**Chemistry Review Package:**

The next two pages include everything you need to know for the test. If any of the following information does not look familiar to you, or you don’t know a lot about it that means you need to ask your teacher and STUDY HARD. Page numbers are for Textbook reference NOT from our note package.

The test covers the following information;

* **Chapters A1, A2 &A3 in your textbook**
  + **Remember that the tests cover what is in the textbook and although we many not have talked about it, if it was in the textbook it can be assessed.**
* Lab safety and WHIMIS
  + WHIMIS signs (handout) and MSDS
* Atomic History
  + All those scientists that worked on a model of what the atom looked like. You need to know their theories and their names
* Nuclear Notation
  + ****Know what each of the numbers mean in the diagram below and be able to write elements in this form
* Periodicity
  + The periodic table and how it is organized
  + Eg. If an element is in group 1 that means it has….
* Energy level diagrams
  + Do you know how to draw energy level diagrams?
  + Do you know how many electrons are held in each energy level and how many electrons an element or ion should have?
  + Eg; Na – atomic # is 11 meaning 11 protons so there should be 11 electrons. Na+ means that sodium is an ION so it has LOST an electron and carries a charge. Na+ has only 10 electrons.
* Ionic Compounds
  + How to put two elements or compounds together.
  + Know that the metal comes first and the non metal second
  + Know you must balance charges
  + Understand why they bond (because they EXCHANGE electrons)
  + Eg. Na2SO4 is sodium sulfate, NaCl is sodium chloride
  + The stock system! (Fe has 2 different charges it can be, Fe (II) is Fe2+
* Solubility
  + Chart of solubility is on the back of your periodic table
  + Know how to tell if something is soluble or not so you can put the STATE the compound is in when you write out chemical equations
* Acids and Bases
  + Know how to name them (if it has a hydrogen in it, its an acid)
  + Know the properties of acids and bases
  + Know how to tell if something is an acid or a base
    - Indicators: pH, litmus, etc
  + LOTS from the textbook on this stuff!!
* Molecular Compounds
  + Know the difference between these and ionic compounds (theory)
  + Know how to name them (prefix system)
  + Know characteristics

|  |  |  |  |
| --- | --- | --- | --- |
| **Nonmolecular Nonmetallic Elements** | **Molecular Monoatomic Elements** | **Molecular Diatomic Elements** | **Other Molecular Elements** |
| **C or Cn**  **Si or Sin**  **(a continuous array)** | **Noble gases**  **(He, Ne, Ar, Kr, Xe, Rn)** | **Group VIIA**  **(H2, F2, Cl2, Br2, I2, At2, and O2, N2)** | **P4 (white) (a pyramid)**  **S8 (solid) (cyclic)** |

* Properties of Water
  + Know what makes water different from all other compounds on earth
* Common Chemical reactions (the big one…)
  + Evidence of a reaction
    - How do we know one is taking place
  + Conservation of mass
    - What is it and how does it apply to chemical bonding?
  + Balancing equations
    - Putting numbers in front and how to get both sides to equal
* Types of Chemical reactions
  + Know how to distinguish between all 5
  + Know how to take a word problem and change it into balanced equations and vice versa.
  + Formation – elements form a compound
  + Simple decomposition – compound breaks into its elements
  + Single replacement – replace what it can (metal if it is a metal)
  + Double replacement – switch with the other partner
  + Combustion – makes a common oxide, balance oxygen’s last
* Mole Concept (Stoichiometry)
  + Molar mass – how to find it
  + Avagadro’s number
  + Be able to manipulate the formula to solve all different problems and use unit analysis
  + **n=m/M**

Fill in the blanks. You can use each answer once, more than once, or not at all.

|  |  |  |  |
| --- | --- | --- | --- |
| Bohr | Element | Metal | Quantum Mechanical |
| Billiard Ball | Exchanging | Molecular | Rutherford |
| Chadwick | Heterogeneous | Nonmetal | Sharing |
| Compound | Homogeneous | Nuclear | Thompson |
| Dalton | Ionic | Planetary |  |

