

24. $\Delta y = ?$ $V_o = -56 \text{ m/s}$ $V_f = 0$
 $m = 85 \text{ kg}$ $F_s = 1.2 \times 10^5 \text{ N up}$

$$a = \frac{\Sigma F}{m} = \frac{F_s - F_g}{m} = \frac{1.2 \times 10^5 - 833}{85}$$

$$= 1402 \text{ m/s}^2$$

$$V_f^2 = V_o^2 + 2a(\Delta y)$$

$$0 = -56^2 + 2(1402)(\Delta y)$$

$$\Delta y = 1.12 \text{ m} \quad \text{snow} \geq 1.12 \text{ m deep}$$

b) $J = ?$ $J = \Delta p$
 $= m(\Delta v)$
 $= 85(0 - 56)$
 $J = 4760 \text{ Ns}$

$$29. \quad \frac{300g}{\text{minute}} = 5 \text{ g/s} = \frac{m}{\Delta t}$$

$$V_0 = 500 \text{ m/s} \quad V_f = -500 \text{ m/s}$$

$$\Sigma F_{\text{avg}} = ?$$

$$J = \Delta p$$

$$(\Sigma F_{\text{avg}})(\Delta t) = m(\Delta v)$$

$$\Sigma F_{\text{avg}} = \frac{m}{\Delta t}(\Delta v)$$

$$\Sigma F_{\text{avg}} = (0.005)(-1000)$$

$$\Sigma F_{\text{avg}} = -5 \text{ N}$$

$$\boxed{|\Sigma F_{\text{avg}}| = 5 \text{ N}}$$

32. $m = 5.0 \text{ kg}$ $V_0 = 0$

a) $\vec{p}(4.0\text{s}) = ?$ $J = \Delta P$

$$(\text{area})_0^4 = P_f - P_0$$

$$\frac{1}{2}(10 \cdot 2) + (10 \cdot 2) = P_f - 0$$

$$30 = P_4$$

$$\vec{P}_4 = 30 \text{ kgm/s} \uparrow$$

b) $\vec{p}(7.0\text{s}) = ?$

$$J = \Delta P$$

$$(\text{area})_4^7 = P_7 - P_4$$

$$\frac{1}{2}(10 \cdot 2) + \frac{1}{2}(-5 \cdot 1) = P_7 - 30$$

$$7.5 = P_7 - 30$$

$$37.5 = P_7$$

$$\vec{P}_7 = 37.5 \text{ kgm/s} \uparrow$$

c) $V(9.0\text{s}) = ?$ $J = \Delta P$

$$(\text{area})_7^9 = P_9 - P_7$$

$$(-5)(1) + \frac{1}{2}(-5)(1) = mV_9 - P_7$$

$$-7.5 = 5V_9 - 37.5$$

$$6 \text{ m/s} = V_9$$

$$\vec{V}_9 = 6 \text{ m/s} \hat{i}$$

35. $\Sigma F_{\max} = ?$

area $\int F dt = m (v_f - v_i)$

$$\frac{1}{2} (0.006 + 0.002) F_{\max} = 0.058 (34 - -34)$$

$$0.004 F_{\max} = 3.944$$

$$F_{\max} = 986 \text{ N}$$

32. again $V_0 = 0$ $m = 5 \text{ kg}$

$$a) \vec{p}(4) = ? \quad J = \Delta P$$

$$\int_0^4 F dt = P_4 - P_0$$

$$\left(\frac{1}{2}\right)(2s)(10N) + (2s)(10N) = P_4 - 0$$

$$30 \text{ kgm/s} = \vec{P}_4$$

$$b) \vec{P}_7 = ? \quad J = P_7 - P_4$$

$$\int_4^7 F dt = P_7 - 30$$

$$\frac{1}{2}(2s)(10N) + \frac{1}{2}(1s)(-5N) = \vec{P}_7 - 30$$

$$7.5 = \vec{P}_7 - 30$$

$$\underline{37.5 \text{ kgm/s} = \vec{P}_7}$$

$$c) v(9s) = ? \quad J = \Delta P$$

$$\int_7^9 F dt = \vec{P}_9 - \vec{P}_7$$

$$(1s)(-5N) + \frac{1}{2}(1s)(-5N) = \vec{P}_9 - 37.5$$

$$-7.5 = \vec{P}_q - 37.5$$

$$30 = \vec{P}_q$$

$$30 = m v$$

$$30 = (5) v$$

$$6 \text{ m/s} = v$$