Module 4, Lecture 8: Review

\[ q_1 = -6.4 \times 10^{-6} \text{ C}; \quad q_2 = 2.8 \times 10^{-6} \text{ C} \]

Where along the x-axis can a third charge \( Q = -8.3 \times 10^{-6} \text{ C} \) be placed such that the resultant force on the third charge is 0?

Electric Potential

An electron is to be accelerated from a velocity of \( 1.00 \times 10^6 \text{ m/s} \) to a velocity of \( 9.90 \times 10^6 \text{ m/s} \). Through what potential difference must the electron pass to accomplish this?

Capacitance

\[ C_1 = 3.4 \mu \text{F}; \quad C_2 = 6.0 \mu \text{F}; \quad V_{ab} = 110 \text{V} \]

The charge on \( C_1 \) is \( 180 \mu \text{C} \).

Calculate the voltage across each capacitor, and the capacitance and charge on \( C_3 \).

Voltage, Power, Current, and Resistance

The power rating of a light bulb is the power it dissipates when connected across a 120-V potential difference.

What is the resistance of a 150 W bulb?

How much current does the 150 W bulb draw?
**Equivalent Resistance, Power**

Each of the three resistors has a resistance of 3.3 Ω and can dissipate power at a maximum rate of 31 W without becoming excessively heated. What is the maximum power the circuit can dissipate?

**Magnetic Force**

A particle with a charge of \(-1.24 \times 10^{-8}\) C is moving with instantaneous velocity of \((4.19i - 3.85j) \times 10^4\) m/s.

a) What is the force exerted on this particle by a magnetic field of 1.4i T?

b) What is the force exerted on this particle by a magnetic field of 1.4k T?

**Magnetic Field**

A closely wound coil has a radius of 6.0 cm and carries a current of 2.5 A. How many turns must it have if, at a point on the coil axis 8.0 cm from the center of the coil, the magnetic field is 6.39 \times 10^{-4}\) T?