1. Ionic compounds consist of a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and are bonded together by exchanging electrons.
2. Molecular compounds consist of a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and are bonded together by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ electrons.
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mixtures are uniform throughout, whereas \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mixtures are not uniform throughout.
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ discovered the electron.
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ discovered the neutron.
6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ believed that electrons orbited the atom like planets orbit the sun.
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ believed that the smallest known particle was the atom.
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ theorized that the atom was a positively charged sphere embedded with negatively charged electrons.
9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ discovered the nucleus.
10. The atomic theory that we use today is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ model.

*------------------------------------------------------------------------------------------------------------*

1. Matter is organized in several major groups based on its properties. In the chart below fill in the terms that you have learned in this unit. [7]

2. In order to distinguish metal from non-metal we look for characteristics that they do not have in common. (think about the lab we did)

* 1. List three properties that all metals share. [3]
  2. List one property that allows you to determine if something is a non-metal. [1]

3. Our present theory of how the atom is structured evolved over many centuries and many scientists contributed to it. Several of the key points and key scientists are listed below.

* 1. Match the Scientist with the key idea. [4]

\_\_\_ Rutherford a) Electrons are found in specific energy levels

\_\_\_ Bohr b) all matter is made of indivisible particles

\_\_\_ Dalton c) Atoms are made of particles that have charges.

\_\_\_ Thomson d) The mass of the atom is concentrates in the

nucleus

* 1. List the letter of the theories in the order in which they were developed. [2]

1. Today we know that the atom is composed of three particles, protons, neutrons and electrons. In the list below identify where they are found and what their charge is. [6]

Location Charge

Protons

Neutrons

Electrons

1. Using nuclear notation and you periodic table determine the number of elementary particles in these elements [12]

Element # of protons # of neutrons # of electrons





Magnesium – 22

Boron - 12

**Complete the following chart, including states of matter at room temperature.**

|  |  |  |
| --- | --- | --- |
|  | **Chemical Formula + State** | **IUPAC Name** |
| 1. | NaHS(s) |  |
| 2. |  | Aluminum sulfate |
| 3. | H2O2(l) |  |
| 4. |  | Calcium chloride tetrahydrate |
| 5. | H2CO3(aq) |  |
| 6. |  | Sulfuric acid |
| 7. | MnCl2(s) |  |
| 8. |  | Sulfurous acid |
| 9. | Cu(NO2)2(s) |  |
| 10. |  | Ethane |
| 11. | Na2CO3•7H2O(s) |  |
| 12. |  | Sulfur |
| 13. | NaCl(s) |  |
| 14. |  | Hydrofluoric acid |
| 15. | B2H8(g) |  |
| 16. |  | Silicon dioxide |

1. Give two (2) types of evidence that a reaction has occurred.
2. Define endothermic reaction.
3. Label each of the following statements as true or false. (10 marks)
   1. \_\_\_\_\_ Acids form conducting solutions in water.
   2. \_\_\_\_\_ Acids react nonmetals to produce hydrogen gas.
   3. \_\_\_\_\_ Bases turn litmus paper red.
   4. \_\_\_\_\_ Bases have a pH greater than 7.00.
   5. \_\_\_\_\_ Acids feel slippery. (Never touch in a lab)
   6. \_\_\_\_\_ Bases taste bitter. (Never taste anything in a lab)
   7. \_\_\_\_\_ All nitrate-containing compounds have low solubility in water.
   8. \_\_\_\_\_ Molecular compounds form non-conducting solutions.
   9. \_\_\_\_\_ Hydrates are compounds with hydroxide molecules as part of their structure.
   10. \_\_\_\_\_ An ionic compound is made up of a cation plus an anion.
4. Complete the following chart for molecular compounds. Use prefixes only where necessary. (12 marks – 1 mark each square)

|  |  |  |
| --- | --- | --- |
|  | Molecular Formula | IUPAC English Name |
| 1. |  | glucose |
| 2. | S4N2(s) |  |
| 3. | CCl4(L) |  |
| 4. |  | tetraarsenic decaoxide |
| 5. |  | trinitrogen octabromide |
| 6. | P4O10 (s) |  |
| 7. | ICl2 (g) |  |
| 8. | SF6 |  |
| 9. | XeF6 |  |
| 10. |  | ethanol |
| 11. |  | ethane |
| 12. |  | sucrose |

