2nd Semester Physical Final Review

**Vocabulary:  
Define the following terms**:

Heat of vaporization- *energy needed to change the state of matter from a liquid to a gas or from a gas to a liquid.*

Heat of Fusion- *energy needed to change the state of matter from a liquid to a solid or from a solid to a liquid.*

Chemical properties- describes how a substance changes into a new substance, either by combining with other elements or by breaking apart into new substances. Ex. Flammable, reacts with acids

Physical properties- Characteristics that can be observed without changing the identity of the substance Ex. Density, texture, melting point

Law of Conservation of Mass- Matter cannot be created or destroyed. The mass of the reactants will equal the mass of the products in a chemical reaction

Physical Change- Change that can be observed without changing the identity of the substance. Ex. Boiling water, breaking off a piece of chocolate

Chemical Change- A change in chemical composition of a substance. Ex. Burning wood, digesting the chocolate bar.

Homogeneous- Reffering to a mixture that is the same throughout. You cannot distinguish between the different pars. Example: kool aid

Heterogeneous- Refering to a mixture that is not evenly distributed. You can identify the individual parts. Ex. Pepporoni pizza

Solution- A homogeneous mixture in which the solute is dissolved completely in the solvent.

Solute- What is being dissolved. Ex. salt

Solvent- What is doing the dissolving. Ex. water

Solubility- Amount of solute that can dissolve in 100ml of water at a specific temperature.

Nucleus- The central part of the atom that contains the protons and neutrons. Most of the atoms mass is located in the nucleus

Proton- subatomic particle with a (+) charge. Located in the nucleus.

Neutron- subatomic particle with NO charge. Located in the nucleus.

Electron- subatomic particle with a negative charge and very little mass. Travels around the nucleus in the electron cloud that contains specific energy levels.

Isotope- An atom with the same number of protons but a different number of neutrons. Ex. Carbon -12 and Carbon- 14

Compound Properties- 2 or more different atoms chemically bound together.

Element Properties- A substance that consists of the same kind of atom. Organized on the periodic table

Decomposition Reaction- A chemical reaction in which a compound is broken down into individual elements. Ex. NaCl Na + Cl

Single Displacement Reaction- A chemical reaction in which a compound and an element react together to form a new compound and an element. Ex. NaCl + Li LiCl + Na

Double Displacement Reaction- A chemical reaction in which two compound react together and exchange ions. NaCl + LiF NaF + LiCl

Combustion- A chemical reaction involving a compound that contains carbon and hydrogen in the presence of oxygen to produce Carbon dioxide and water. Ex. Gasoline being burned in your car’s engine

Base- A chemical that when dissolves in water, forms hydroxide ions (OH-). Usually bitter, slippery, and turn red litmus paper blue

Acid- A chemical that when dissolved in water, forms hydrogen ions (H+). These free H+ ions react with water to form hydronium H3O + ions. Usually sour, react with metals, and turn blue litmus paper red

pH- indicates the substances H+ ion concentration. Indicates the strength of an acid or base

Potential Energy- Energy that is stored in a substance due to its height,or chemical composition.

Kinetic Energy- Energy of an object that is in motion.

1. What is the average Kintetic energy of a substance called? Temperature
2. What is Thermal Energy? Total potential and kinetic energy of the particles in a substance
3. How do the particles move in a solid, liquid and gas? Solid- very close and vibrate Liquid – very close and slide past each other. Gas- far apart and move in all directions
4. Give three examples of physical properties of an Apple. Tastes sweet, red skin, breaks in small pieces when hit with a baseball bat.
5. Give three examples of chemical properties flammable, reacts with acids to form hydrogen gas, reacts with oxygen to form rust
6. What is a mixture? Two or more pure substances mixed together
7. Give 3 examples of a homogenous mixture. Salt water, kool aid, bronze
8. Where are protons, neutrons and electrons found? Protons and neutrons are in the nucleus. Electrons are in the electron cloud around the nucleus.
9. For the following element, give its atomic number, atomic mass, number of protons, neutrons and electrons

Carbon:

