



Al-Mustaqbal University
College of Science
Department of Forensic Evidence
First Stage



جامعة المستقبل
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LECTURE (2)

Electricity and Magnetism
What is Electricity

First stage

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What is Electricity?

- A. We use electricity every day. Our homes, stores, and workplaces depend on electricity.
- B. Electricity usually means the flow of something called electric current in wires, motors, light bulbs, and other devices.
- C. Electric current flows through solid metal so we cannot usually see it.
- D. Electric current can carry energy over great distances. That's why you can have an electric company hundreds of miles away from your house and still have electricity.
- E. Electric current can be very powerful. An electric motor the size of a basketball can do as much work as 15 strong men or women. This great power can also be very dangerous.

Charges

❖ Charges come in 3 main forms;

➤ Objects can be positive, negative, or neutral.

1. Positive - A positive object has lost electrons, so it has more protons than electrons.
2. Negative - A negative object has gained electrons, so it has more electrons than protons.
3. Neutral - A neutral (No charge) object has an equal amount of protons and electrons.

➤ The unit of charge is the coulomb (C).

C. Charge comes in two forms - positive and negative charge.

D. Like charges repel each other, and unlike charges attract. That means that a positive charge and a positive charge will push away from each other. The same thing happens with a negative charge and a negative charge. A positive and a negative charge will come together.



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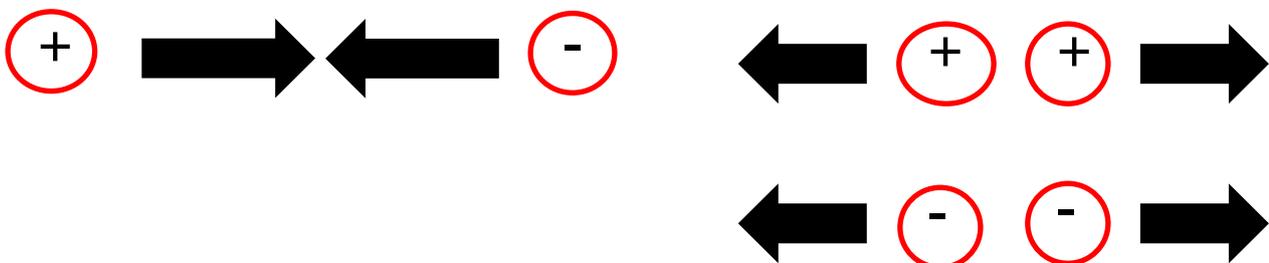
E. The forces between positive and negative charges are called electrostatic forces. Electrostatic forces are extremely strong - electrostatic forces hold all matter together.

F. Most matter is electrically neutral - The amount of positive charge in an object is exactly equal to the amount of negative charge in an object. The total charge is zero.

G. The unit of charge is the coulomb - it is abbreviated C.

H. The protons in an atom carry a positive charge and the electrons in an atom carry a negative charge.

- In an atom, protons are held together in the nucleus by strong nuclear forces, but electrons are free to move around.
- Electricity is caused by moving electrons.
- Electricity comes from electrons moving between atoms. **NOT PROTONS!!!**
- Electric charges are from protons, which are positive, and electrons which are negative .
- Atoms become charged by gaining or losing electrons.
- Law of Conservation of Charge – electric charges can be transferred from object to object, but it cannot be created or destroyed.
- Positive and negative charges exert forces on each other.



Static Electricity – accumulation of excess electric charges on an object

When you rub your socks on the carpet electrons are flowing from the ground to your socks building up static electricity.



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Static Discharge - is the release or balancing effect of excess charges that have accumulated on an object.

When you touch or “Shock” someone, you are discharging that accumulation of charge.

Lightning is static discharge on a 100x level.

Electric Current

I. Voltage

A. Review - Remember that a circuit is something that provides a path through which energy in the form of electricity moves.

B. A circuit contains several parts - an energy source, wires, and sometimes switches or things that use energy, like light bulbs.

C. We can measure the energy level of any place in a circuit. To measure electrical energy, we use a unit called volts.

II. Current

A. In a circuit, energy flows from places of high voltage to places of low voltage. Electrical current is the term used to describe this flow of energy.

B. Current is actually the flow of negative charges through a circuit. Current can be thought of as how much charges flows through a wire per second

Current in Your Home

The electricity in your house uses alternating current, or AC current. This means the direction of current goes back and forth. In electrical systems in the US, the current reverses direction 60 times per second. In Europe, the AC current



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reverses direction only 50 times per second, and the voltage is different, so adapters are needed for electric devices made in the US.

Each wall socket you see in your house has three holes - and each hole has a wire attached to it inside the wall. One wire is the hot wire, which carries 120 Volts AC. The second wire stays neutral and carries no volts. The third wire is a ground wire which is connected to the actual ground near your home - if there is a short circuit in your appliance, the current will flow through the ground wire instead of through you

The current from a battery does not alternate. A battery only makes current that flows in one direction. This is called direct current, or DC current



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Question

1_ Electricity usually means:

- A. Flow of protons
- B. Flow of electric current
- C. Flow of neutrons
- D. Flow of atoms

2_ The unit of electric charge is:

- A. Volt
- B. Ampere
- C. Coulomb
- D. Watt

3_ A negative object has:

- A. More protons than electrons
- B. More electrons than protons
- C. Equal electrons and protons
- D. No electrons

4_ Like charges:

- A. Attract each other
- B. Repel each other
- C. Do nothing
- D. Become neutral

5_ Electricity is caused by the movement of:

- A. Protons
- B. Neutrons
- C. Electrons
- D. Nucleus



6_ Static electricity means:

- A. Moving current
- B. Accumulation of charges
- C. Loss of electrons
- D. Magnetic field

7_ Lightning is an example of:

- A. Magnetic force
- B. Static discharge
- C. Nuclear force
- D. Thermal energy

8_ Current in homes is:

- A. DC
- B. AC
- C. Static
- D. Neutral

9_ Current from batteries is:

- A. AC
- B. DC
- C. Static
- D. Neutral

10_ A circuit provides:

- A. Path for electricity
- B. Source of heat
- C. Storage of electrons
- D. Magnetic force