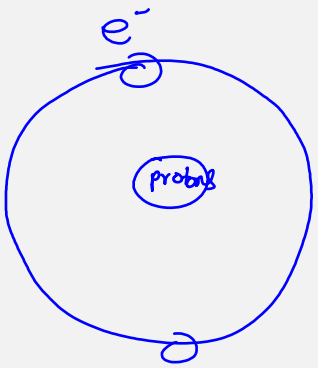


4.2.1 Electrical charge

Charges

positive (protons)

negative (electrons)

Unit of Charge

coulombs (C)

charge on 1 electron = charge on 1 proton = 1.6×10^{-19} C

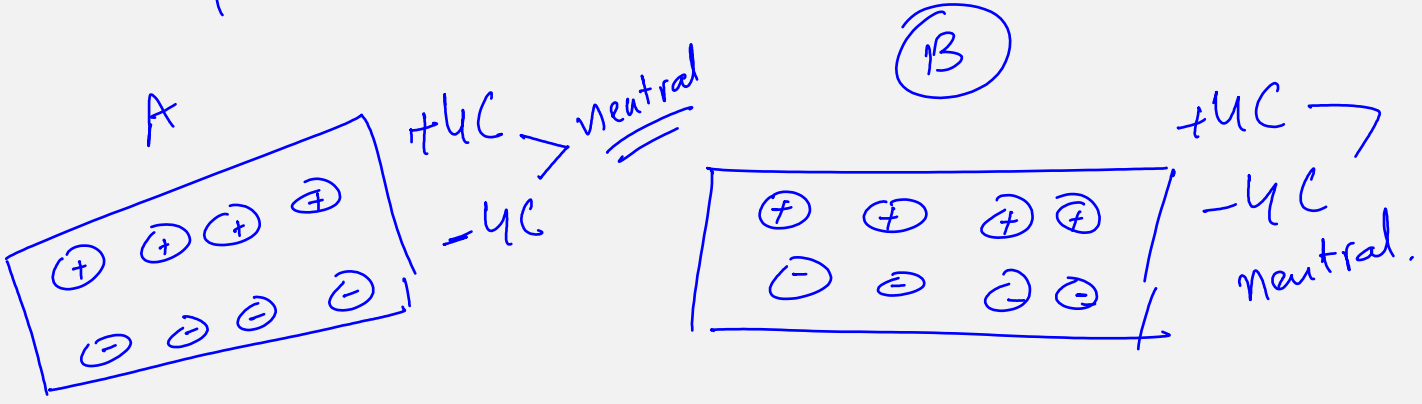
Charging by friction

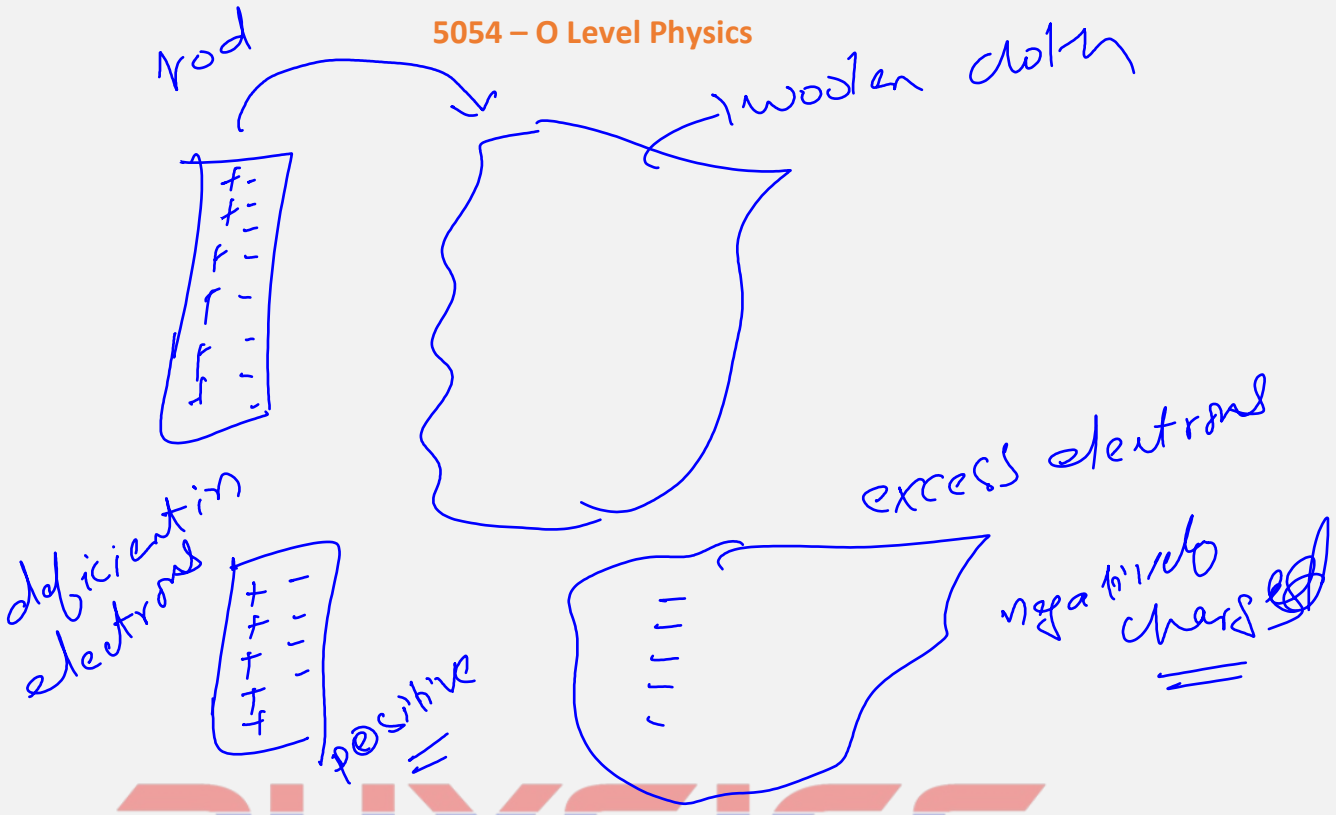
