

23 Lecture - PHY101

Important Subjective

What is electric charge, and what are the two types of charges?

Answer: Electric charge is a fundamental property of matter that arises from the presence of charged particles. The two types of charges are positive and negative.

What is Coulomb's law, and how is it related to electric charges?

Answer: Coulomb's law states that the force of attraction or repulsion between two charged particles is proportional to the product of their charges and inversely proportional to the square of the distance between them. This law describes the relationship between electric charges.

What is an electric field, and how is it represented?

Answer: An electric field is a vector field that describes the force that would be exerted on a charged particle placed at any point in space. It is represented by electric field lines, which are drawn in the direction of the force on a positive test charge.

What is Gauss's law, and how is it useful in electrostatics?

Answer: Gauss's law relates the electric field to the charge distribution in space. It states that the electric flux through any closed surface is proportional to the total charge enclosed by that surface. This law is useful in calculating the electric field in various situations.

What is the potential difference, and how is it measured?

Answer: The potential difference is the amount of work done per unit charge in moving a test charge from one point to the other against the electric field. It is measured in volts (V).

What is the electric potential energy, and how is it related to the potential difference?

Answer: The electric potential energy of a charged object in an electric field is defined as the amount of work done in bringing the object from infinity to that point in the field. It is related to the potential difference by the equation $\Delta U = q\Delta V$, where ΔU is the change in electric potential energy, q is the charge, and ΔV is the potential difference.

What is capacitance, and how is it related to the charge and potential difference of a capacitor?

Answer: Capacitance is the ratio of the charge on each plate of a capacitor to the potential difference between the plates. It is related to the charge and potential difference by the equation $C=q/V$, where C is the capacitance, q is the charge, and V is the potential difference.

What is dielectric constant, and how does it affect the capacitance of a capacitor?

Answer: Dielectric constant is a measure of the ability of a material to store electrical energy in an electric field. It affects the capacitance of a capacitor by increasing it, as it reduces the electric field between the plates and allows more charge to be stored.

What is the difference between an insulator and a conductor?

Answer: An insulator is a material that does not conduct electricity, while a conductor is a material that allows electricity to flow through it.

How is the electrostatic force different from other fundamental forces of nature?

Answer: The electrostatic force is the strongest of the four fundamental forces of nature, and it has an infinite range. It is also different from the other forces because it can be both attractive and repulsive, depending on the charges involved.