$$\begin{aligned} F_{net} &= F_{Tx} - F_{fr} \\ &= 44.6\ \text{N} - 15.0\ \text{N} \\ &= 29.6\ \text{N} \end{aligned}$$

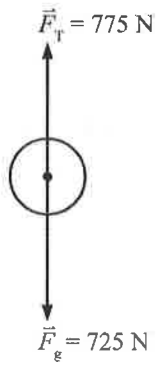
Again

$F_{net} = ma$

Therefore

$$\begin{aligned} a &= \frac{F_{net}}{m} \\ &= \frac{29.6\ \text{N}}{12.7\ \text{kg}} \\ &= 2.32\ \text{m/s}^2 \end{aligned}$$

18.



$$\begin{aligned} F_{net} &= F_T - F_g \\ &= 775\ \text{N} - 725\ \text{N} \\ &= 50\ \text{N} \\ F_g &= mg \\ m &= \frac{F_g}{g} \\ &= \frac{725\ \text{N}}{9.81\ \text{m/s}^2} \\ &= 73.9\ \text{kg} \\ a &= \frac{F_{net}}{m} \\ &= \frac{50\ \text{N}}{73.9\ \text{kg}} \\ &= 0.676\ \text{m/s}^2 \end{aligned}$$

19. $v^2 = v_0^2 + 2ad$

$$\begin{aligned} 0 &= (3.0\ \text{m/s})^2 + 2(a)(8.0\ \text{m}) \\ a &= -0.56\ \text{m/s}^2 \end{aligned}$$

Negative sign indicates that the puck is decelerating.

$$\begin{aligned} \vec{F}_{net} &= m\vec{a} \\ &= (0.48\ \text{kg})(-0.56\ \text{m/s}^2) \\ &= -0.27\text{N}\ \text{or}\ 0.27\ \text{N south} \end{aligned}$$

20.

$$\begin{aligned} F_g &= mg \\ &= (8.0\ \text{kg})(9.81\ \text{m/s}^2) \\ &= 78.5\ \text{N} \\ F_{net} &= F_T - F_g \\ &= 95\ \text{N} - 78.5\ \text{N} \\ &= 16.5\ \text{N} \\ F_{net} &= ma \\ a &= \frac{F_{net}}{m} \\ &= \frac{16.5\ \text{N}}{8.0\ \text{kg}} \\ &= 2.06\ \text{m/s}^2 \end{aligned}$$

Again

$$\begin{aligned} a &= \frac{v - v_0}{t} \\ 2.06\ \text{m/s}^2 &= \frac{v - 0}{1.1\ \text{s}} \\ v &= 2.3\ \text{m/s} \end{aligned}$$

21. a)

$$\begin{aligned} F_{net} &= ma \\ a &= \frac{F_{net}}{m} \\ &= \frac{20.0\ \text{N}}{5.0\ \text{kg}} \\ &= 4.0\ \text{m/s}^2 \end{aligned}$$

b)

$$\begin{aligned} F_{net} &= ma \\ &= (3.0\text{kg})(4.0\ \text{m/s}^2) \\ &= 12\ \text{N} \end{aligned}$$

22. a)

$$\begin{aligned} F_{fr} &= \mu F_N \\ &= \mu mg \\ &= (0.21)(5.0\ \text{kg})(9.81\ \text{m/s}^2) \\ &= 10.3\ \text{N} \end{aligned}$$

$$\begin{aligned} F_{net} &= F_T - F_{fr} \\ &= 20.0\ \text{N} - 10.3\ \text{N} \\ &= 9.7\ \text{N} \\ F_{net} &= ma \\ a &= \frac{F_{net}}{m} \\ &= \frac{9.7\ \text{N}}{5.0\ \text{kg}} \\ &= 1.9\ \text{m/s}^2 \end{aligned}$$