When two surfaces rub against each other the electrons get energy. This causes the electrons to transfer from one surface to another.

The surface that loses electrons becomes positively charged.

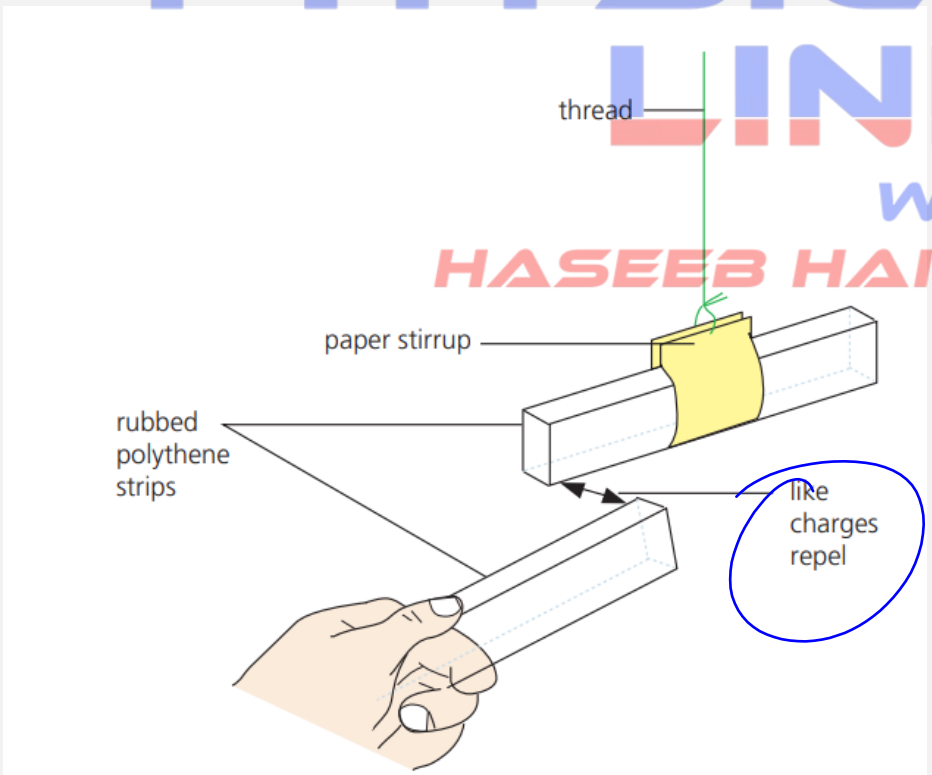
The surface which accepts the electrons becomes negatively charged.

