Mixed Groups (p. 584 – 591)

I. Properties Of Metalloids

1. **Define the term metalloids.**

   Metalloids – elements that shares properties with metals + non-metals

2. **Which statement is false concerning metalloids?**

   a. Metalloids can have metallic, ~~but not~~ and non-metallic properties.
   b. Some metalloids can conduct electricity better than most non-metals.
   c. Metalloids do not conduct electricity better than some metals.
   d. Metalloids form a stair-step line in the periodic table of elements.

II. The Boron Group

p. 584

1. **Which group of the periodic table makes up the boron group?**

   Group 13 (3A)

2. **How many electrons are in the outer energy level in each boron group element?**

   3 electrons

3. **Identify a use for each boron group element.** (Some examples may not be found in the book.)

   (Metalloid) Boron = Borax (water softener) / Glass Flasks / Jet + Rocket Fuel

   (Metals)
   - Aluminum = Pop Cans / Foil / Siding / Baseball Bats (Most abundant metal)
   - Gallium = Semiconductors (Calculators, Watches, Solar Panels)
   - Indium = LCD displays, Computer Screens
   - Thallium = Photocells / Rodent + Ant Killers

III. The Carbon Group

p. 585

1. **Which group of the periodic table makes up the carbon group?**

   Group 14 (4A)

2. **How many electrons are in the outer energy level in each carbon group element?**

   4 electrons

3. **Identify a use for each carbon group element.** (Some examples may not be found in book.)

   (Non-Metal) Carbon = Coal / CO_2 / Glucose / Graphite / Diamond

   (Metalloids)
   - Silicon = Sand / Rocks / Semiconductors (2nd Most abundant metal)
   - Germanium = Semiconductors / Phosphor in Fluorescent lights

   (Metals)
   - Tin = Tin Cans / Corrosion Preventer / Bronze / Pewter
   - Lead = Sinkers / Batteries / X-Ray Gear

p. 586
1. Graphite
2. Diamond
3. Buckminsterfullerene

4. Define the following terms.

Allotropes – different forms of the same element with different molecular structures

Semiconductors – elements that conduct electricity under certain conditions (necessary for computers)

III. The Nitrogen Group

p. 587

1. Which group of the periodic table makes up the nitrogen group?

Group 15 (5A)

2. How many electrons are in the outer energy level in each nitrogen group element?

5 electrons

3. Identify a use for each nitrogen group element. (Some examples may not be found in book.)

(Non-Metal)
- Nitrogen = Fertilizers / Elemental → atmosphere / Ammonia
- Phosphorus = Fertilizers / Match Heads / Fine China

(Metalloid)
- Arsenic = Wood Preservation, Poisons
- Antimony = Semiconductors / Infrared Detectors / Diodes

(Metal)
- Bismuth = Fire-sprinkler Heads / Cosmetics / Medicine

IV. The Oxygen Group

p. 588

1. Which group of the periodic table makes up the oxygen group?

Group 16 (6A)

2. How many electrons are in the outer energy level in each oxygen group element?

6 electrons

3. Identify a use for each oxygen group element. (Some examples may not be found in book.)

(Non-Metals)
- Oxygen = 21% atmosphere / Ozone /
- Sulfur = Paint pigments / Hot Springs / Seafloor Communities
- Selenium = Multivitamin Component / Photocopiers

(Metalloids)
- Tellurium = Semiconductors / Ceramics / Glass Tinting
- Polonium = Source of Neutrons / Thermoelectric Power To Satellites

V. Synthetic Elements

Plutonium = Nuclear Reactor Fuel Rods / Bombs
Americium = Smoke Detectors

p. 589

1. Define the term transuranium elements.

Transuranium Elements - elements having more than 92 protons (Synthetically created)

Uranium = 92 protons