Quiz 3 Sheet

Thursday, November 1, 2018 6:30 PM

1 V = 1 J/C
1 N/C = 1 V/m
1 eV = $1.6 * 10^{-19}\ C \cdot V$

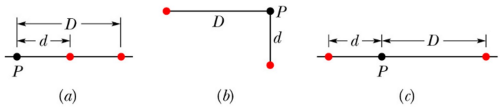
$\vec{E}$ →
+ →
− ←

Potential difference between two points in an electric field

$V = \frac{kq}{r}$ $V = \frac{U}{q}$

$\Delta V = V_f - V_i = \frac{\Delta U}{q} = -\frac{W}{q}$
Definition of potential difference

V is path independent

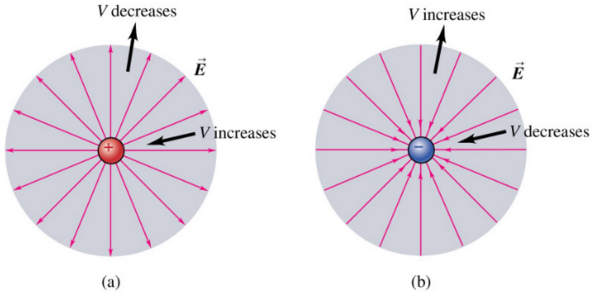


Answer: all equal as protons are the same distance from P

$\vec{E} = \frac{kq}{r^2}\hat{r}$

Potential differences of charge distributions by summing or integrating over point charges

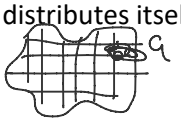
$V = -\int_i^f E \cdot ds$



In both cases, if you move in the direction of E, potential V decreases

The concept of equipotentials
An equipotential is a surface on which the potential is constant.
a conductor in electrostatic equilibrium is an equipotential

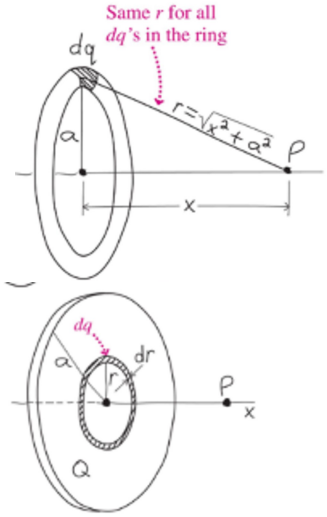
How charge distributes itself on conductors

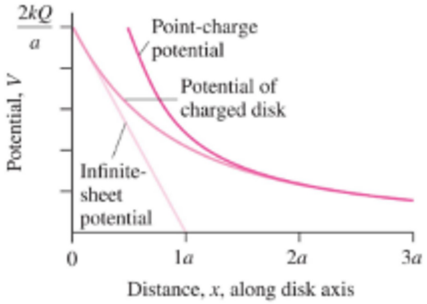


$\int \frac{k\,dq}{r}$

Specific Examples

$$V(x) = \int \frac{k\,dq}{r} = \frac{k}{r}\int dq = \frac{kQ}{\sqrt{x^2 + a^2}}$$





$$V(x) = \frac{2kQ}{a^2}\left(\sqrt{x^2 + a^2} - |x|\right)$$