

STATIC ELECTRICITY

VOCABULARY

1. matter
2. nucleus
3. protons
4. neutrons
5. electrons
6. charged objects
7. (+) charged object
8. (-) charged object
9. neutral charged object
10. Ion
11. Coulomb (C)
12. electric force
13. conductors
14. insulators
15. polarization
16. electron affinity
17. Triboelectric series
18. The Law of Conservation of Charge
19. grounding
20. Coulomb's Law

CONCEPTS

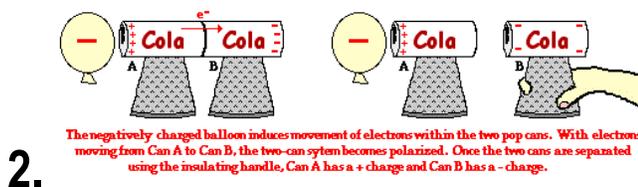
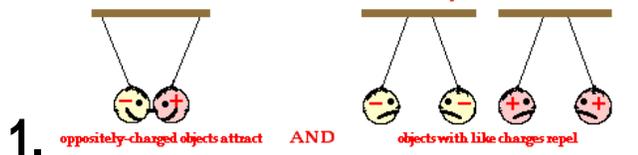
1. Oppositely charged objects attract
2. Objects with like charges repel
3. Newton's 3rd Law : Electric force pairs have equal magnitudes and opposite directions.
4. (+) or (-) charge attracts neutral object
5. polarization is NOT charging (it is separation of charges in a neutral object)
6. Methods of charging:
 - a. Friction
 - b. Induction
 - c. Conduction
7. The process of Lightning
 - a. Charging by friction of ice crystals and water droplets
 - b. Polarization occurs within the cloud
 - i. Electrons → bottom of cloud
 - ii. Positive charges → at top of cloud
 - c. The (-) cloud bottom repels e- on objects and the surface of the Earth. (leaving + charges)
 - d. The cloud discharges as lightning to the ground

PROBLEMS

1. Determine the behavior of charges in given a scenario.
2. Determine the charge before and after charging occurs between two objects.
3. Coulomb's Law problem

DIAGRAMS

In the world of static electricity ...



CURRENT ELECTRICITY

VOCABULARY

1. Electric Field
2. Source Charge
3. Test charge
4. Joule (J)
5. Electric Potential Energy
6. Electric Potential
7. Electric Potential Difference
8. Volts (V)
9. Electric circuit
10. Current
11. Ampere (A)
12. Voltage drop
13. Load
14. Power
15. Watt (W)
16. kilowatt • hour
17. Resistance
18. Ohm (Ω)
19. resistor
20. Ohm's Law

CONCEPTS

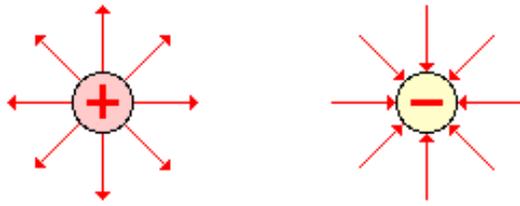
1. Test charges are assumed to be +
2. Objects move from high to low energy
3. + source charge:
 - a. high energy = close
 - b. low energy = far
4. - source charge:
 - a. high energy = far
 - b. low energy = close
5. Electric PE:
 - a. 2 charges interact
 - b. depends on:
 - i. amount of charge
 - ii. location of charge
6. Electric Potential:
 - a. 1 charge
 - b. depends on:
 - i. location
7. Potential Difference: initial location energy – final location energy (measured in volts)
8. Circuits:
 - a. For charges to flow (current), there must be:
 - i. Potential difference
 - ii. Closed loop
 - b. Voltage Drop (charges release energy to loads equally)
9. Power:
 - a. a rate (measured with time)
 - b. kW hour (used to measure energy consumed)
10. Resistance:
 - a. Factors:
 - i. Length
 - ii. Cross section area
 - iii. Material
 - iv. Temperature

PROBLEMS:

1. Determine high and low energy locations for a given source charge
2. (see Homework) Find: Q, ΔPE , ΔV , I, P, R

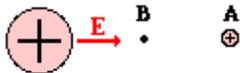
DIAGRAMS:

Direction of an Electric Field



1. The electric field direction is always directed away from positive source charges and towards negative source charges.

Diagram A



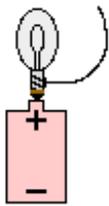
Moving the + test charge from location B to location A will require work and increase the potential energy of the charge.

Diagram B

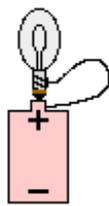


The + test charge will naturally move in the direction of the E field; work is not required. The potential energy of the charge will decrease.

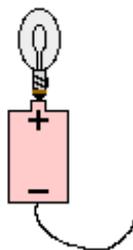
- 2.



Attempt A



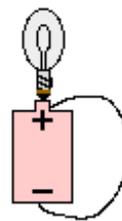
Attempt B



Attempt C

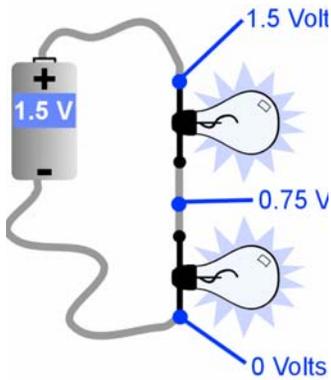


Attempt D



Attempt E

- 3.



- 4.