Question 1

Two small bulbs are on for different amounts of time. The currents and times are as indicated.

Wire	Current	Time On
Bulb A	$0.20\,\mathrm{A}$	$100\,\mathrm{s}$
Bulb B	$0.10\,\mathrm{A}$	$400\,\mathrm{s}$

Which of the following is true while the bulbs are on?

1. The total charge flowing through B is the same as that of A.
2. The total charge flowing through B is smaller than that of A.
3. The total charge flowing through B is larger than that of A.

Question 2

A bulb is connected to a battery. When the switch is closed the bulb lights up and also produces heat.

Which of the following is true?

1. Switch closed $\rightarrow$ battery loses energy;
   Switch open $\rightarrow$ battery loses energy.
2. Switch closed $\rightarrow$ battery loses energy;
   Switch open $\rightarrow$ battery gains energy.
3. Switch closed $\rightarrow$ battery loses energy;
   Switch open $\rightarrow$ battery energy constant.
4. Switch closed $\rightarrow$ battery energy constant;
   Switch open $\rightarrow$ battery loses energy.
5. Switch closed $\rightarrow$ battery energy constant;
   Switch open $\rightarrow$ battery gains energy.
6. Switch closed $\rightarrow$ battery energy constant;
   Switch open $\rightarrow$ battery energy constant.

Question 3

A $9.0\,\mathrm{V}$ battery is connected to a bulb. In a certain period of time, total charge $1\,\mathrm{C}$ of charge flows around the circuit. In a later period of time, total charge $3\,\mathrm{C}$ flows around the circuit.

Consider the amount of energy that the bulb supplies to the two collections of charge. Which of the following is true?

1. Supplies $9.0\,\mathrm{J}$ to $1\,\mathrm{C}$ and also to $3\,\mathrm{C}$.
2. Supplies $9.0\,\mathrm{J}$ to $1\,\mathrm{C}$ and $27\,\mathrm{J}$ to $3\,\mathrm{C}$.
3. Supplies $9.0\,\mathrm{J}$ to $1\,\mathrm{C}$ and $3\,\mathrm{J}$ to $3\,\mathrm{C}$.