$$\int_{\theta_0}^{\theta} d\theta = \int_0^t (\omega_0 + \alpha t)\, dt$$

$$\left\{ \int dx = x . \quad \int x^n dx = \frac{x^{n+1}}{n+1} \right.$$

$$[\theta]_{\theta_0}^{\theta} = \int_0^t \omega_0 dt + \int_0^t \alpha t . dt$$

$$\theta - \theta_0 = \omega_0 \int_0^t dt + \alpha \int_0^t t' dt$$

$$\Delta\theta = \omega_0 [t]_0^t + \alpha \left[\frac{t^2}{2}\right]_0^t$$

$$\Delta\theta = \omega_0 (t - 0) + \alpha\left(\frac{t^2}{2} - \frac{0}{2}\right)$$

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

$v^2 = u^2 + 2as$

3. $\underline{\omega^2 = \omega_0^2 + 2\alpha \cdot \Delta\theta}$

Let at $t=0$, Ang. vel $= \omega_0$ and ang. position $= \theta_0$
at $t=t$, Ang. vel $= \omega$ and ang. position $= \theta$

$\because \quad \alpha = \frac{d\omega}{dt}$

or $\quad \alpha = \frac{d\omega}{d\theta} \cdot \frac{d\theta}{dt}$

or $\quad \alpha = \frac{d\omega}{d\theta} \cdot \omega \qquad \left(\because \omega = \frac{d\theta}{dt}\right)$

$\alpha \cdot d\theta = \omega . d\omega \quad - 1$

Integrating both the sides

$$\int x^n dx = \frac{x^{n+1}}{n+1}$$

$$\int_{\theta_0}^{\theta} \alpha \cdot d\theta = \int_{\omega_0}^{\omega} \omega' d\omega$$

$$\alpha \int_{\theta_0}^{\theta} d\theta = \left[\frac{\omega^2}{2}\right]_{\omega_0}^{\omega}$$

$$\alpha . [\theta]_{\theta_0}^{\theta} = \left(\frac{\omega^2}{2} - \frac{\omega_0^2}{2}\right).$$

$$\alpha(\theta - \theta_0) = \tfrac{1}{2}(\omega^2 - \omega_0^2)$$

$$2\alpha \cdot \Delta\theta = \omega^2 - \omega_0^2$$

$$\omega_0^2 + 2\alpha \cdot \Delta\theta = \omega^2 \Rightarrow \underline{\omega^2 = \omega_0^2 + 2\alpha \cdot \Delta\theta}$$

$1 \text{ rev} = 2\pi \text{ rad}$

Ex 1:

A wheel rotating with uniform angular acceleration covers 50 revolutions in the first five seconds after the start. Find the angular acceleration and the angular

$t = 5$ sec