Science 10

**Unit A – Chemistry**

**Unit Exam Study Guide**

# Section 1

# Section A 1.1

* Lab safety
* WHMIS and MSDS

# Section A 1.2

* Chemical and physical properties
* Chemical and physical changes
* Classifying matter
* 5 Signs of chemical reactions

**Section A 1.3 – The History of Chemistry**

* Atomic models and history (Bohr, Rutherford, etc.)
* Subatomic particles (mass and charge)

# Section 2

# Section A 2.1 – The Periodic Table

* Patterns of the table
  + Families/ Groups (and names )
  + Periods
  + Atomic number
* Atomic theory and electron energy levels
  + The rule of 8
* Isotopes and symbols
* Ionization (rule of 8)
* Naming ions (cation vs. anion)

# Section A 2.2 – Ionic vs. Molecular compounds

* Classification and naming
* Naming and formulas for ionic compounds
  + Simple ionic
  + Multivalent ionic
  + Complex ionic
* Naming and formulas for molecular compounds

**\*\*MEMORIZE THE PREFIXES\*\***

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| #Atoms | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Prefix | mono | di | tri | tetra | penta | hexa | hepta | octa | nona | deca |

**\*\*MEMORIXE TABLE A 2.12\*\***

|  |  |
| --- | --- |
| **Name** | **Chemical Formula** |
| water | H­2O |
| hydrogen peroxide | H2O2 |
| ammonia | NH3 |
| sucrose | C12H22O11 |
| methane | CH4 |
| propane | C3H8 |
| methanol | CH3OH |
| ethanol | C2H5OH |
| hydrogen sulphide | H2S |

* Naming and formulas for acids
  + How do you recognize an acid?

# Section A 2.3 – Properties of Ionic & Molecular compound and Acids & Bases

* Conductivity
* Solubility 🡪 solubility table
* Phase at room temperature
* Colour of solutions

Acid and Bases properties

* Bases are ionic hydroxides
* Acids are aqueous solutions with H as a cation
* Indicators, pH scale, buffers,
* Acid + Base reaction = neutralization

# Section 3

# Section A 3.1 – Chemical Change

* Example of chemical change
  + Gas formation, solid formation (precipitate), energy (exothermic/endothermic)
  + Photosynthesis and Cellular respiration
  + Conservation of mass

# Section A 3.2 – Word equations and Chemical equations

* Balancing
* 5 types of reactions – classification
  + formation, decomposition, hydrocarbon combustion, single replacement and double replacement.
* Predict reactions and products

A1.1 - WHMIS SYMBOLS

Write the name of the safety symbol beside each of the symbols on the left.

|  |
| --- |
| **WHMIS Symbols** |
|
|
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

**BONUS:** What does “WHMIS” stand for?

Chemical vs. Physical Properties

List as many chemical and physical properties as you can.

|  |  |
| --- | --- |
| CHEMICAL PROPERTIES | PHYSICAL PROPERTIES |
|  |  |

Chemical change vs. Physical change

Classify the following as chemical (C) or physical (P) changes. (1 mark each)

* 1. Car rusting \_\_\_\_\_\_\_\_\_
  2. Digesting food \_\_\_\_\_\_\_\_\_
  3. Sweat evaporating \_\_\_\_\_\_\_\_\_
  4. Burning paper \_\_\_\_\_\_\_\_\_
  5. Making ice \_\_\_\_\_\_\_\_\_
  6. Bubbling soup in a pot \_\_\_\_\_\_\_\_\_

Fill in the missing terms in the following chart about the organization of matter:

# 

MIXTURES

Homogeneous Compounds

Mixtures

(Solutions) Ex) Carbon, Ex)

Oxygen, Iron

### Periodic Table Review

1. For the periodic table and it’s parts & atomic structure, complete the following:
   1. The vertical columns are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and horizontal rows are known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   2. \_\_\_\_\_\_\_\_\_\_\_\_ are found to the left of the staircase, while \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are found to the right of the staircase. Elements that are located very close to the staircase are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   3. Group #1 is known as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. Group #2 is known as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. Group #17 is known as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   6. Group #18 is known as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   7. In general, the elements in the middle of the table are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. In the atom, the nucleus consists of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Orbiting around the outside are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. How do you determine the atomic number of an atom?
4. What is an isotope? How do you determine the mass number?
5. What is an ion? When do they form?
6. Another name for a positive ion is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Another name for a negative ion is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. The name for the outer electrons is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ electrons.
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ compounds transfer electrons, whereas \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ compounds have covalent bonds.

