**Regents Chemistry Extra Review Packet for Midterm Exam**

**Name:**

**Atomic Structure**

1. What is the definition of each of the following terms:
   1. Atomic number
   2. Mass number
   3. Isotope
   4. Nucleon
2. The number of electrons in a neutral atom is equal to the number of \_\_\_\_\_\_
3. Complete the following table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Atom** | **# of protons** | **# of neutrons** | **# of electrons** | **Atomic #** | **Mass #** |
| **126C** |  |  |  |  |  |
| **73Li** |  |  |  |  |  |
| **2311Na** |  |  |  |  |  |
| **31H** |  |  |  |  |  |
| **42He** |  |  |  |  |  |

1. Describe Rutherford’s famous experiment. What were the two results of the experiment and what conclusion did Rutherford draw from each result?
2. What is the difference between an isotope and an ion?
3. Given that chlorine is 75% Cl-35 and 25% Cl-37, calculate the average atomic mass of chlorine.
4. What radioactive isotope is used to date organic material (wool, linen, wood, bones, etc)?
5. What is the absolute temperature scale?
6. In the Bohr model of the atom, describe the type of electron transition which will result in the production of a spectral line. Is this transition endothermic or exothermic?
7. How many atoms are represented in the formula (NH4)2SO4?
8. What are two common substances that sublime?

**Periodic Table**

1. What is nuclear charge? What is effective nuclear charge?
2. What is ionization energy?
3. What is electronegativity?
4. What are the trends for atomic size, ionization energy, & electro negativity in the Periodic Table?

**Intermolecular Forces**

1. What are the three IMF? Which force is weakest? Which force is strongest?
2. Describe the kind of molecule that exhibits each kind of intermolecular force (ex: polar, non-polar, etc)
3. Why does water have a high boiling point?
4. What kind of IMF exists between each of the following molecules?
   1. CH4 \_\_\_\_\_\_\_\_\_\_\_
   2. HCl \_\_\_\_\_\_\_\_\_\_\_
   3. CH3OH \_\_\_\_\_\_\_\_\_\_
   4. CO2 \_\_\_\_\_\_\_\_ \_\_\_
   5. Xe \_\_\_\_\_\_\_\_\_\_\_
   6. NH3 \_\_\_\_\_\_\_\_\_\_\_\_
   7. He \_\_\_\_\_\_\_\_\_\_\_\_\_
   8. N2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_
   9. HF \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Matter:**

**Using a to represent atoms of elements A and a to represent the**

**atoms of element B draw the following:**

|  |  |
| --- | --- |
| **Pure Substance** | **Solid** |
| **gas** | **liquids** |
| **mixture** | **Mixture of elements and compound** |
| **Two different compounds** | **Another Pure substance** |

**Energy Changes:** Identify the Q equation needed to solve each of the following energy word problems below, then solve each problem.

1. How much energy is required to heat a 35.0 g sample of water from 35ºC to 75ºC?

Equation:\_\_\_\_\_\_\_\_\_\_\_\_\_

1. An ice cube at 0˚C with a mass of 175.0g melts. How much energy does the ice absorb to melt?

Equation: \_\_\_\_\_\_\_\_\_\_

1. An 85.0g sample of water at 100.0˚C boils. How much energy is required to convert the water to steam at 100.0˚C?

Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A sample of water with a mass of 160.0g is heated from 15.0˚C to 70.0˚C. How much energy is required to heat the water?

Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. 450.0g of water at 0.0˚C is frozen to ice at 0.0˚C. How much energy is released to the environment?

Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. 200.0g of steam at 100.0˚C condenses to water at 100.0˚C. How much energy is released to the environment?

Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. If you carry out a reaction in a Styrofoam cup calorimeter and
   1. the temperature of the water increases, is the reaction endothermic orexothermic?
   2. the temperature of the water decreases, is the reaction endothermic or exothermic?
   3. How would you calculate the energy change? Q = mcΔT