## Electric Potential Energy

→ "Energy of charged particle (body) in an electric field is called Electric Potential Energy."

→ It is denoted by **"U"**.

→ Its unit is **joule, J.**

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## Q. Derive newton/coulomb from volt/meter.

$$\frac{volt}{meter}\left(\frac{V}{m}\right) = \frac{\text{joule/coulomb}}{meter}\left(\frac{J/C}{m}\right)$$

$$= \frac{newton \times meter}{meter \times coulomb}\left(\frac{N \times m}{m \times C}\right)$$

$$= \frac{newton}{coulomb}\left(\frac{N}{C}\right)$$

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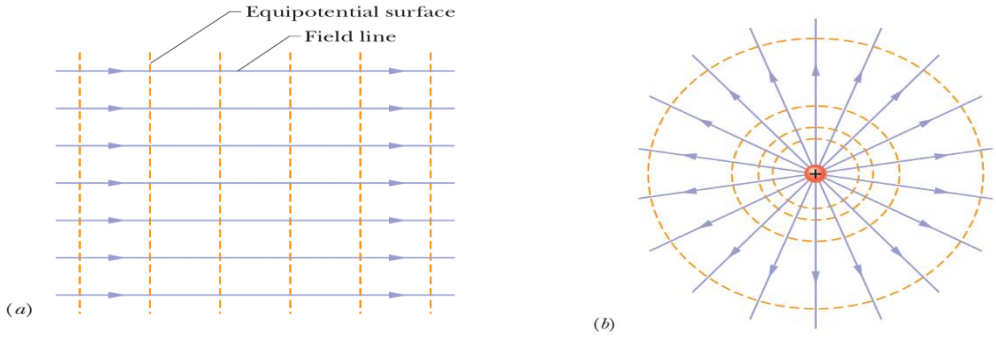
## Equipotential Surface

→ "A surface on which potential has the same value everywhere is called an equipotential surface".

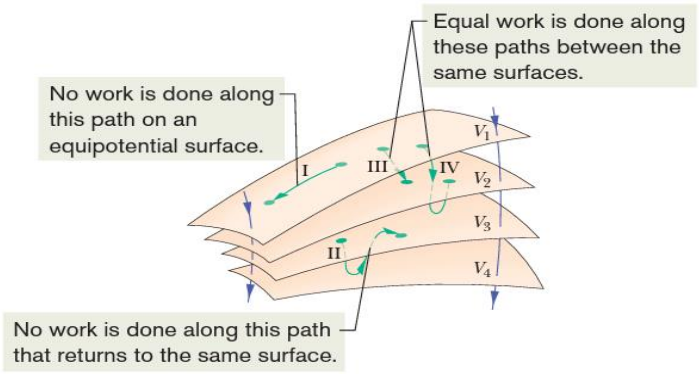



→ Electric field lines must everywhere be perpendicular to the equipotential surfaces.

→ No net work is done by electric forces, when we move a test charge from one point on equipotential surface to another point on the same surface because $\Delta V = 0$.

→ Some work is done when test charge moves from one equipotential surface to another equipotential surface.

$$W_{AB} = -q(V_B - V_A)$$

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**Q. Prove 1eV = 1.602×10$^{-19}$ J.**

1eV = e (1V)

= (1.602×10$^{-19}$ C) (1 J/C)

= 1.602×10$^{-19}$ J Hence Proved.