26. (a) The angular acceleration is

$$\alpha = \frac{\Delta\omega}{\Delta t} = \frac{0 - 150\,\text{rev/min}}{(2.2\,\text{h})(60\,\text{min}/1\,\text{h})} = -1.14\ \text{rev/min}^2\ .$$

(b) Using Eq. 11-13 with $t = (2.2)(60) = 132$ min, the number of revolutions is

$$\begin{aligned}\theta &= \omega_0 t + \frac{1}{2}\alpha t^2 \\ &= (150\,\text{rev/min})(132\,\text{min}) + \frac{1}{2}\left(-1.14\,\text{rev/min}^2\right)(132\,\text{min})^2 \\ &= 9.9 \times 10^3\ \text{rev}\ .\end{aligned}$$

(c) With $r = 500$ mm, the tangential acceleration is

$$a_t = \alpha\, r = \left(-1.14\,\text{rev/min}^2\right)\left(\frac{2\pi\,\text{rad}}{1\ \text{rev}}\right)\left(\frac{1\,\text{min}}{60\,\text{s}}\right)^2 (500\,\text{mm})$$

which yields $a_t = -0.99$ mm/s^2.

(d) With $r = 0.50$ m, the radial (or centripetal) acceleration is given by Eq. 11-23:

$$a_r = \omega^2 r = \left((75\,\text{rev/min})\left(\frac{2\pi\,\text{rad/rev}}{1\,\text{min}/60\,\text{s}}\right)\right)^2 (0.50\,\text{m})$$

which yields $a_r = 31$ in SI units – and is seen to be much bigger than a_t. Consequently, the magnitude of the acceleration is

$$|\vec{a}| = \sqrt{a_r^2 + a_t^2} \approx a_r = 31\ \text{m/s}^2\ .$$