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 <u>two</u> elements that are found in the same period. Explain what they have in common.

b) Choose <u>two</u> 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_4), with 71 g of chlorine gas (Cl_2) produces 73 g of hydrochloric acid (HCl) and a certain amount of carbon (C)

The balanced equation for this chemical reaction is as follows:

$CH_4 + 2\ Cl_2 \rightarrow C + 4\ HCl$

What mass of carbon is produced by this reaction?

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

a) $H_2O + Cl_2 \rightarrow HCl + O_2$

b) $HNO_3 + H_2 \rightarrow NH_3 + H_2O$

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.

a) ___ C_2H_2 + ___ O_2 ⟶ ___ H_2O + ___ CO_2

b) ____ Na_2SO_4 + ____ HCl ⟶ ____ $NaCl$ + ____ H_2SO_4

c) ____ Zn + ____ HCl ⟶ ____ $ZnCl_2$ + ____ H_2

d) ___ C_3H_8 + ___ O_2 ⟶ ___ CO_2 + ___ H_2O

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

a) Chlorine

b) Calcium

c) Carbon

d) Phosphorus