LT1 Summary

Constants

Coulomb's Constant: $k = \frac{1}{4\pi\epsilon_0} = 8.99 \times 10^9 \, \mathrm{m^2 C^{-2}}$
Mass of an electron: $m_e = 9.11 \times 10$

Electrical Equations

Coulomb's Law: $\vec{F} = k\frac{q_1 q_2}{r^2}\hat{r}$
Electric Field: $\vec{E} = k\frac{q}{r^2}\hat{r}$
Electric Potential: $V = k\frac{q}{r}$
Electric Flux/Gauss' Law: $\phi_{\text{net}} = \oint_S \vec{E} \cdot d\vec{A} = \frac{q}{\epsilon_0}$

Circuits

Ohm's Law: $V = IR$

Series

Current: $I_{\text{net}} = I_1 = I_2 = I_3 = \dots$
Potential Difference: $V_{\text{net}} = V_1 + V_2 + V_3 + \dots$
Resistance: $R_{\text{net}} = R_1 + R_2 + R_3 + \dots$

Parallel

Current: $I_{\text{net}} = I_1 + I_2 + I_3 + \dots$
Potential Difference: $V_{\text{net}} = V_1 = V_2 = V_3 = \dots$
Resistance: $R_{\text{net}} = \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots\right)^{-1}$

Capacitance

Capacitance Equation: $C = \frac{Q}{V}$ (unit, Farad)
Energy Stored: $\frac{1}{2}QV = \frac{1}{2}CV^2$
Series: $\frac{1}{C_{total}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \dots$
Parallel: $C_{\text{total}} = C_1 + C_2 + C_3 + \dots$