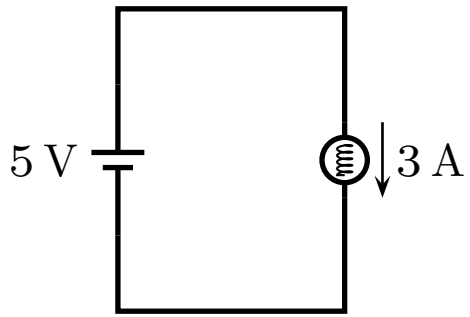
Question 1

A bulb is connected to a battery as illustrated.



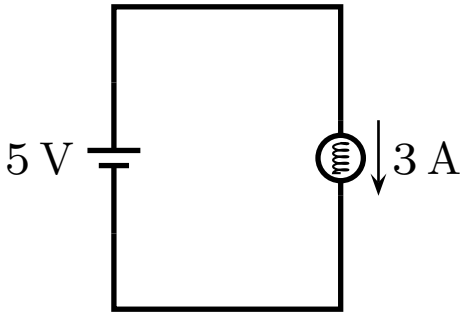
The current through the bulb and potential difference across the battery are indicated. The wires offer negligible resistance.

Which of the following is true?

1. In $10\,\mathrm{s}$ the total charge that flows through the bulb is $3\,\mathrm{C}$ and through the battery $3\,\mathrm{C}$.
2. In $10\,\mathrm{s}$ the total charge that flows through the bulb is $5\,\mathrm{C}$ and through the battery $5\,\mathrm{C}$.
3. In $10\,\mathrm{s}$ the total charge that flows through the bulb is $30\,\mathrm{C}$ and through the battery $5\,\mathrm{C}$.
4. In $10\,\mathrm{s}$ the total charge that flows through the bulb is $30\,\mathrm{C}$ and through the battery $30\,\mathrm{C}$.
5. In $10\,\mathrm{s}$ the total charge that flows through the bulb is $30\,\mathrm{C}$ and through the battery $50\,\mathrm{C}$.

Question 2

A bulb is connected to a battery as illustrated.



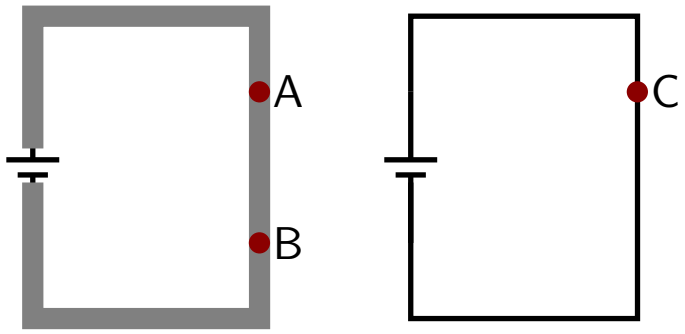
The current and potential difference across the battery are indicated. The wires offer negligible resistance.

In $2\,\mathrm{s}$ a total of $6\,\mathrm{C}$ moves from the positive to negative terminal of the battery. Which of the following is true?

1. The energy lost by this charge is $0\,\mathrm{J}$.
2. The energy lost by this charge is $3\,\mathrm{J}$.
3. The energy lost by this charge is $5\,\mathrm{J}$.
4. The energy lost by this charge is $6\,\mathrm{J}$.
5. The energy lost by this charge is $30\,\mathrm{J}$.

Question 3

Two identical batteries are connected in two different scenarios as illustrated. In the scenario on the left a thicker wires (smaller resistance) are used.

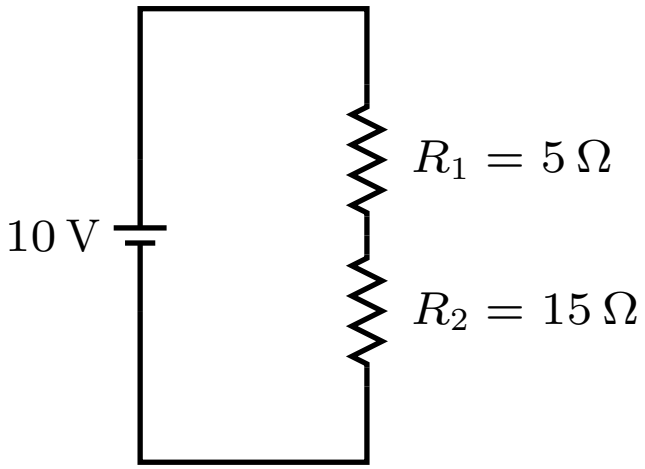


Which of the following represents the rank of the magnitude of the currents?

1. $I_A = I_B = I_C$
2. $I_A = I_B > I_C$
3. $I_C > I_A = I_B$
4. $I_B > I_A = I_C$
5. $I_C = I_A > I_B$

Question 4

Consider the following circuit.



Which of the following best represents the potential difference across each of the resistors?

1. $\Delta V_1 = \frac{1}{3}\,\Delta V_2$
2. $\Delta V_1 = \frac{1}{2}\,\Delta V_2$
3. $\Delta V_1 = \Delta V_2$
4. $\Delta V_1 = 3\Delta V_2$
5. Not enough info/none of the above.