General Physics 2 | 3rd Quarter
Formula Card
February 20 2022

Chapter 1: Electric Forces & Fields

SI unit of charge is Coulomb C

Electron charge $-e=-1.6\times10^{-19}C$
Proton charge $+e=+1.6\times10^{-19}C$

Coulomb's Law

$$F=k\frac{q_1q_2}{r^2}=\frac{q_1q_2}{4\pi\epsilon_o r^2}$$

where:

- k is a constant $8.99\times10^9 N\frac{m^2}{C^2}$
- q_1 and q_2 are two charges C
- r is the distance m between the charges
- ϵ_o is another constant called permittivity of free space $8.85\times10^{-12}\frac{C^2}{Nm^2}$

Chapter 2: Electric Potential

Point charge force $\vec{F}=q\vec{E}$

Change in potential energy $\Delta PE_{elec}=-W=-F\Delta x=-qE\Delta x$

Electric Potential $PE_{elec}=\frac{kq_1q_2}{r}$

Voltage $V=\frac{PE_{elec}}{q}$
SI unit of voltage/electric potential is Volt V

$$1V=1\frac{J}{C}$$
$$1\frac{V}{m}=1\frac{N}{C}$$

Capacitance $C=\frac{Q}{\Delta V}$
SI unit of capacitance is Farad F

$$1F=1\frac{C}{V}$$

Capacitance in Series $\frac{1}{C_T}=\frac{1}{C_1}+\cdots+\frac{1}{C_n}$
Capacitance in Parallel $C_T=C_1+\cdots+C_n$

Chapter 3: Electric Currents & Circuits

SI unit of current is Ampere A

$$1\,A=1\frac{C}{s}$$

Ohm's Law

$$I=\frac{V}{R}$$

where:

- I is the current A
- V is the voltage V
- and R is the resistance Ω

SI unit of resistance is Ohm Ω

$$1\Omega=1\frac{V}{R}$$

Resistance in Series $R_T=R_1+\cdots+R_n$
Resistance in Parallel $\frac{1}{R_T}=\frac{1}{R_1}+\cdots+\frac{1}{R_n}$

Current in Series $I_T=I_1=\cdots=I_n$
Current in Parallel $I_T=I_1+\cdots+I_n$

Voltage in Series $V_T=V_1+\cdots+V_n$
Voltage in Parallel $V_T=V_1=\cdots=V_2$