

A centrifuge spinning at 3850 rpm is allowed to come to rest ( $t=10.25$ ).

1. Determine the angular acceleration.
2. How many revolutions were completed from  $t=0$  to  $t=10.25$ ?

$$\omega_i = 3850 \frac{\text{rev}}{\text{min}} \times \frac{2\pi \text{ rad}}{1 \text{ rev}} \times \frac{1 \text{ min}}{60 \text{ s}} = 403.2 \frac{\text{rad}}{\text{s}}$$

$$\omega = 0 \frac{\text{rad}}{\text{s}}$$

$$\Delta t = 10.25$$

$$\alpha = ?$$

$$\omega = \omega_i + \alpha \Delta t$$

$$\alpha = \frac{\overset{0}{\omega} - \omega_i}{\Delta t} = \frac{-403.2 \frac{\text{rad}}{\text{s}}}{10.25} = \boxed{-39.5 \frac{\text{rad}}{\text{s}^2}}$$

$$\Delta\theta = ?$$

$$\omega^2 = \omega_i^2 + 2\alpha\Delta\theta$$

$$\Delta\theta = \frac{\overset{\rightarrow 0}{\omega^2} - \omega_i^2}{2\alpha} = \frac{-(403.2 \text{ rad/s})^2}{2(-39.5 \text{ rad/s}^2)}$$

$$= 2.06 \times 10^3 \text{ rad}$$

$$2.06 \times 10^3 \text{ rad} \times \frac{\text{rev}}{2\pi \text{ rad}} = 3.28 \times 10^2 \text{ rev}$$

328 revolutions