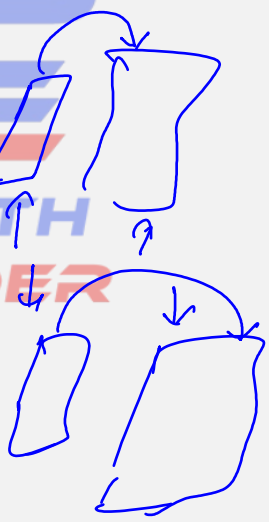
CHARGING NEVER INVLOVES TRANSFER OF PROTONS





Force between the charges





attraction b/w opposite charges

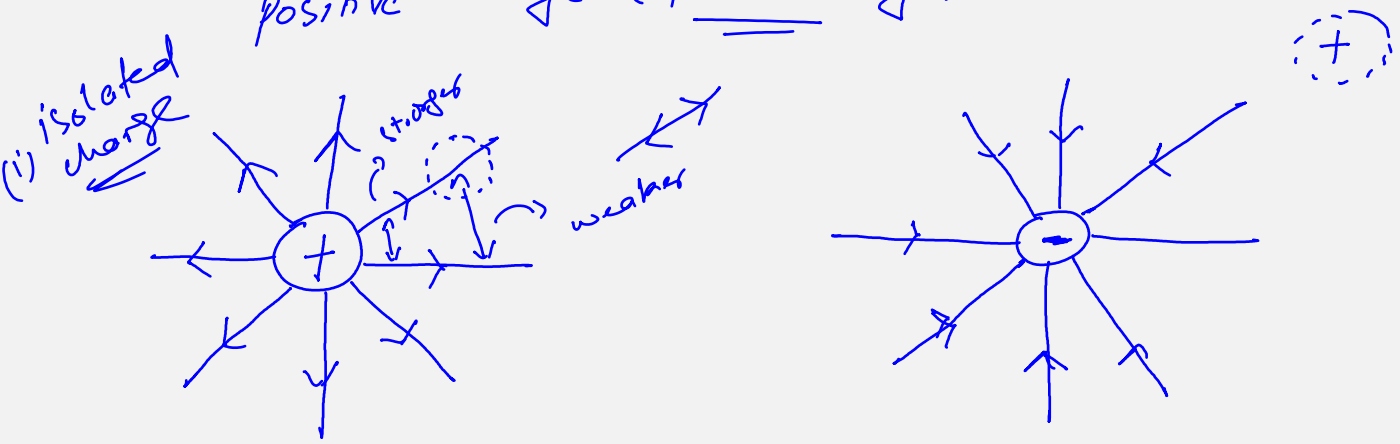
Repulsion b/w same/like charges

Electric Field

A region in which an electric charge experiences a force.

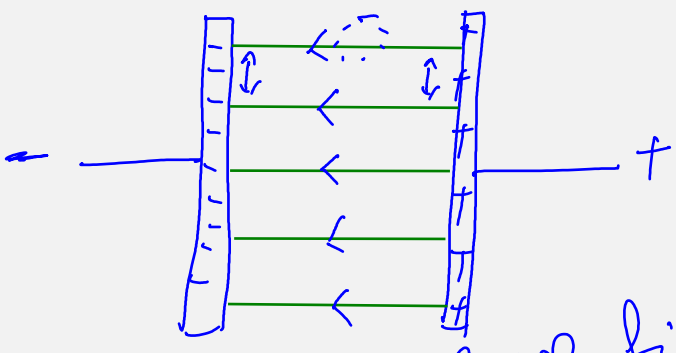
positive charge (test charge)

(i) isolated charge



(ii) charged sphere.

