

Practice Problems from Ppt. of notes

2) $d = 30.0 \text{ cm}$
 $r = 15.0 \text{ cm}$

$$\theta = \omega_0 t + \frac{1}{2} \alpha t^2$$

$$\omega_0 = 0$$

$$\alpha = 0.87 \text{ rad} \cdot \text{s}^{-2}$$

$$t = 0.50 \text{ s}$$

$$\omega = ?$$

$$\theta = ?$$

$$\theta = (0) + \frac{1}{2} (0.87) (0.50 \text{ s})^2$$

$$\theta = 0.11 \text{ rad} \times \frac{1 \text{ rev}}{2\pi} = 0.017 \text{ rev.}$$

$$\omega = \omega_0 + \alpha t$$

$$\omega = 0 + (0.87)(0.5)$$

$$\omega = 0.435 \approx 0.44 \text{ rad} \cdot \text{s}^{-1}$$

3) $\omega_0 = (210 \text{ rpm}) \left(\frac{2\pi \text{ rad/rev}}{60 \text{ s/min}} \right) = 21.99 \text{ rad} \cdot \text{s}^{-1}$

$$\omega = (380 \frac{\text{rev}}{\text{min}}) \left(\frac{2\pi}{60} \right) = 39.79 \text{ rad} \cdot \text{s}^{-1}$$

$$t = 5.09 \text{ s}$$

$$\alpha = ?$$

$$\theta = ?$$

a) $\omega = \omega_0 + \alpha t$

$$39.79 = 21.99 + \alpha (5.09)$$

$$\frac{17.80}{5.09} = \alpha$$

$$3.5 \text{ rad} \cdot \text{s}^{-2} = \alpha$$

b) $\theta = \left(\frac{\omega + \omega_0}{2} \right) \cdot t$

$$\theta = \frac{39.79 + 21.99}{2} \times 5.09 = 157.2 \text{ rad}$$

$$(157.2) \left(\frac{1 \text{ rev}}{2\pi} \right) = 25 \text{ rev.}$$

Practice Problem 2
4) rev = 18

$$\theta = (18)(2\pi) = 36\pi = 113.1 \text{ rad}$$

$$t = 3.0 \text{ min} = 180 \text{ sec.}$$

$$\bar{\omega} = \frac{113.1}{180} = 0.628 \approx \boxed{0.63 \text{ rad}\cdot\text{s}^{-1}}$$

$$b) v = \omega r \rightarrow @ 5.0 \text{ m} \rightarrow v = (0.63)(5)$$

$$= \underline{3.14 \text{ m}\cdot\text{s}^{-1}} \approx \textcircled{3.1 \text{ m/s}}$$

$$@ 4.0 \text{ m} \rightarrow v = (0.63)(4)$$

$$= \underline{2.52 \text{ m}\cdot\text{s}^{-1}} \approx \textcircled{2.5 \text{ m/s}}$$