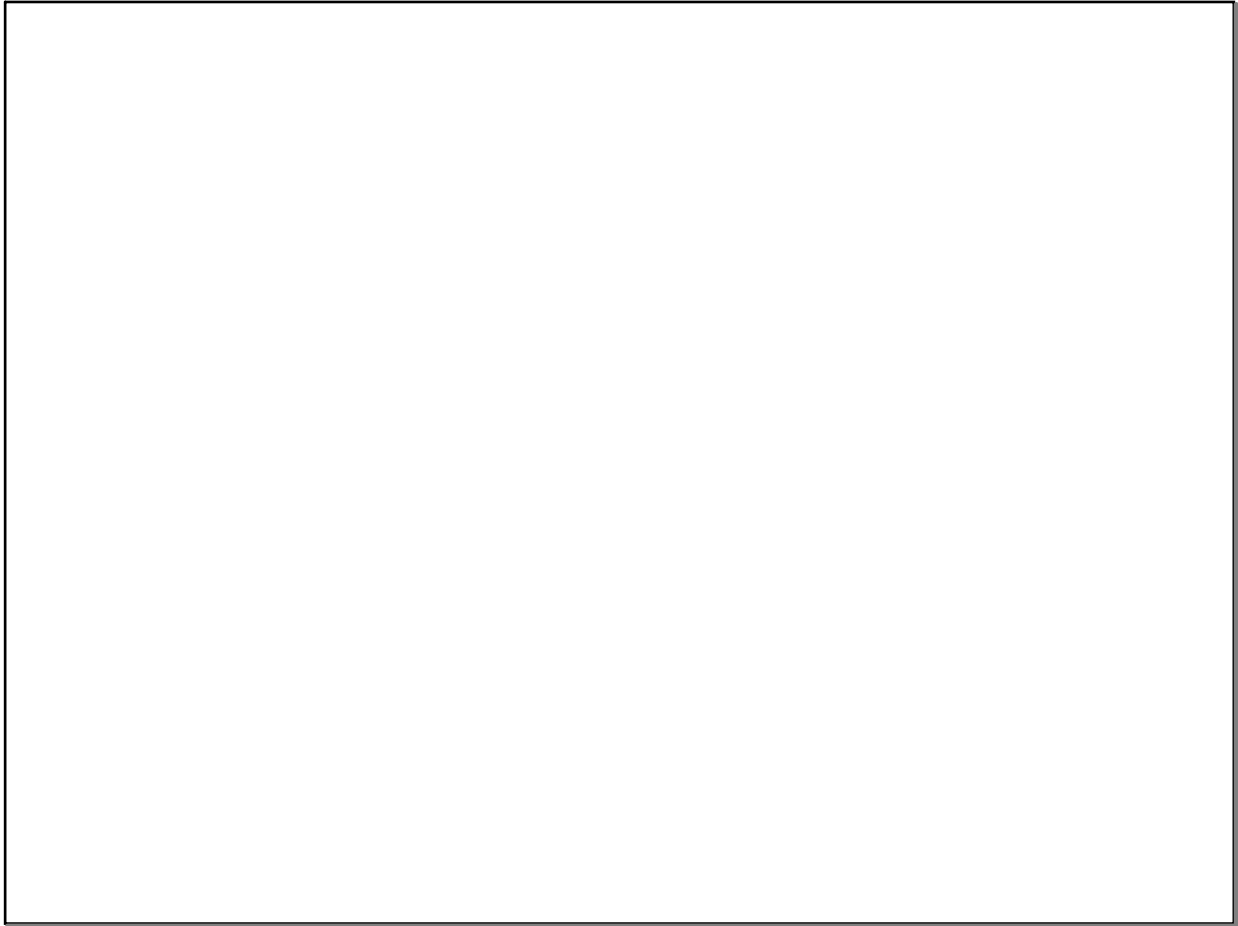
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$$\begin{aligned}
 \text{b)} \quad W_{2-3} &= F_{FK} \cdot d_{2-3} \cdot \cos \theta \quad (\text{DEF.}) \\
 -79,800 &= F_{FK} \cdot (100) \cos(180^\circ) \\
 -79,800 &= F_{FK} \cdot (100) \cdot (-1) \\
 &\quad \left. F_{FK} = 798 \text{ N} \right\}
 \end{aligned}$$

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$$\begin{aligned}
 \text{c)} \quad F_{FK} &= \mu_k \cdot F_N \quad (\text{DEF.}) \\
 798 &= \mu_k \cdot (140) \cdot (10) \\
 &\quad \left. \mu_k = 0.57 \right\}
 \end{aligned}
 \quad \left[\begin{array}{l} \text{FROM FBD:} \\ F_N = F_g \quad \text{AND} \\ F_g = m \cdot g \end{array} \right]$$

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