Electrostatics

Constants

Coulomb's constant, $k = 9\text{x}10^9\ \text{Nm}^2/\text{C}^2$

Charge on electron, $e = -1.602 \times 10^{-19}$ Coulomb

Mass of electron, $m_e = 9.11 \text{ x } 10^{-31}$ kg

Electrostatic Force and Fields

Force

Force Between Two Charges

$$F = \frac{k q_1 q_2}{d^2}$$

Force on a charge in an electric field

$$F = Eq$$

F *- Force, N;* ***E*** *- Electric field strength, N/C;* ***q*** *- charge, C;* ***d*** *- distance between charges, m*

Electric Fields

Field around a charge

$$E = \frac{kQ}{d^2}$$

E *- Field strength, N/C;* ***Q*** *- charge, Coulombs;* ***r*** *- distance from charge, m*

Vectors

Quantities in this document that are set in **dark type** are vectors.

Potential Energy, *U*, & Work, *W*

$$U = qEd$$

$$U = \frac{k q_1 q_2}{d}$$

$$U = \frac{kq^2}{d}$$

$$W = U_f - U_i$$

$$W = Vq$$

U *- Potential energy, J;* ***W*** *- Work, J;* ***q, q_1, q_2*** *- charge, C;* ***E*** *- Field strength, N/C;* ***d*** *- distance, m ;* ***V*** *- potential diff., V*