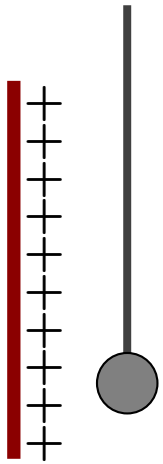
Question 1

A small neutral conductor is placed near to a positively charged sheet.

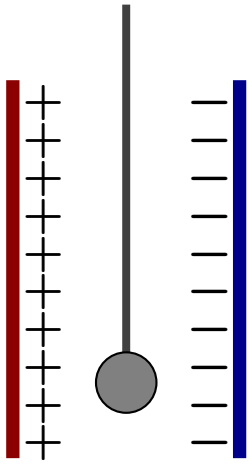


Which of the following best describes the subsequent motion of the ball?

1. The ball is immediately repelled from the plate.
2. The ball is attracted to the plate and then adheres to the plate.
3. The ball is attracted to the plate, then moves away from the plate, coming to rest at an angle to the left of vertical.
4. The ball is attracted to the plate, then moves away from the plate, coming to rest in a vertical position.
5. The ball is attracted to the plate, then moves away from the plate, coming to rest at an angle to the right of vertical.

Question 2

Two capacitor plates are closely separated. A conducting ball is placed between them. The plates are connected to a power supply, allowed to charge and then disconnected from the power supply.



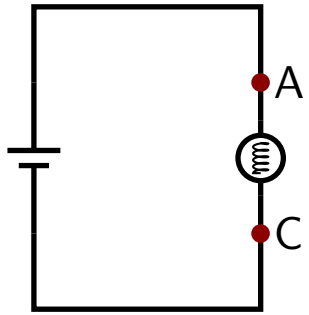
The ball is initially attracted to one of the plates.

Which of the following is subsequently true?

1. The ball sticks to the plate to which it was attracted.
2. The ball is repelled and hangs midway between the plates
3. The ball is repelled to the opposite plate and sticks to that plate.
4. The ball bounces back and forth between the plates.

Question 3

A bulb is connected to a battery as illustrated.

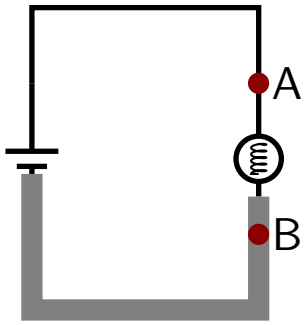


Which of the following is true for the currents at different points?

1. $I_{\text{A}} = I_{\text{bulb}} = I_{\text{C}}$
2. $I_{\text{A}} > I_{\text{bulb}} > I_{\text{C}}$
3. $I_{\text{A}} = I_{\text{C}} > I_{\text{bulb}}$
4. $I_{\text{A}} < I_{\text{bulb}} < I_{\text{C}}$

Question 4

A bulb is connected to a battery as illustrated. A thicker wire is used to connect one terminal of the bulb to the battery.

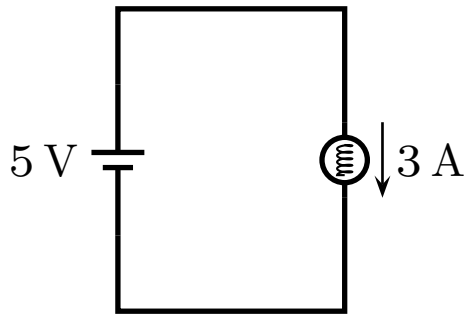


Which of the following represents the rank of the magnitude of the currents?

1. $I_A = I_B$
2. $I_A > I_B$
3. $I_B > I_A$

Question 5

A bulb is connected to a battery as illustrated.



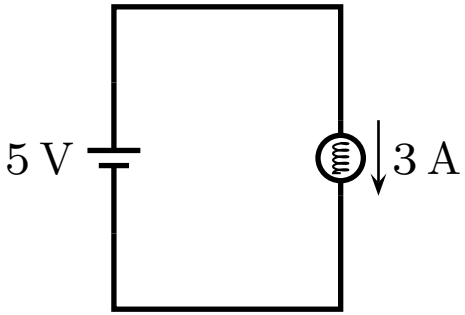
The current through the bulb and potential difference across the battery are indicated. The wires offer negligible resistance.

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 6

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 $30\,\mathrm{J}$.