Chemistry 11

Review Package #1

Matter and Its Changes
Nomenclature

1. <u>Matter and Its Changes</u>:

A. Matter: (text pgs. 65-73)

- definition of matter
- states of matter – solid, liquid, gas, plasma
- properties of matter – physical properties (hardness, malleability, ductility, luster, viscosity, diffusion, vapor, vapor pressure, boiling point, melting point, freezing point)
  – chemical properties
- changes in matter – physical and chemical changes
- Law of Conservation of Matter (mass)

B. Classification of Matter (text pgs. 74-76)

- Matter Map –
- differences between heterogeneous and homogeneous mixtures
- solvent, solute, aqueous solution
- atom, ion, molecule

C. Separation Techniques for Mixtures (text pgs. 77-79)

- know the techniques and when they are used/what they separate (mechanical separation, evaporation, filtration, floatation, settling, electrolysis, centrifugation, distillation, crystallization, chromatography)

2. <u>Nomenclature</u>:

A. Names and Formulae of Ionic and Molecular Compounds (text pgs. 231-234, 244-247)

- properties of ionic compounds vs. molecular compounds
- writing formulae for ionic and covalent compounds
- naming ionic and covalent compounds
- names and formulae for ionic hydrates

B. Names and Formulae of Acids and Base compounds (text pgs. 248-249)

- properties of acid and base compounds
- rules for naming acids

Matter:

1. Define the term “matter”.

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2. Differentiate between an atom, ion and molecule (hint, use their definitions).

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Mixtures vs. Pure Substances:

1. Match each separation technique with its appropriate description.

Technique	Description
____ centrifugation	A. components of a mixture separate into layers on their own
____ chromatography	B. solid component of the mixture becomes trapped in a screen, allowing the liquid component to pass through
____ crystallization	C. oil, detergent, or some other chemical is added to a mixture, air is forced through the mixture as a means of stirring, and the desired component is skimmed off the top
____ distillation	D. mixture is spun at high speeds creating a force which pulls heavier solid particles towards the bottom of the container
____ electrolysis	E. the mixture is heated until a liquid component reaches its boiling point and is evaporated, leaving the other component behind
____ filtration	F. the mixture is concentrated and cooled until the solid component slowly forms at the bottom of the container
____ floatation	G. the mixture is applied to a solid support and separated into its components by a solvent which carries the various components up the solid support at different rates
____ settling	H. a process in which an electric current is applied to a sample, decomposing the sample into its component elements

2. State three things that distinguish a pure substance from a mixture (consider nature, properties)

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3. Describe what a MECHANICAL MIXTURE is (its nature and properties), provide an example, and state the separation method that should be used to isolate its component parts.

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4. How is it possible to determine whether a pure substance is an element or a compound? Provide an example of an element and a compound.

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5. How can you determine whether a material is “homogeneous” or “heterogeneous”?

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6. Sketch the phase diagram that would be produced when solid nitrogen is heated. Label all states and phase changes.

Ionic Compounds:

1) Compare the following properties of both IONIC and MOLECULAR compounds:
   (a) Component elements (metal vs nonmetal)
   (b) Type of chemical bonding (ionic vs covalent)
   (c) Most likely states at room temperature (solid, liquid, gas)
   (d) General trend in melting point temperatures
   (e) General trend in electrical conductivity

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2) Write the chemical formulae resulting from the combination of the following ions.

a) Na^{+} O^{2-} _____ c) Sr^{2+} Br^{-} _____

b) Au^{3+} S^{2-} _____ d) Pb^{4+} $C_2O_4^{2-}$ _____

3) Write the correct name for each of the following ionic compounds.

a) Li_2O _____ c) Mg_3N_2 _____

b) $CoCl_3$ _____ d) $Cr_3(PO_4)_2$ _____

4) Write the correct formula for each of the following ionic compounds.

a) Cesium iodide _____ d) Aluminum oxide _____

b) Strontium cyanide _____ e) Iron (III) hydroxide _____

c) Copper (I) bicarbonate _____ f) Potassium permanganate _____

5) Write the correct name for each of the following ionic hydrates.

a) $Cd(NO_3)_2 \cdot 4H_2O$ _____

b) $NaSCN \cdot 5H_2O$ _____

Acids and Bases:

1. State three properties of acids and three properties of bases. (think back to grade 10)

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2. Write the correct names for the following bases.

a. $Ca(OH)_2$ _____ b. LiOH _____

3. Provide the missing formula or name for the following simple (binary) acids.

a. Hydrofluoric acid_____ c. $H_2S_{(aq)}$ _____

b. Hydrobromic acid_____ d. $HI_{(aq)}$ _____

4. Provide the missing formula or name for the following complex acids.

a. Chromic acid _____ d. $H_2CO_{3(aq)}$ _____

b. Sulphurous acid _____ e. $H_3PO_{4(aq)}$ _____

c. Hypochlorous acid_____ f. $HNO_{2\ (aq)}$ _____

Molecular Compounds:

1. Write the correct name for each of the following molecular compounds.

a. NF_3 _____ d. N_2O_4 _____

b. CO_2 _____ e. SCl_6 _____

c. P_2O_5 _____ f. N_2O _____

2. Write the correct formula for each of the following molecular compounds.

a. Silicon disulphide _____ d. Triarsenic pentabromide _____

b. Carbon tetrachloride _____ e. Dicarbon hexahydride _____

c. Oxygen gas _____ f. Iodine heptachloride _____

Mixed Naming:

1) Provide the correct name for each of the following compounds.

a) CsBr _____ c) H_2SO_4 _____

b) ICl _____ d) $Cu(NO_3)_2$ _____