Name _____

Electric Charge (p. 192 – 199)

I. Positive & Negative Charge

SI unit = coulomb (C)
1 Coulomb = 6.24×10^{18} electrons

1. **What are the two types of electric charge?**

   1. Positive (+) 2. Negative (−)

2. **An atom has no net electric charge.** p. 192

   Circle One : (True) False

   Lightning = 10-20 coulombs
   Camera Flash = 0.025 coulomb

3. **Define the term static electricity.**

   Socks sticking together

   Static Electricity – accumulation of excess electric charge on an object

4. **Electrons are bound more tightly to some atoms and molecules than others.** p. 193 Top

   Circle One : (True) False

   Shoes soles = stronger attraction (gain electrons)
   Carpet = less attraction (lose electrons)

5. **Define the term law of conservation of charge.**

   Law Of Conservation Of Charge – charge can be transferred from object to object, but it cannot be created or destroyed.

6. **As one object gains an ~~electrical~~ negative charge, another object must gain a** positive **charge.**

7. **Unlike charges ~~repel~~ attract each other, while like charges ~~attract~~ repel each other.** p. 193 Bottom

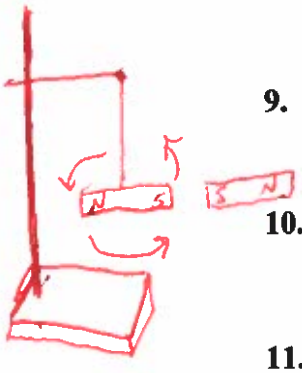
   Circle One : True (False)

8. **What happens to the force between electric charges as the distance increases?**

   - Electric force decreases as distance increases

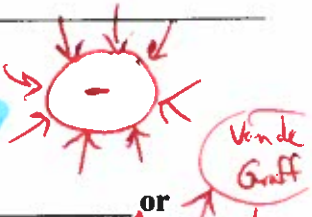
9. **What happens to the electrical force if the charge is increased?**

   - Electric force increases.



10. **An electric field surrounds every electric charge.** p. 194 Top

    Circle One : (True) False



11. **Any charge that is placed in an electric field will be** pushed **or** pulled **by the field.**

12. **Electric field arrows indicate a** positive **charge move.**

13. **Which of the following is a stronger force (over short distances)?**

    Circle One : Gravitational (Electrical)

    Greater longer distance force

Name _____

II. Conductors & Insulators

1. **Define the term conductor.**

Conductor – material in which electrons are able to move easily

2. **List three examples of electrical conductors.**

1. Copper 2. Silver 3. Water

3. **Define the term insulator.**

p. 195

Insulator – material in which electrons are not able to move easily

4. **List three examples of electrical insulators.**

1. Plastic 2. Wood 3. Rubber
4. Air 5. Glass

III. Charging Objects

Van de Graff generator

- Touching electric fence
- Finger in outlet

Walking on a carpet

1. **Define the term charging by contact.**

Charging By Contact – process of transferring charge by touching or rubbing (charging by friction)

2. **When two materials are rubbed together, a transfer of** electrons **occurs where one material is left with a** negative **charge and the other with a** positive **charge.**

DEMO:
1. Rub balloon on head
2. Put on wall
3. Attraction
Balloon = (-)
Wall = (+)

3. **Define the term charging by induction.**

Charging By Induction – rearrangement of electrons on a neutral object caused by a nearby charged object

4. **No contact of materials occurs when an object is charged by induction.**

Circle One : True False

Ex - Static cling

5. **Define the term static discharge.**

Static Discharge Machine

Static Discharge – transfer of charge between two objects because of a buildup of static electricity

6. **Complete the flowchart of how lightning occurs.**

p. 197

The top of a cloud is positively-charged and the bottom is negatively charged.

↓

A positive charge develops on the ground.

↓

Attraction from the positively-charged ground moves electrons towards the ground.

↓

As electrons get close to the ground a surge of positive charges moves upward.

→ Lightning occurs!

Name _____

7. **What produces thunder?** (heats up to 30,000 °C)

- Rapid heating + cooling of air that sends out sound waves

8. **The Earth is a large, neutral object and an ~~insulator~~ conductor of charge.**

Circle One : True (False)

9. **Define the term grounding.**

p. 198

Grounding – the connecting of an object to the Earth with a conductor

10. **List three examples of ideal grounding devices.** (Go into the ground)

1. Pipes 2. Metal Faucets 3. Sinks

IV. Detecting Electric Charge

1. **Define the term electroscope.**

p. 199

Electroscope – device that detects the presence of electric charges

2. **What happens to the metal leaves of an electroscope when no charge is present?**

- Metal leaves hang straight down.

3. **If a negatively-charged object touches the knob of a neutral electroscope, what will happen to the metal leaves?**

- Electrons travel down rod into leaves
  → (leaves = negatively-charged → repel)

4. **If a positively-charged object touches the knob of a neutral electroscope, what will happen to the metal leaves?**

- Electrons flow out of metal leaves onto rods
  → (leaves = positively-charged → repel)