

28. (a) The tangential acceleration, using Eq. 11-22, is

$$a_t = \alpha r = (14.2 \text{ rad/s}^2) (2.83 \text{ cm}) = 40.2 \text{ cm/s}^2 .$$

(b) In rad/s, the angular velocity is $\omega = (2760)(2\pi/60) = 289$, so

$$a_r = \omega^2 r = (289 \text{ rad/s})^2 (0.0283 \text{ m}) = 2.36 \times 10^3 \text{ m/s}^2 .$$

(c) The angular displacement is, using Eq. 11-14,

$$\theta = \frac{\omega^2}{2\alpha} = \frac{289^2}{2(14.2)} = 2.94 \times 10^3 \text{ rad} .$$

Then, using Eq. 11-1, the distance traveled is

$$s = r\theta = (0.0283 \text{ m}) (2.94 \times 10^3 \text{ rad}) = 83.2 \text{ m} .$$