Electric Fields – Part 2

Storing Charges

- Capacitors
  - designed to _____ electrical charge
  - made of two_____ separated by an insulator
  - measured in farads (F)
  - most commercial capacitors are usually 10×10^{-12} F to 500×10^{-6} F
  - to find capacitance

$$C = \frac{q}{\Delta V}$$

1

Sample Problem

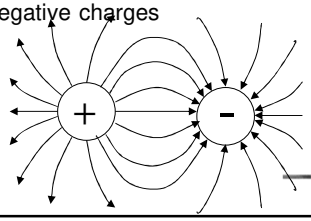
- A sphere has an electric potential difference between it and the Earth of 60.0 V when it has been charged to 3.0×10^{-6}C. What is its capacitance?

Answer: 5.0×10^{-8} F

2

Electric Field Lines

- A _____ used to symbolize the force and direction felt on a charge in an electric field.
- Point _____ from positive charges and _____negative charges



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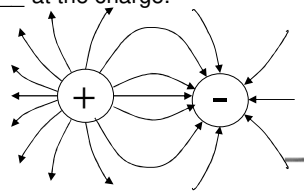
Electric Field Lines

- Intensity of force is symbolized by the number of lines in a given area.
- The relative amount of the charge can be shown by the _____ at the charge.



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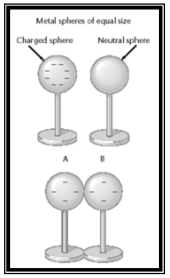
Electric Fields – Part 2

Sharing Charge

- Like gravitational potential energy, charged objects want to have the _____ amount of electric potential
- Charges will flow until all parts of the conducting object are at the _____ potential (equipotential)



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Grounding

- The earth is considered to be an unlimited _____ of electrons, and a limitless sink that electrons can be "poured" into without changing the potential.
- The earth and any conductor attached to the earth is given a potential of _____, and is said to be grounded.

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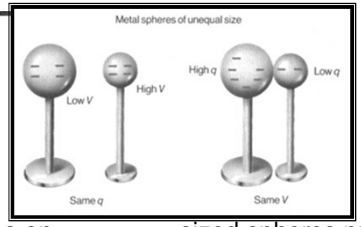
Charges vs. Potential



- Same charges on _____ sized spheres produce different potentials

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Charges vs. Potential

- The larger an object's surface area, the more charges it can hold while only increasing the potential a small amount
- Reducing the excess charge on an object by touching the earth is known as grounding

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Electric Fields – Part 2

Electric Fields and Conductors

- Charges try to _____ as much as possible to decrease the amount of energy on a conductor
- Charges are _____ spaced on smoothly shaped objects
- The _____ is equipotential
- Inside the conductor is _____
- Charges and e-fields are more highly concentrated on _____ parts of objects
- Example: Lightning Rod

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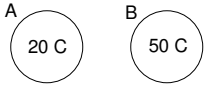
Sample Problem

- Two equal – sized spheres have charges as shown:



  Which sphere has the higher potential?
- If the spheres were touched together, what would be the charge on each sphere?
- If sphere A has an area of 10 cm^2, what would sphere B's radius have to be to have the same potential?

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