**Chemical Change:** Balancing Chemical Formula Equations

Balance the following equations and **put in the state** wherever possible:

E.g. Mg(s) + 2HCl(aq)  MgCl2(aq) + H2(g)

1. \_\_\_P4(s) + \_\_\_O2(g) \_\_\_P4O10(s)
2. \_\_\_Ac(OH)3(s)  \_\_\_Ac2O3 + \_\_\_H20
3. \_\_\_HNO3(aq) + \_\_\_Al(OH)3(aq)  \_\_\_Al(NO3)3 + \_\_\_HOH
4. \_\_\_Zn(NO3)2(aq) + \_\_\_H2S(s)  \_\_\_ZnS + HNO3
5. \_\_\_SiO2  + \_\_\_C  \_\_\_SiC + \_\_\_CO
6. \_\_\_Ca + \_\_\_H3PO4   \_\_\_Ca3(PO4)2  + \_\_\_H2
7. \_\_\_CaO + \_\_\_NH4Cl  \_\_\_CaCl2  + \_\_\_H2O + \_\_\_NH3
8. \_\_\_Al4C3  + \_\_\_H2O  \_\_\_CH4  + \_\_\_Al(OH)3
9. \_\_\_HCl + \_\_\_Ca(ClO)2  \_\_\_CaCl2  + \_\_\_Cl2 + \_\_\_H2O
10. \_\_\_Br2  + \_\_\_SO2  + \_\_\_H2O  \_\_\_HBr + \_\_\_H2SO4
11. \_\_\_ZnS + \_\_\_O2   \_\_\_ZnO + \_\_\_SO2
12. \_\_\_C3H5(OH)3 + \_\_\_HNO3   \_\_\_C3H5(NO3)3  + \_\_\_H2O
13. \_\_\_Pb(C2H5)4  + \_\_\_O2   \_\_\_CO2  + \_\_\_H2O + \_\_\_PbO

**Chemical Change:** Chemical Equations

For each of the following questions classify the reaction type (f, sd, sr, dr, or c) and predict the balanced chemical equation.

1. \_\_\_Al(s) + \_\_\_O2(g) 
2. \_\_\_Ag2O(s) 
3. \_\_\_Br2(aq) + \_\_\_KI(aq) 
4. \_\_\_BaCl2(aq) + \_\_\_Na2SO4(aq) 
5.  \_\_\_CuS(s) + \_\_\_NaCH3COO(aq)
6. \_\_\_CuS(s) + \_\_\_O2(g) 
7. \_\_\_Na2CO3(aq) + \_\_\_HCl(aq)  \_\_\_NaCl(aq) + \_\_\_CO2(g) + \_\_\_H2O(l)
8. Propane burns in air
9. Sulphuric acid reacts with solid calcium phosphate.
10. Phosphoric acid is neutralized with a calcium hydroxide solution.
11. Carbon disulfide liquid burns in air.
12. Sucrose burns in air.
13. A sodium carbonate solution reacts with aqueous lead (II) nitrate to recover and dispose of an environmentally hazardous substance. How does this reaction help in disposal?

**Molar Mass**

1. What amount of calcium carbonate is present in 6.03 g of the compound?
2. What is the mass of 1.2 mol of copper (II) sulfate octahydrate?
3. A 168 g sample of an unknown element was found to contain 3.01 mol of substance.
   1. What is the molar mass of the substance?
   2. Which element is this substance most likely to be?