Atomic Mass:\_\_\_\_\_12\_\_\_\_\_ Atomic number\_\_\_\_6\_\_\_P=\_\_\_6\_\_, N=\_\_\_6\_\_\_, E=\_\_\_\_6\_\_\_

1. Where is most of the mass of an atom?

nucleus

1. How many valence electrons do the following elements have?

Berylium\_\_\_\_\_\_\_2\_\_\_\_\_\_\_ Nitrogen\_\_\_\_\_\_5\_\_\_\_\_\_\_ Neon\_\_\_\_\_\_8\_\_\_\_\_\_\_

1. Which one is the most stable? \_\_\_\_\_\_\_\_\_neon\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Why? Outer energy level is filled\_\_
3. What is used to tell the exact number of atoms of each element in compound there are?

Subscripts and coefficients

1. What type of bond shares electrons? covalent
2. What type of bond gives away or transfers electrons? ionic
3. What is the difference between a polar and a non-polar molecule? Polar molecules have an uneven charge due to the uneven sharing of electrons within the atoms of the compound
4. What kind of elements form ionic bonds? Metal bonds with a nonmetal

Using an electron dot diagram, show the bonding of Sodium and Chlorine

1. In a chemical name, the first element is the \_\_\_\_metal\_\_\_\_\_\_\_\_\_\_\_ and the 2nd element is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_nonmetal\_\_\_\_\_\_\_\_\_\_\_\_
2. In all chemical reactions the mass of the product must \_\_\_\_equal\_\_\_\_\_\_\_\_\_\_\_the mass of the reactants.
3. What is the formula of the compound formed when Potassium combines with sulfur?

K2S potassium sulfide

What is the Name of this compound?\_\_\_potassium sulfide\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the formula of the compound formed when Calcium combines with Chlorine?  
     
   What is the name of this compound?\_\_\_\_\_\_\_\_CaCl2\_\_\_\_\_\_\_\_Calcium chloride\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Whsn a chemical reaction takes place….what must be broken, and requires enery?

Break the chemical bonds

1. What is used to determine if a substance is an acid or a base? Indicator such as litmus or pH paper
2. If a substance has an pH of less than 7, it is a \_\_\_\_\_\_\_\_\_acid\_\_\_\_\_\_\_\_\_\_\_\_
3. If a substance has a pH of greater than 7, it is a \_\_\_\_\_\_\_base\_\_\_\_\_\_\_\_\_\_\_\_
4. Identify the reactants in the following equation:  
     
   NiCl2 + NaOH→Ni(OH)2 + NaCl

Reactants\_NiCl2 and Na OH\_\_  
  
Products Ni(OH)2 and NaCl\_\_\_\_\_\_\_

1. Identify the types of bonds Ionic or Covalent in the following
2. K I → KI\_\_\_ionic\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. N N → NN\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_covalent\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Mg Cl → Mg Cl 2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ionic\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Balance the following equations and identify what type of reaction they are:
6. 2P + 5O2  → 2P2O5  Reaction\_\_\_\_\_synthesis\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. 2Al + 6HCl →2 AlCl3  + 3H2

Reaction\_\_\_\_\_\_Single\_\_replacement

1. C6H12O6 yields 6 C + 6 H20

Reaction \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_N/A\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Use the Periodic Table to complete the following Chart:

* Use the Periodic Table to complete the following chart:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Symbol | Name | Atomic# | #p+ | #e- | Energy level Arrangement | Group | Period | Region | State of Matter |
| Cl | chlorine | 17 | 17 | 17 |  | 17 | 3 | Non metal | G |
| S | Sulfur | 16 | 16 | 16 |  | 16 | 3 | Non  Metal | s |
| Br | Bromine | 35 | 35 | 35 |  | 17 | 4 | Non metal | l |
| Kr | Krypton | 36 | 36 | 36 |  | 18 | 4 | Non metal noble gas | G |
| He | Helium | 2 | 2 | 2 |  | 18 | 1 | Non metal noble gas | G |
| Al | Aluminum | 13 | 13 | 13 |  | 13 | 3 | Metal | s |