AR Chemistry: Semester 1 Final Review Name_____

Part 1: Matter and Change, Atomic Structure, Chemical Names and Formulas

1. What are the 4 states of matter?
2. Which of the following are physical properties?
   a. boiling point b. freezing point c. density d. color e. crystal shape
   f. solubility g. ionic charge i. density

X. What is the density of a solid if when dropped in water the level changes from 14.0 to 26.0 mL, and when placed on a scale starting at 3.5 grams raises it to 51.5 grams?

3. What is the term for the type of separation of mixtures:
   a. that separates liquids based on their boiling points
   b. that separates materials based on their attractions between a medium and a solvent
   c. from spinning materials in a circle really, really fast.
4. Concerning chemical reactions:
   a. Everything to the left of the arrow (→) are classified as ??
   b. Everything to the right of the arrow (→) are classified as ???
   c. What must be true about all the atoms on the left side of the arrow and the right?
5. 52.0 grams of reactants are mixed together. 28.0 grams of CO_2 are evolved. What is the mass of the solid products?
6. What is the "claim to fame" of:
   a. electrons b. protons c. neutrons
7. What is the masses and charges for:
   a. electrons b. protons c. neutrons
8. Why is the atomic mass of an element found in the table a decimal number?
9. What two things are necessary for two atoms to be isotopes?
10. The atomic mass of an atom equals the number of ???? in the nucleus.
11. Complete the following chart

Atom / Ion	Atomic Number	Atomic Mass	Number of P^{+1}	Number of N^0	Number of e^{-1}
${}_{17}^{35}Cl^0$					
${}_{11}^{23}Na^0$					
${}_{29}^{64}Cu^0$					
${}_{54}^{132}Xe^0$					
${}_{38}^{88}Sr^{+2}$					
${}_{35}^{80}Br^{-1}$					
${}_{15}^{31}P^{-3}$					
${}_{28}^{59}Ni^{+2}$					

12. What are the formulas created between the following atoms and ions (ionic compounds)
    a. Ca Cl b. Na HCO_3^{-1} c. Cu^{+2} OH^{-1}
    d. NH_4^{+1} CO_3^{-2} e. Sc NO_3^{-1} f. Mg N
    g. K SO_4^{-2} h. Fe^{+3} PO_4^{-3} i. Li O
    j. Ba I k. K $Cr_2O_7^{-2}$ l. Cr^{+3} O
13. What are the names for each of the compounds formed in number 12?
    a. b. c.
    d. e. f.
    g. h. i.
    j. k. l.
14. What are the formulas for the following compounds?
    a. sodium carbonate b. sodium hydrogen carbonate c. iron (II) chloride
    d. potassium sulfide e. ammonium bromide f. calcium chloride
    g. copper (II) hydroxide h. lithium carbonate i. magnesium nitrate
    j. barium bromide k. magnesium sulfate l. zinc phosphate

AR Chemistry: Semester 1 Final Review Name_____

Part 1: Matter and Change, Atomic Structure, Chemical Names and Formulas

1. What are the 4 states of matter? **gas, liquid, solid, plasma**
2. Which of the following are physical properties? **bold items are physical properties**
   a. boiling point **b. freezing point** **c. density** **d. color** **e. crystal shape**
   f. solubility g. ionic charge **h. density**

X. What is the density of a solid if when dropped in water the level changes from 14.0 to 26.0 mL, and when placed on a scale starting at 3.5 grams raises it to 51.5 grams? **D = m / v = (51.5 – 3.5) / (26.0 – 14.0) = 4.0 g / mL**

3. What is the term for the type of separation of mixtures:
   a. that separates liquids based on their boiling points **distillation**
   b. that separates materials based on their attractions between a medium and a solvent **chromatography**
   c. from spinning materials in a circle really, really fast. **centrifugation**
4. Concerning chemical reactions:
   a. Everything to the left of the arrow (→) are classified as ?? **reactants**
   b. Everything to the right of the arrow (→) are classified as ??? **products**
   c. What must be true about all the atoms on the left side of the arrow and the right? **must be the same**
5. 52.0 grams of reactants are mixed together. 28.0 grams of CO_2 are evolved. What is the mass of the solid products? **(24.0 grams)**
6. What is the "claim to fame" of:
   a. electrons **chemical bonds** b. protons **determines element** c. neutrons **stabilizes nucleus**
7. What is the masses and charges for:
   a. electrons **0 amu, -1** b. protons **1 amu, +1** c. neutrons **1 amu, 0 charge**
8. Why is the atomic mass of an element found in the table a decimal number? **it is a weighted average**
9. What two things are necessary for two atoms to be isotopes? **same element, different masses (from Neutrons)**
10. The atomic mass of an atom equals the number of ???? in the nucleus. **protons and neutrons**
11. Complete the following chart

Atom / Ion	Atomic Number	Atomic Mass	Number of P^{+1}	Number of N^0	Number of e^{-1}
$_{17}{}^{35}Cl^0$	**17**	**35**	**17**	**18**	**17**
$_{11}{}^{23}Na^0$	**11**	**23**	**11**	**12**	**11**
$_{29}{}^{64}Cu^0$	**29**	**64**	**29**	**35**	**29**
$_{54}{}^{132}Xe^0$	**54**	**132**	**54**	**78**	**54**
$_{38}{}^{88}Sr^{+2}$	**38**	**88**	**38**	**50**	**36**
$_{35}{}^{80}Br^{-1}$	**35**	**80**	**35**	**45**	**36**
$_{15}{}^{31}P^{-3}$	**15**	**31**	**15**	**16**	**18**
$_{28}{}^{59}Ni^{+2}$	**28**	**59**	**28**	**31**	**26**

12. What are the formulas created between the following atoms and ions (ionic compounds)
    a. $CaCl_2$ **b. $NaHCO_3$** **c. $Cu(OH)_2$**
    d. $(NH_4)_2 CO_3$ **e. $Sc(NO_3)_3$** **f. Mg_3N_2**
    g. K_2SO_4 **h. $FePO_4$** **i. Li_2O**
    j. BaI_2 **k. $K_2Cr_2O_7$** **l. Cr_2O_3**
13. What are the names for each of the compounds formed in number 12?
    a. **calcium chloride** b. **sodium hydrogen carbonate** c. **copper (II) hydroxide**
    d. **ammonium carbonate** e. **scandium nitrate** f. **magnesium nitride**
    g. **potassium sulfate** h. **iron (III) phosphate** i. **lithium oxide**
    j. **barium iodide** k. **potassium dichromate** l. **chromium (III_) oxide**
14. What are the formulas for the following compounds?
    a. Na_2CO_3 **b. $NaHCO_3$** **c. $FeCl_2$**
    d. K_2S **e. NH_4Br** **f. $CaCl_2$**
    g. $Cu(OH)_2$ **h. Li_2CO_3** **i. $Mg(NO_3)_2$**
    j. $BaBr_2$ **k. $MgSO_4$** **l. $zZn_3(PO_4)_2$**