

## Definition of Electrical Current

Electrical current is a fundamental concept in the field of physics and plays a crucial role in our daily lives. Current refers to the rate at which electric charges flow through a conductor. It measures how quickly charge moves through a wire or circuit over a specific period.

Current is given the symbol "I" and is measured in amperes (A). One ampere is equal to one coulomb of charge flowing per second. So, if one coulomb of charge moves through a wire in one second, the current flowing through that wire is one ampere.

## Relationship Between Charge, Current, and Time

The amount of charge transferred through a conductor can be found using the relationship:

$$Q = I \times t$$

where Q represents the charge in coulombs, I represents the current in amperes, and t represents the time in seconds. This equation allows us to solve problems involving charge, current, and time.

For example, if a current of 2 amperes flows through a wire for 5 seconds, the total charge transferred would be:

$$Q = 2 \text{ A} \times 5 \text{ s} = 10 \text{ C}$$

By knowing the current and the time, we can find the amount of charge transferred.

## Alternating Current vs. Direct Current

There are two types of electrical currents: alternating current (AC) and direct current (DC). The main difference between them lies in the direction of the flow of charges.

**Alternating Current (AC):** AC is a type of current in which the direction of the flow of charges changes periodically. It alternates between flowing in one direction and then reversing to flow in the opposite direction. AC is commonly used in our homes to power appliances and devices.

**Direct Current (DC):** DC is a type of current that flows in a single direction. The charges move from the positive terminal to the negative terminal of a power source without changing their direction. Batteries and solar cells make DC power.

## Identifying the Type of Current

To show whether a source is AC or DC, we can make use of tools like an oscilloscope or data logging software. An oscilloscope is a device that displays the waveforms of electrical signals. When connected to a circuit, it can show the shape of the current waveform.

If the current waveform on the oscilloscope shows a pattern that continuously changes direction, it shows an alternating current (AC) source. On the other hand, if the current waveform stays constant in one direction without any change, it suggests a direct current (DC) source.

Understanding the difference between AC and DC is essential in various applications, such as designing electrical circuits and troubleshooting electrical issues.

Remember, the concept of electrical current stands for the rate at which charges flow through a conductor. By understanding the relationship between charge, current, and time, as well as the two types of currents, you are equipped with the knowledge to explore and solve problems related to electrical circuits and devices.

## Questions

- Define electrical current?
  - The flow of electric charge through a conductor
  - The measure of the rate of flow of charges
  - The movement of electrons in a circuit
  - The resistance in an electrical circuit
  - The voltage across a circuit
- Which unit is used to measure current?
  - Watts
  - Joules
  - Amperes
  - Volts
  - Ohms
- What is the relationship between charge, current, and time?
  - $Q = I + t$
  - $Q = I - t$
  - $Q = I \times t$
  - $Q = I / t$
  - $Q = I^t$
- What is the main difference between alternating current (AC) and direct current (DC)?
  - AC flows in one direction, while DC changes direction periodically
  - AC is used in homes, while DC is used in industries
  - AC is produced by batteries, while DC is produced by generators
  - AC is measured in volts, while DC is measured in amperes
  - AC changes direction periodically, while DC flows in one direction
- What would you look at to find the type of current using an oscilloscope?
  - By measuring the voltage across the circuit
  - By observing the resistance of the circuit
  - By analysing the frequency of the current
  - By observing the shape of the current waveform
  - By measuring the power consumed by the circuit
- Which of the following is the correct equation to calculate the amount of charge transferred through a conductor?
  - $Q = V \times I$
  - $Q = R / I$
  - $Q = P \times t$
  - $Q = I / R$
  - $Q = I \times t$
- If a current of 3 amperes flows through a wire for 10 seconds, what is the total charge transferred?
  - 3 C
  - 7 C
  - 10 C
  - 20 C
  - 30 C

8. Which type of current is used to power most of the appliances and devices in our homes?

- A. Direct Current (DC)
- B. Alternating Current (AC)
- C. Static Current (SC)
- D. Pulsating Current (PC)
- E. Irregular Current (IC)

9. Which of the following devices can be used to identify the type of current in a circuit?

- A. Voltmeter
- B. Ammeter
- C. Oscilloscope
- D. Multimeter
- E. Resistor

10. What is the unit of measurement for current?

- A. Amperes
- B. Ohms
- C. Watts
- D. Coulombs
- E. Volts

11. What is the unit of measurement for electrical charge?

- A. Amperes
- B. Ohms
- C. Watts
- D. Coulombs
- E. Volts

## Answers

1 B

2 C

3 C

4 E

5 D

6 E

7 E

8 B

9 C

10 A

11 D