70. The speed of the center of mass of the car is $v = (40)(1000/3600) = 11$ m/s. The angular speed of the wheels is given by Eq. 12-2: $\omega = v/R$ where the wheel radius R is not given (but will be seen to cancel in these calculations).

(a) For one wheel of mass $M = 32$ kg, Eq. 11-27 gives (using Table 11-2(c))

$$K_{\text{rot}} = \frac{1}{2}I\omega^2 = \frac{1}{2}\left(\frac{1}{2}MR^2\right)\left(\frac{v}{R}\right)^2 = \frac{1}{4}Mv^2$$

which yields $K_{\text{rot}} = 9.9 \times 10^2$ J. The time given in the problem (10 s) is not used in the solution.

(b) Adding the above to the wheel's translational kinetic energy, $\frac{1}{2}Mv^2$, leads to

$$K_{\text{wheel}} = \frac{1}{2}Mv^2 + \frac{1}{4}Mv^2 = \frac{3}{4}(32)(11)^2 = 3.0 \times 10^3 \text{ J} .$$

(c) With $M_{\text{car}} = 1700$ kg and the fact that there are four wheels, we have

$$\frac{1}{2}M_{\text{car}}v^2 + 4\left(\frac{3}{4}Mv^2\right) = 1.2 \times 10^5 \text{ J} .$$