Electric field 1

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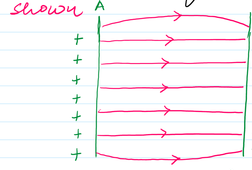
"ELECTRICITY"

Concept of Electric field.

- Electric field is a region around any charge particle where other point charges if placed, they will experience either an attractive force or a repulsive force

- Electric fields are classified as "Uniform" or "Non-uniform"

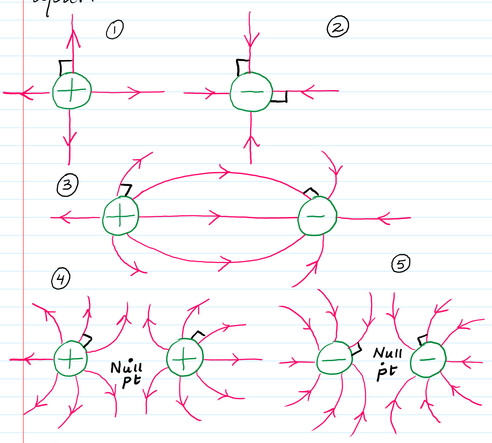
① Uniform Electric field is one in which field Lines are Parallel and Equidistant apart as shown



Property :
No matter wherever the charge is placed, it experiences the SAME force.

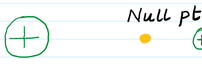
direction of E·F = from +ve to -ve
OR
from a higher potential towards a lower potential.

② Non-Uniform Electric field is one in which the field Lines are neither parallel nor equidistant apart.

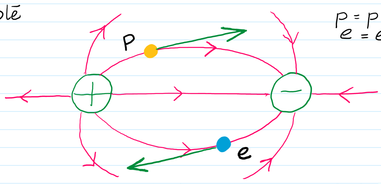


- for identical charges, null pt is in the Centre

- for Non identical charges, Null pt is further away from Larger charge & closer to the Smaller one as shown



Note



p = proton
e = electron

proton moves in the direction of the Electric field by making a TANGENT with the field Lines.

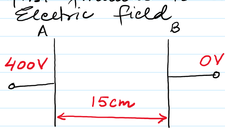
electron moves opposite to the direction of a Electric field again by making a TANGENT with the field Lines.

* mass of proton = 1.66×10^{-27} kg
Charge of proton = 1.6×10^{-19} C
mass of electron = 9.11×10^{-31} kg
Charge of electron = -1.6×10^{-19} C
"Given in Exams"

How can we calculate Electric field Strength"

- Electric field Strength is denoted by the symbol "E"
- It can be calculated using 2 formulas

first formula is "only" for Uniform Electric field



$$E = \frac{V}{d}$$ units Vm^{-1}

$$E = \frac{400}{15 \times 10^{-2}}$$

V = Voltage / potential diff $E = 2670\ Vm^{-1}$

d = distance b/w the plates

Second formula is used to define Electric field Strength & this is a universal formula i.e it can be used for both uniform & non-uniform Electric field.

definition

Electric field Strength is defined as force per unit +ve charge.

$$E = \frac{F}{q} \quad \text{or} \quad F = Eq$$

unit NC^{-1}