

Wednesday Reading Assessment: Unit 1, Capacitance

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1 Memory Bank

- $\vec{E}(x) = -\frac{dV}{dx}$... E-field from voltage.
- $C_{tot}^{-1} = C_1^{-1} + C_2^{-1}$... Total capacitance of two capacitors in series.
- $C_{tot} = C_1 + C_2$... Total capacitance of two capacitors in parallel.

2 Electric Field

1. Suppose a charged system is arranged such that the potential is

$$V(x) = ax^2 + bx + c \quad (1)$$

What is the electric field as a function of x ?

2. What are the units of a , b , and c ?
 - A: Volts per meter, volts per meter, and volts
 - B: Volts, volts, and volts
 - C: Volts per meter-squared, volts per meter, and volts
 - D: Volts per meter, volts per meter-squared, and volts
3. What is the value of the E-field at $x = 1$ m, if $a = 1$, $b = 0.5$ and $c = -1$ (all in the appropriate units)?

3 Capacitance

1. Consider Fig. 1. Suppose each capacitor has a value of $10 \mu\text{F}$. (a) What is the total capacitance in circuit (a) and circuit (b)? (b) What is the total charge stored in each?

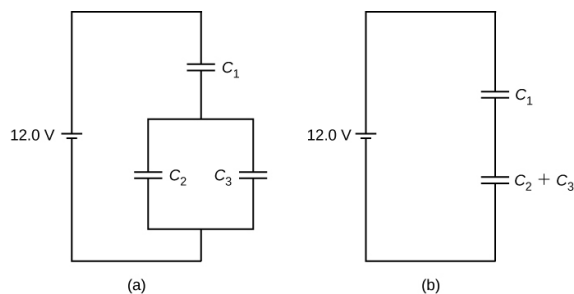


Figure 1: Two systems of capacitors.