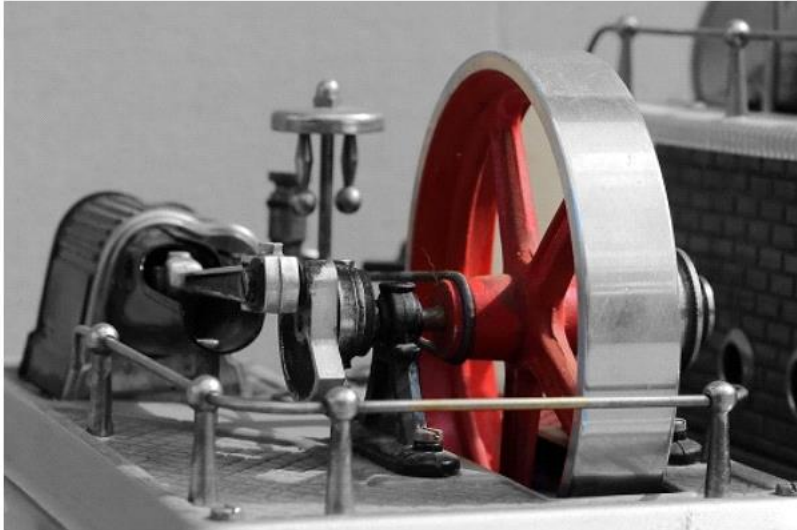


Problem 1

A flywheel rotates on a fixed axel in a steam engine. The flywheel is rotating at a rate of 600 rpm before a brake begins decelerating the flywheel at a constant rate of 30 rad/s^2 . What is the time required to bring the flywheel to a complete stop? How many rotations does the flywheel go through while decelerating?



$$600 \text{ rpm} \rightarrow 62.83 \text{ rad/s}$$

$$\alpha(t) = -30$$

$$\omega(t) = -30t + 62.83$$

$$\theta(t) = -15t^2 + 62.83t + \cancel{\theta_0}$$

$$\omega(t') = 0 = -30t' + 62.83$$

$$t' = 2.094 \text{ s}$$

$$\theta(t') = -15(2.094)^2 + 62.83(2.094)$$

$$\theta(t') = 65.797 \text{ rad} = 10.472 \text{ rotations}$$