Atoms and Ions Practice

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Symbol** | **Mass Number** | **Atomic Number** | **Protons** | **Neutrons** | **Electrons** | **Electric**  **Charge** |
| fluorine atom | F | 19 | 9 | 9 | 10 | 9 | 0 |
| nitride ion | N3− | 15 | 7 | 7 | 8 | 10 | 3− |
| boron atom |  | 11 |  |  |  |  |  |
| carbon atom |  | 14 |  |  |  |  |  |
| aluminium ion |  |  |  |  | 14 |  | 3+ |
| gold ion |  |  |  |  | 116 |  | 1+ |
|  |  | 40 |  | 19 |  |  | 0 |
|  |  | 79 | 35 |  |  | 35 |  |
|  |  |  |  |  | 19 | 18 | 1− |
|  |  |  |  | 16 | 16 |  | 2− |
|  | Ag | 110 |  |  |  |  |  |
| cesium ion |  |  |  |  | 77 |  | 1+ |
|  | I− | 125 |  |  |  |  |  |

***Complete the following table. Each blank is worth 1 mark.***

|  |  |  |
| --- | --- | --- |
|  | **Chemical Formula** | Chemical Name |
| **1** | **H2O** |  |
| **2** |  | **tribromine nonasulphide** |
| **3** | **Zn3N2** |  |
| **4** |  | **gold ( III ) nitrate** |
| **5** |  | **sulfur** |
| **6** | **Na3PO4** |  |
| **7** |  | **sucrose** |
| **8** | **SrF2** |  |
| **9** |  | **calcium sulphite** |
| **10** |  | **lead (IV) carbonate** |
| **11** | **NH3** |  |
| **12** | **Al(ClO3)3** |  |
| **13** | **Cu2O** |  |
| **14** |  | **ozone** |
| **15** | **Ba(MnO4)2** |  |
| **16** | **H3P (aq)** |  |
| **17** |  | **potassium bicarbonate** |
| **18** |  | **hydrogen** |
| **19** | **(NH4)2SO4** |  |
| **20** |  | **nitrogen monoxide** |

Complete the following table. Each blank is worth 1 mark.

