42. (a) We apply conservation of angular momentum: $I_1\omega_1 + I_2\omega_2 = (I_1 + I_2)\omega$. The angular speed after coupling is therefore

$$\omega = \frac{I_1\omega_1 + I_2\omega_2}{I_1 + I_2} = \frac{\left(3.3\,\text{kg}\cdot\text{m}^2\right)(450\,\text{rev/min}) + \left(6.6\,\text{kg}\cdot\text{m}^2\right)(900\,\text{rev/min})}{3.3\,\text{kg}\cdot\text{m}^2 + 6.6\,\text{kg}\cdot\text{m}^2} = 750\ \text{rev/min}\ .$$

(b) In this case, we obtain

$$\omega = \frac{I_1\omega_1 + I_2\omega_2}{I_1 + I_2} = \frac{(3.3)(450) + (6.6)(-900)}{3.3 + 6.6} = -450\,\text{rev/min}$$

where the minus sign indicates that $\vec{\omega}$ is in the direction of the second disk's initial angular velocity.