

# R-C-L Components

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## Overview:

This is all about finding the electrical properties of given configurations. In general,

- **Resistance**: Assume  $V \xrightarrow{\text{Def.}} \vec{E} \xrightarrow{\text{Ohm}} \vec{J} \xrightarrow{\text{Def.}} I$ . Finally  $R = \frac{V}{I}$
  - **Capacitance**: Assume  $Q \xrightarrow{\text{Gauss}} \vec{E} \xrightarrow{\text{Def.}} V$ . Finally  $C = \frac{Q}{V}$
  - **Inductance**: Assume  $I \xrightarrow{\text{Ampere}} \vec{B} \xrightarrow{\text{Faraday}} \epsilon$ . Finally  $L = \frac{\epsilon}{\frac{dI}{dt}}$
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## 1 Resistance

By definition, resistance is

### 1.1 Ohm's Law

### 1.2 Addition of Resistance

### 1.3 Conductivity & Microscopic Form of Ohm's Law

### 1.4 Finding Resistance from Configurations

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## 2 Capacitance

### 2.1 Potential & Capacitance

### 2.2 Addition of Capacitance

### 2.3 Finding Capacitance from Configurations

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## **3 Inductance**

### **3.1 Self-Inducance & Mutual Inductance**

### **3.2 Addition of Inductance**

### **3.3 Finding Inductance from Configurations**

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