

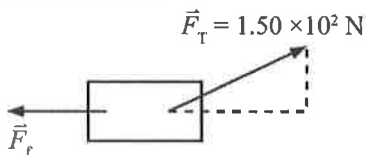
$$F_{\text{net}} = 117.7 \text{ N} - 58.9 \text{ N} \\ = 58.9 \text{ N}$$

$$F_{\text{net}}d = \frac{1}{2}m(v^2 - v_0^2)$$

$$(58.9 \text{ N})(1.5 \text{ m}) = \frac{1}{2}(18 \text{ kg})(v^2 - 0)$$

$$v = \sqrt{\frac{2(58.9 \text{ N})(1.5 \text{ m})}{18 \text{ kg}}} \\ = 3.1 \text{ m/s}$$

11. Find net force



$$F_{Tx} = F_T \cos \theta \\ = (1.50 \times 10^2 \text{ N})(\cos 25^\circ) \\ = 135.9 \text{ N}$$

$$F_{Ty} = F_T \sin \theta \\ = (1.50 \times 10^2 \text{ N})(\sin 25^\circ) \\ = 63.39 \text{ N}$$

$$F_N + F_{Ty} = F_g \\ F_N = F_g - F_{Ty} \\ = (50.0 \text{ kg})(9.81 \text{ m/s}^2) - 63.39 \text{ N} \\ = 427.1 \text{ N}$$

$$F_{fr} = \mu F_N \\ = (0.35)(427.1 \text{ N}) \\ = 149.5 \text{ N}$$

$$F_{\text{net}} = F_{Tx} - F_{fr} \\ = 135.9 \text{ N} - 106.8 \text{ N} \\ = 29.1 \text{ N}$$

$$F_{\text{net}}d = \frac{1}{2}m(v^2 - v_0^2)$$

$$(29.1 \text{ N})(12.0 \text{ m}) = \frac{1}{2}(50.0 \text{ kg})(v^2 - 0)$$

$$v = \sqrt{\frac{2(29.1 \text{ N})(12.0 \text{ m})}{50.0 \text{ kg}}} \\ = 3.74 \text{ m/s}$$

$$12. \quad P = \frac{\text{work}}{t} \\ \text{work} = Pt \\ = (0.0290 \text{ J/s})(275 \text{ h})(3600 \text{ s/h}) \\ = 2.87 \times 10^4 \text{ J}$$

$$W = Fd = \frac{1}{2}m(v^2 - v_0^2)$$

$$2.87 \times 10^4 \text{ J} = \frac{1}{2}(0.145 \text{ kg})(v^2 - 0)$$

$$v = \sqrt{\frac{2(2.87 \times 10^4 \text{ J})}{0.145 \text{ kg}}} \\ = 629 \text{ m/s}$$

13. Find net force:



$$F_{fr} = \mu F_N \\ = (0.35)(45.0 \text{ N})(9.81 \text{ m/s}^2) \\ = 154.5 \text{ N}$$

$$F_{\text{net}} = F_T - F_{fr} \\ = 192 \text{ N} - 154.5 \text{ N} \\ = 37.4 \text{ N}$$

$$F_{\text{net}}d = \frac{1}{2}m(v^2 - v_0^2)$$

$$(37.5 \text{ N})(8.0 \text{ m}) = \frac{1}{2}(45.0 \text{ kg})(v^2 - 0)$$

$$v = \sqrt{\frac{2(37.5 \text{ N})(8.0 \text{ m})}{45.0 \text{ kg}}} \\ = 3.7 \text{ m/s}$$

14. Convert 15 km/h to m/s

$$\frac{(15 \text{ km/h})(1000 \text{ m/km})}{3600 \text{ s/h}} = 4.17 \text{ m/s}$$

Convert 25 km/h to m/s

$$\frac{(25 \text{ km/h})(1000 \text{ m/km})}{3600 \text{ s/h}} = 6.94 \text{ m/s}$$

$$Fd = \frac{1}{2}m(v^2 - v_0^2) \\ = \frac{1}{2}(1.1 \times 10^3 \text{ kg})((6.94 \text{ m/s})^2 - (4.17 \text{ m/s})^2) \\ = 1.7 \times 10^4 \text{ J}$$