**Chemistry**

**Semester 1 Review**

# Part 1 – Moles, masses and general stuff

1. A certain element has 15 protons, 15 electrons and 16 neutrons.

What is the mass number?

What is the atomic number?

What is the charge on the atom?

What atom is it?

1. How does a covalent bond differ from an ionic bond?
2. What is the molar mass of manganese?
3. What is the molar mass of oxygen gas?
4. Elements in the halogen family when they ionize will have a charge of what? What about the charge of alkali metals? The alkaline earth metals? Aluminum? Chromium (III)?
5. What is the correct way to write calcium phosphate?
6. What is the correct way to write aluminum bromide?

What is the mass of the following?

1. 15 moles carbon tetrafluoride
2. 7.2 moles of aluminum oxide

# Part 2 – Stoichiometry

For the reaction, first balance it and then answer the questions that follow.

SF4 + H2O 🡪 SO2 + HF

1. How many moles of water are needed to react with 2.5 moles of sulfur tetrafluoride?
2. What mass of sulfur dioxide will be produced from reacting .034 moles of sulfur tetrafluoride?
3. If 36 grams of water are available, how many grams of sulfur dioxide will be produced?
4. Paraffin (C25H52) burns in air to produce carbon dioxide and water. If 5 moles of paraffin are burned, how many moles of each product will form?
5. When iron filings react with a copper (II) sulfate solution, only metallic copper and a solution of iron (II) sulfate are produced. How many moles of copper would be produced from 2.45 grams of iron?
6. Titanium metal can be produced by reacting titanium (IV) chloride with magnesium. How many grams of magnesium would be needed to produce 100 grams of titanium?
7. Sodium carbonate can be produced from calcium carbonate and sodium chloride in a double replacement reaction. If 2 kilograms of sodium chloride are available to react, how many grams of each product will be formed?

# Part 3 – Density

Please do the following density problems.

1. What is the density of a 5 gram piece of metal if the volume if 2 cm3?
2. Mercury has a density of 13.53 g/cm3. What would the mass of 25 ml be?
3. 28 grams of carbon monoxide have a volume of 22.4 liters at STP. What is its density?
4. 1 mole of carbon dioxide has a volume of 22.4 liters at STP. What is its density?
5. 1 mole of oxygen has a volume of 22.4 liters at STP. What is its density?