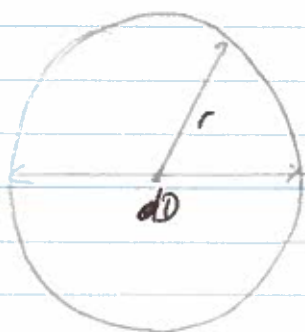


Ex 9.1

p291



Angular position?

$$\theta = (2.0 \text{ rad/s}^2) t^2$$

a/

$$\theta_1(t_1 = 2.0 \text{ s}) : \theta_1 = (2.0 \text{ rad/s}^2) t_1^2$$

$$= (2.0 \text{ rad/s}^2) (2.0 \text{ s})^2$$

$$\underline{\theta_1 = 16 \text{ rad}}$$

$$\text{for } \theta_2(t_2 = 5.0 \text{ s}) : \theta_2 = (2.0 \text{ rad/s}^2) t_2^2$$

$$= (2.0 \text{ rad/s}^2) (5.0 \text{ s})^2$$

$$\underline{\theta_2 = 250 \text{ rad}}$$

b/

Distance travelled by particle at r (radius, r) :

$$S = r \Delta\theta = r (\theta_f - \theta_i) = r (\theta_2 - \theta_1)$$

$$= (0.18 \text{ m}) (250 \text{ rad} - 16 \text{ rad})$$

$$\underline{S = 42 \text{ m}}$$

$$c/ \quad \omega_{av} = \frac{\Delta \theta}{\Delta t} = \frac{\theta_2 - \theta_1}{t_2 - t_1} = \frac{(250 - 16) \text{ rad}}{(5 - 2) \text{ s}}$$

$$\omega_{av} = \underline{78 \text{ rad s}^{-1}}$$

in rev/min

$$\omega_{av, \text{rev/min}} = \omega_{av, \text{rad/s}} \left(\frac{1 \text{ rev}}{2\pi \text{ rad}} \right) \left(\frac{60 \text{ sec}}{1 \text{ min}} \right)$$

$$= 78 \text{ rad s}^{-1} \left(\frac{1 \text{ rev}}{2\pi \text{ rad}} \right) \left(\frac{60 \text{ s}}{1 \text{ min}} \right)$$

$$= \underline{740 \text{ rev/min}}$$

$$d/ \quad \omega_2 = \frac{d\theta}{dt} = \frac{d}{dt} (2.0 \text{ rad s}^{-1}) t^3$$

$$\omega = (6.0 \text{ rad s}^{-1}) t^2$$

$$= 2.0 \text{ s} \quad \omega_1 = (6.0 \text{ rad s}^{-1}) (2.0 \text{ s})^2$$

$$\underline{\omega_{1\text{e}} = 24 \text{ rad s}^{-1}}$$

$$= 5.0 \text{ s} \quad \omega_2 = (6.0 \text{ rad s}^{-1}) (5.0 \text{ s})^2$$

$$\underline{\omega_{2\text{e}} = 150 \text{ rad s}^{-1}}$$