Force between 2 point charges $\vec{F} = \frac{1}{4\pi\varepsilon_0}\frac{q_1 q_2}{r^2}\hat{r}$,

Electric field due to point charge $\vec{E} = \frac{1}{4\pi\varepsilon_0}\frac{q}{r^2}\hat{r}$,

Dipole moment direction from - ve to positive $\vec{p} = 2\vec{a}q$,

Flux enclosed in surface (For Gauss Law) $\Phi = \oint \vec{E}.d\vec{S}$

Electric field due to SHEET $E = \frac{\sigma}{\varepsilon_0}$ Electric field due to LINEAR CHARGE $E = \frac{\lambda}{2\pi\varepsilon_0 r}$,

E due to dipole axial line $E = \frac{1}{4\pi\varepsilon_0}\frac{2pr}{(r^2 - a^2)^2}$ For short dipole $E = \frac{1}{4\pi\varepsilon_0}\frac{2p}{r^3}$

E due to dipole equatorial line $E = \frac{1}{4\pi\varepsilon_0}\frac{p}{(r^2 + a^2)^{3/2}}$ For short dipole $E = \frac{1}{4\pi\varepsilon_0}\frac{p}{r^3}$

Torque on dipole $\tau = \vec{p} \times \vec{E}$ Torque maximum at 90^0 minimum at 0^0 & 180^0

Potential energy of dipole $U = -\vec{p}.\vec{E}$ Energy minimum at 0^0 and max at 180^0

Potential due to point charge $V = \frac{1}{4\pi\varepsilon_0}\frac{q}{r}$; Potential energy of 2 charge system $U = \frac{1}{4\pi\varepsilon_0}\frac{q_1 q_2}{r}$

Relation between Electric field and potential difference $E = -\frac{dV}{dr}$

Capacitance $C = \frac{Q}{V}$ Capacitance of isolated sphere $C = 4\pi\varepsilon_0 R$

Capaitance of parallel plate capacitor $C = \frac{\varepsilon_0 A}{d}$

Energy of capacitor $U = \frac{1}{2}CV^2 = \frac{1}{2}QV = \frac{1}{2}\frac{Q^2}{C}$

Equivalent capacitance of capacitor in PARALLEL $C = C_1 + C_2$ Greater than GREATEST

Equivalent capacitance of capacitor in SERIES $\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2}$ Less than the LEAST

Equivalent capacitance of parallel plate filled with dielectric constant k $C = \frac{\varepsilon_0 kA}{d}$

Equivalent capacitance of parallel plate filled with dielectric slab of thickness 't' $C = \frac{\varepsilon_0 kA}{d - t + t/k}$

Equivalent capacitance of parallel plate filled with conducting slab of thickness 't' $C = \frac{\varepsilon_0 A}{d - t}$

Energy density in parallel plate capacitor $u_E = \frac{1}{2}\varepsilon_0 E^2$

Net potential when C_1 charged to V_1 and C_2 charged to V_2 joined like treminals together

$V = \frac{C_1V_1 + C_2V_2}{C_1 + C_2}$ Energy lost in this case $\Delta U = \frac{C_1C_2(V_2 - V_1)^2}{2(C_1 + C_2)}$

Net potential when C_1 charged to V_1 and C_2 charged to V_2 joined unlike treminals together

$V = \frac{C_1V_1 - C_2V_2}{C_1 + C_2}$