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Lect.6

Electricity

Electrostatic:

is the study of charges at rest.

Electric current:

is the study of charges at motion.

Charge:

*is the fundamental quantity of electricity and it have two kinds:
positive charge and negative charge*

Rules of charges:

Alike charges are attracted .

Different charge are repulse.

Charges are measured by Coulomb.

One Coulomb = 6.24×10^{18} e (negative charge)

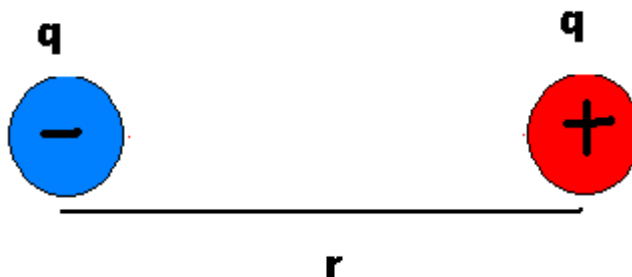
One Coulomb = 6.24×10^{18} p (positive charge)



Electric force:

*the electric force which each charge exerts on the other can be calculated by
Coulomb's law:*

$$F = \frac{(K q_1 q_2)}{(r^2)}$$



$$k = 9 \times 10^9 \text{ N m}^2 \text{ Col}^{-2} \quad k = 1/4\pi\epsilon_0$$

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$\epsilon_0 = 8.854 \times 10^{-12} \text{ F m}^{-1}$ electric constant

Electric field: (E)

is the space surround the charge and it given by:

$$E = F/q$$

$$E = 1/4\pi\epsilon_0 (q/r^2)$$

Electric potential (V)

is the potential difference due to the charge and is given by:

$$V = 1/4\pi\epsilon_0 (q/r)$$

Conductors are materials like metals such as, gold, silver, and copper.

Insulators are materials like non-metals such as, wood, plastic and mica.

Capacitor:

is an electric device consists of two conductor plates and an insulator plate in between.



The capacitance of the capacitor is calculated by

$$C = Q/V$$

Q is the total charge of the capacitor, V is the electric potential between the capacitor plates.