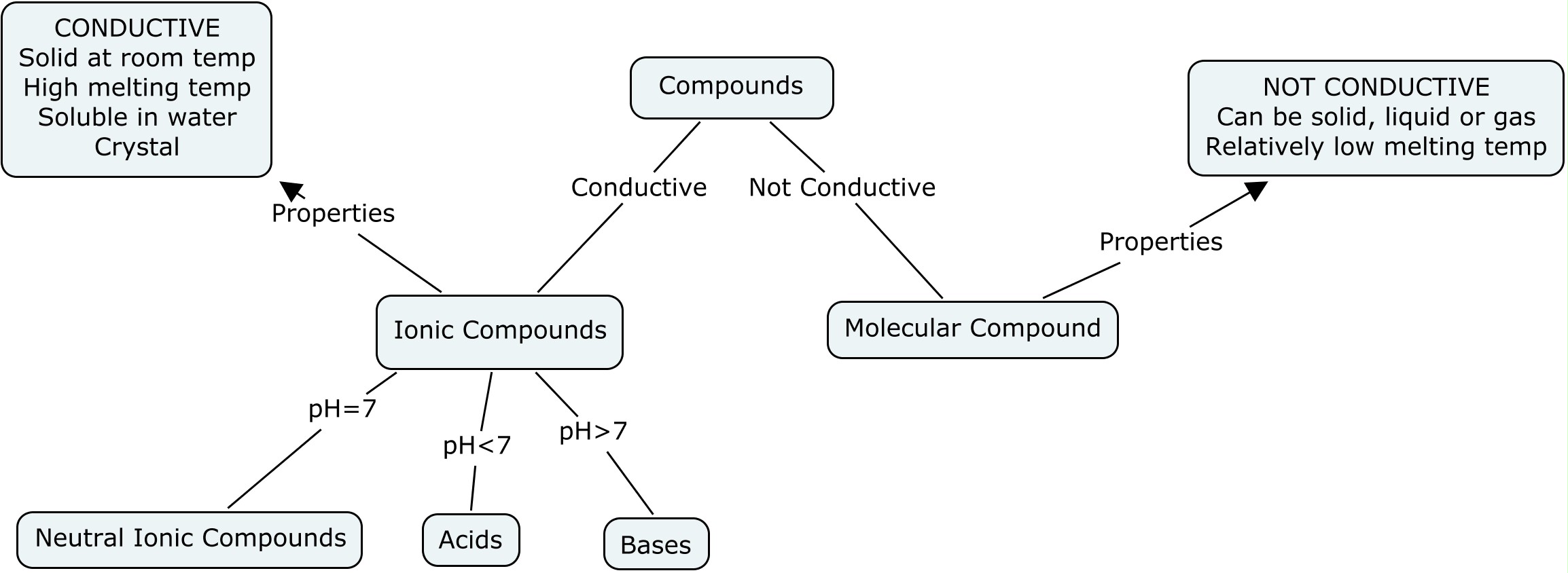
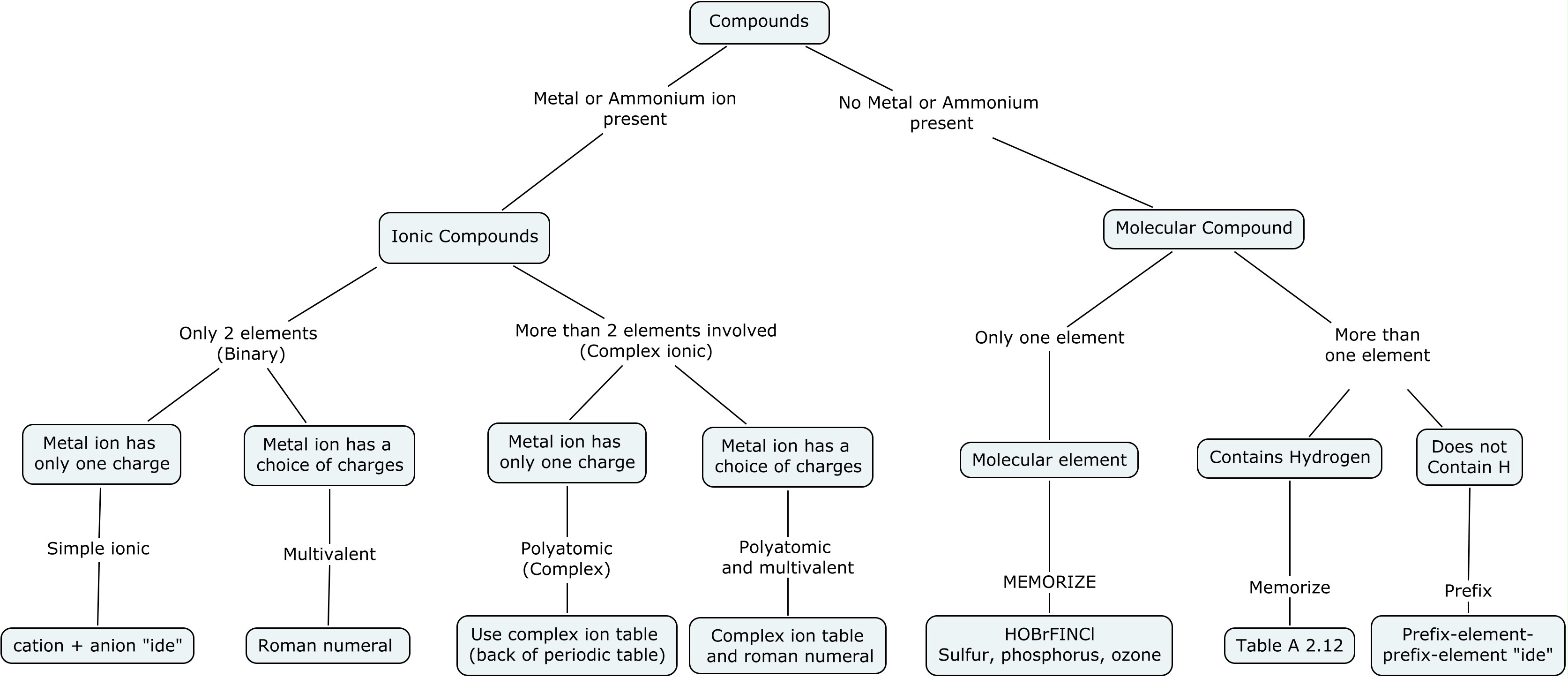
|  |  |  |  |
| --- | --- | --- | --- |
|  | (i)onic,  (m)olecular,  (a)cid | **Chemical Formula** | Chemical Name |
| **1** |  | **CH4** |  |
| **2** |  |  | **carbon tetrachloride** |
| **3** |  | **Al2O3** |  |
| **4** |  |  | **iron ( III ) sulphate** |
| **5** |  |  | **acetic acid** |
| **6** |  | **CaCO3** |  |
| **7** |  |  | **ammonia** |
| **8** |  | **UO3** |  |
| **9** |  |  | **strontium nitrite** |
| **10** |  |  | **copper (II) phosphate** |
| **11** |  | **H2SO4 ( aq )** |  |
| **12** |  | **FrI** |  |
| **13** |  | **Br3S8** |  |
| **14** |  |  | **aluminum hydrogen phosphate** |
| **15** |  | **Ba3N2** |  |
| **16** |  | **H3N (aq)** |  |
| **17** |  |  | **potassium permanganate** |
| **18** |  |  | **chlorine** |
| **19** |  | **Sn(HCO3)4** |  |
| **20** |  |  | **sulphurous acid** |

