40. The deceleration a of the car is given by $v_f^2 - v_i^2 = -v_i^2 = 2ad$, or

$$a = -\frac{[(90\,\text{km/h})(10^3\,\text{m/km})(1\,\text{h}/3600\,\text{s})]^2}{2(80\,\text{m})} = -3.9\ \text{m/s}^2\ .$$

The time t it takes for the car to stop is then

$$t = \frac{v_f - v_i}{a} = -\frac{(90\,\text{km/h})(10^3\,\text{m/km})(1\,\text{h}/3600\,\text{s})}{-3.9\,\text{m/s}^2} = 6.4\ \text{s}\ .$$

The average rate at which thermal energy is produced is then

$$P = \frac{\frac{1}{2}mv_i^2}{t} = \frac{(1500\,\text{kg})[(90\,\text{km/h})(1000\,\text{m/km})(1\,\text{h}/3600\,\text{s})]^2}{2(6.4\,\text{s})} = 7.3 \times 10^4\ \text{W}\ .$$