49. (a) We use the kinematic equation $\omega = \omega_0 + \alpha t$, where ω_0 is the initial angular velocity, ω is the final angular velocity, α is the angular acceleration, and t is the time. This gives

$$\alpha = \frac{\omega - \omega_0}{t} = \frac{6.20\,\text{rad/s}}{220 \times 10^{-3}\,\text{s}} = 28.2\ \text{rad/s}^2\ .$$

(b) If I is the rotational inertia of the diver, then the magnitude of the torque acting on her is

$$\tau = I\alpha = \left(12.0\,\text{kg} \cdot \text{m}^2\right)\left(28.2\,\text{rad/s}^2\right) = 3.38 \times 10^2\,\text{N} \cdot \text{m}\ .$$