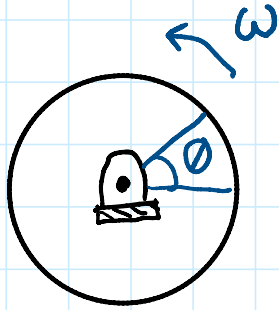


20-R-KM-DK-4

July 31, 2020 11:23 AM

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Inspiration: None



## Beginner Constant Acceleration

The flywheel rotates with an angular velocity of  $\omega = 0.002\theta^3$  rad/s. Determine the angular acceleration when it has rotated 5 revolutions.

$$\omega = 0.002 \theta^3 \quad \frac{d\omega}{dt} = \frac{d\theta}{dt} (0.006 \theta^2) \quad \alpha = \omega (0.006 \theta^2)$$

$\downarrow$                        $\downarrow$   
 $\alpha$                        $\omega$

$$\alpha = (0.002 \theta^3) (0.006 \theta^2) = 0.000012 \theta^5$$

$$5 \text{ revolutions} \Rightarrow 5 \times 2\pi = 10\pi \text{ rad}$$

$$\alpha = 0.000012 (10\pi)^5 = \boxed{367.2236 \text{ rad/s}^2}$$