67. The momentum before the collision (with $+x$ rightward) is

$$(6.0\text{ kg})(8.0\text{ m/s}) + (4.0\text{ kg})(2.0\text{ m/s}) = 56\text{ kg}\cdot\text{m/s}\ .$$

(a) The total momentum at this instant is $(6.0\,\text{kg})(6.4\,\text{m/s}) + (4.0\,\text{kg})\vec{v}$. Since this must equal the initial total momentum (56, using SI units), then we find $\vec{v} = 4.4$ m/s.

(b) The initial kinetic energy was

$$\frac{1}{2}(6.0\text{ kg})(8.0\text{ m/s})^2 + \frac{1}{2}(4.0\text{ kg})(2.0\text{ m/s})^2 = 200\text{ J}\ .$$

The kinetic energy at the instant described in part (a) is

$$\frac{1}{2}(6.0\text{ kg})(6.4\text{ m/s})^2 + \frac{1}{2}(4.0\text{ kg})(4.4\text{ m/s})^2 = 162\text{ J}\ .$$

The "missing" 38 J is not dissipated since there is no friction; it is the energy stored in the spring at this instant when it is compressed. Thus, $U_e = 38$ J.