SOLUBILITY OF IONIC SUBSTANCES

*FILL IN THE FOLLOWING TABLE, WRITE THE FORMULA OR NAME OF EACH CHEMICAL. INDICATE WHETHER THE IONIC COMPOUND LISTED IS* ***SOLUBLE*** *(aq) or* ***INSOLUBLE*** *(s) IN SOLUTION.*

*YOU MAY PUT EITHER “aq” OR “s”.*

|  |  |  |  |
| --- | --- | --- | --- |
| # | FORMULA | **NAME** | **aq or s** |
| 1 | AgCl |  |  |
| 2 | CaS |  |  |
| 3 | Cu(NO3)2 |  |  |
| 4 | AgCH3COO |  |  |
| 5 | NaCH3COO |  |  |
| 6 | CuO |  |  |
| 7 | CoS |  |  |
| 8 | Al(OH)3 |  |  |
| 9 | Ca3(PO4)2 |  |  |
| 10 | TlOH |  |  |
| 11 |  | thallium(III)hydroxide |  |
| 12 |  | francium carbonate |  |
| 13 |  | barium phosphate |  |
| 14 |  | mercury (I) bromide |  |
| 15 |  | silver chlorate |  |
| 16 |  | ammonium sulfide |  |
| 17 |  | lead (II) sulfate |  |
| 18 |  | potassium hydroxide |  |
| 19 |  | copper (II) iodide |  |
| 20 |  | zinc perchlorate |  |



### For the following reactions:

### 1) Change the word equations to proper formulas.

*2) Balance the overall equations.*

*3) Indicate on the line in the right hand margin whether the reaction is a* (F)*ormation,* (D)*ecomposition,*

(SR)*Single Replacement,* (DR)*Double Replacement, or* (HC)*Hydrocarbon Combustion reaction.*

*4) For the last two reactions, you must predict the products of the reaction (formulas only) before balancing.*

***BONUS:*** *Indicate the STATES of each substance (g), (l), (s), or (aq)*

1. strontium + nitrogen 🡪 strontium nitride \_\_\_\_\_\_
2. sucrose + oxygen 🡪 carbon dioxide + water \_\_\_\_\_\_
3. chromium (III) oxide 🡪 chromium + oxygen \_\_\_\_\_\_
4. magnesium + silver nitrate solution🡪 \_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
5. lead (II) nitrate + sodium sulfate solution 🡪 \_\_\_\_\_\_\_ + \_\_\_\_\_\_\_ \_\_\_\_\_\_