

Name: \_\_\_\_\_

Science and Technology 404  
Review for Test #1

*Content:*

- Rutherford-Bohr diagrams
- Periodic table (Periods and Families)
- Lewis Dot notation
- Ions
- Conservation of mass
- Balancing equations
- Combustion reactions

1. **Who Am I?**

- a) I am in period 4 and I have two valence electrons \_\_\_\_\_
- b) I have one valence electron, react vigorously with water to form a base and I have two electron shells \_\_\_\_\_
- c) I have a full last shell so I am chemically stable and I am located in period 3 \_\_\_\_\_
- d) I am often used as a disinfectant and I have two electron shells \_\_\_\_\_
- e) I am located in period 4 and I have two less electrons than the closest inert gas. \_\_\_\_\_

2. Below is a list of six elements.

Name of element	Chemical Symbol
Lithium	Li
Helium	He
Oxygen	O
Magnesium	Mg
Bromine	Br
Calcium	Ca

- a) Choose two elements that are found in the same period. Explain what they have in common.
- b) Choose two elements that are in the same group in the periodic table of elements. Explain why these have the same chemical reactivity (why they behave the same way) using the Rutherford- Bohr model.

**3. Draw Lewis Dot diagrams for the following atoms.**

a) Magnesium (Mg)

b) Nitrogen (N)

c) Sulfur (S)

d) Krypton (Kr)

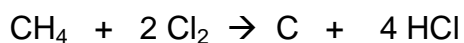
**4. Calculate the sum of the charges for each of the following electron transfers and indicate the net charge of the resulting ion.**

a) A sodium atom loses one electron

b) A sulfur atom gains two electrons

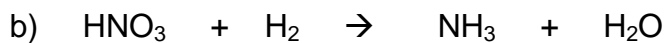
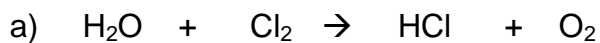
5. The complete reaction of 8 g of methane (CH<sub>4</sub>), with 71 g of chlorine gas (Cl<sub>2</sub>) produces 73 g of hydrochloric acid (HCl) and a certain amount of carbon (C)

The balanced equation for this chemical reaction is as follows:



**What mass of carbon is produced by this reaction?**

**6. Write the balanced equation for each chemical reaction.**



7. According to the fire triangle, three components are needed for combustion to occur. What are the three components needed.

a) \_\_\_\_\_

b) \_\_\_\_\_

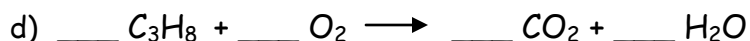
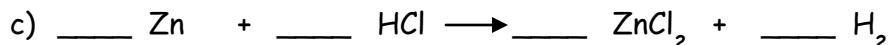
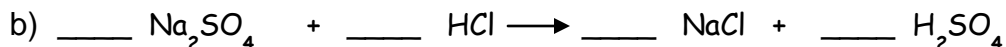
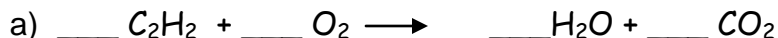
c) \_\_\_\_\_

8. For each of the following situations, state what is the missing component of the fire triangle.

- i. The propane valve on a barbeque is closed. \_\_\_\_\_
- ii. A person who is in flames must Stop, Drop and Roll \_\_\_\_\_
- iii. A diesel truck won't start on a cold day \_\_\_\_\_
- iv. Water is put on a fire to extinguish it \_\_\_\_\_
- v. A forest is clear cut to avoid the spread of a fire \_\_\_\_\_
- vi. Oil well firefighters create an explosion to put out a fire \_\_\_\_\_
- vii. You blow on a match to put it out. \_\_\_\_\_
- viii. Cigarettes are extinguished in sand ashtrays \_\_\_\_\_
- ix. Magnesium must be placed in a blue-green flame to burn and produce a blinding flash of light \_\_\_\_\_

9. For each of the following reactions, do both of the following:

- Balance the equation (if it is already balanced, write "balanced")
- Identify which reactions are combustion reactions.



10. Draw the Bohr-Rutherford diagram for each of the elements below:

a) Chlorine

b) Calcium

c) Carbon

d) Phosphorus