

62. We denote the wheel with subscript 1 and the whole system with subscript 2. We take clockwise as the negative sense for rotation (as is the usual convention). Conservation of angular momentum gives  $L = I_1\omega_1 = I_2\omega_2$ , where  $I_1 = m_1R_1^2$ . Thus

$$\omega_2 = \omega_1 \frac{I_1}{I_2} = (-57.7 \text{ rad/s}) \frac{(37 \text{ N/9.8 m/s}^2)(0.35 \text{ m})^2}{2.1 \text{ kg}\cdot\text{m}^2}$$

which yields  $\omega_2 = -12.7 \text{ rad/s}$ . The system therefore rotates clockwise (as seen from above) at the rate of  $12.7 \text{ rad/s}$ .