Problem 1

> Consider a hybrid car that has 400kJ of kinetic energy at certain speed. The car's regenerative braking is 37% efficient ($\eta = 0.37$) at converting kinetic energy ($E_k = \frac{1}{2}mv^2$) to energy stored in a battery. When the car comes to a complete stop, what is the energy, ΔE, added to the car's battery?

37% of the kinetic energy are stored back into the battery, according to the problem. Therefore,

$$\Delta E = 0.37 \cdot 400\text{kJ} = \boxed{148\text{kJ}}$$

(The significant digits = 3)

Problem 2

> If a battery is labeled at 1.5V and 400mAh, how much energy does it store?

The energy is

$$E = 1.5\text{V} \cdot 400\text{mAh} = 1.5\text{V} \cdot 400 \cdot 0.001\text{A} \cdot 3600\text{s} = \boxed{2.16 \cdot 10^3\text{J}}$$

(The significant digits = 3)