(iii) B/w oppositely charges plates
↳ parallel &



uniform field,

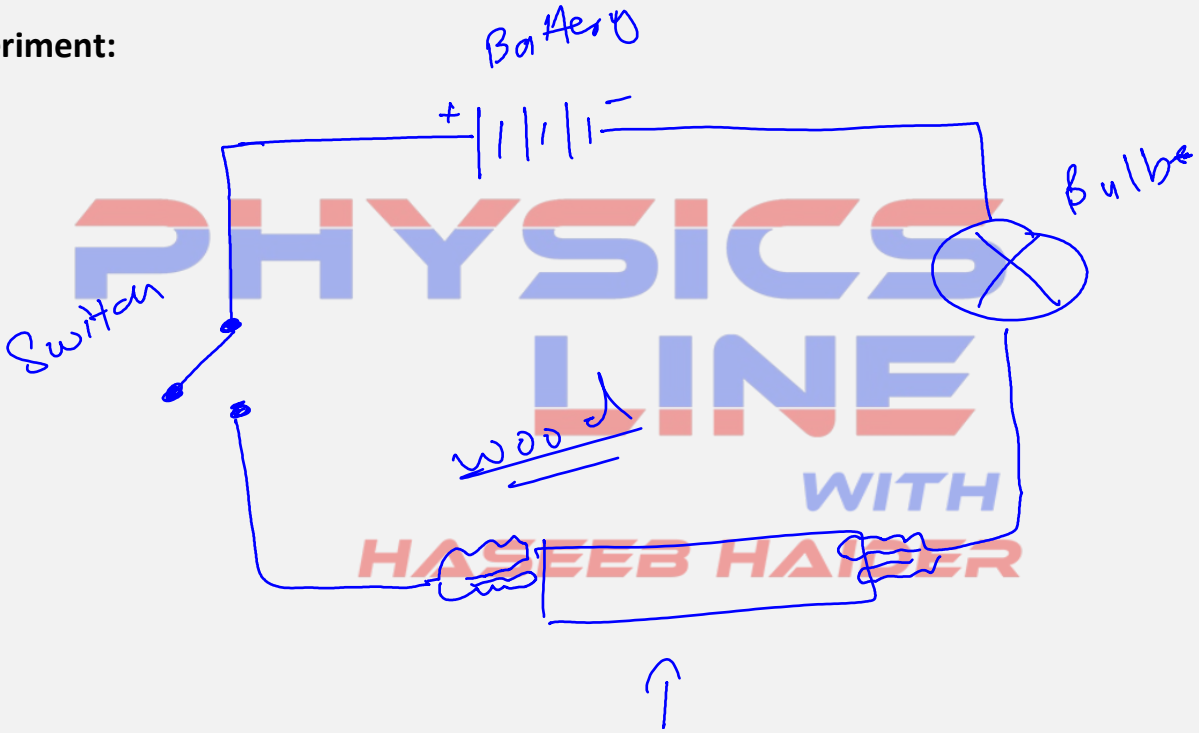
- *Field line is in the direction of force that a positive charge will experience.*
- *The negative charge will experience a force in the direction opposite to the field line.*
- *Closer the field lines stronger will be the field*

Insulators vs Conductors

Insulators have *tightly bound electrons* that cannot help in conducting the charge. So materials like nylon, polythene, Perspex and cellulose acetate accumulate static charge.

Conductors have free electrons that can conduct the excess charge as soon as it develops.

Experiment:



Connect the material between crocodile clips.
turn on the switch
if the bulb glows brightly then the material is a conductor.
if the bulb's light is dim then the material is a bad conductor of charge.