81. (a) The rotational inertia relative to the specified axis is

$$I = \sum m_i r_i^2 = (2M)L^2 + (2M)L^2 + M(2L)^2$$

which is found to be $I = 4.6\ \text{kg}\cdot\text{m}^2$. Then, with $\omega = 1.2$ rad/s, we obtain the kinetic energy from Eq. 11-27:

$$K = \frac{1}{2}I\omega^2 = 3.3\ \text{J}\ .$$

(b) In this case the axis of rotation would appear as a standard y axis with origin at P. Each of the $2M$ balls are a distance of $r = L\cos 30^\circ$ from that axis. Thus, the rotational inertia in this case is

$$I = \sum m_i r_i^2 = (2M)r^2 + (2M)r^2 + M(2L)^2$$

which is found to be $I = 4.0\ \text{kg}\cdot\text{m}^2$. Again, from Eq. 11-27 we obtain the kinetic energy

$$K = \frac{1}{2}I\omega^2 = 2.9\ \text{J}\ .$$