24/02/23 : Applied Physics :

Gauss's law :

➡ The Gausses law applied to any closed surface, (symmetric) and simplify the calculations of Electric field sorrounded a charge (distribution) distribution.

The flow of electric flux can be given this :

$$\Phi = \oint E \cdot dA$$ — E flux

Phi (define close surface) Through G.S.

integer

★ So, the Gausses law state that the total flux through a closed surface charge "q" is given by

$$\boxed{\varepsilon_0 \Phi = q}$$

$$\varepsilon_0 \oint E \cdot dA = q$$

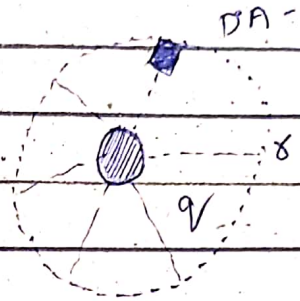
★ Where E is electric field.

★ -dA is small surface area of Guasse's surface.

★ $-\varepsilon_0$ is permittivity "q" amount of charges an Guasses' suface.

Guasses law & Coulomb's law.

→ given a point charge "q".



$\varepsilon_0 \Phi = E \cdot dA = q$

Electric fields radiates outward and will have same values.

$$\varepsilon_0 E \oint dA = q$$

* Now, the integral is sum of all the area dA on the Gauss's surface.

$$\varepsilon_0 E (4\pi r^2) = q$$

→ $$E = \frac{1}{4\pi\varepsilon_0} \frac{q}{r^2}$$