Name: Chemistry I

Mid-Semester Review: Units 1 – 4

Part I: Classify each of the following substances as; an element, a compound, a homogeneous or a heterogeneous mixture.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1.  Sand | | 2.  Salt | | 3.  Pure Water | 4.  Soil | | |
| 5.  Soda | | 6.  Pure Air | | 7.  Carbon Dioxide | 8.  Gold | | |
| 9.  Bronze | | 10. Oxygen | | 11.  Salad Dressing | 12. Salt Water | | |
| Part IIA: Identify each of the following changes and chemical or physical. | | | | |
| 13. Freezing of H2O | | | 14. Burning wood | | | |
| 15. Rusting of a nail | | | 16. Melting Metal | | | |
| 17. Dissolving salt in water | | | 18. Distilling water | | | |

**1. How many atoms of oxygen are in the following compound: Zn3(PO3)2 ? Al(OH)3 ?**

***2. How Many Significant figures are in the following:* Do the operation and report to the correct SF:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A | **25,050** |  | **A** | **3.482 + 7.5 =** |  |
| B | **1.0025** |  | **B** | **684.89 -25.752 =** |  |
| C | **0.0025** |  | **C** | **5.564 x 2.2 =** |  |
| D | **3.450 x 10-6** |  | **D** | **15,000 / 3.0000 =** |  |
| E | **3.000** |  | **D** | **15,000 / 3.0000 =** |  |
| F | **200.000** |  | **E** | **2.56 x 104 x 2.203 x 10-3** |  |

Please make the following metric conversions. List the metric prefixes from largest to smallest.

|  |  |  |  |
| --- | --- | --- | --- |
| A 0.0025 kg to grams |  | E 535 liters to milliliters |  |
| B 123.56 ml to kL |  | F 125150 cg to hectograms |  |
| C 0.525cm to m |  | G 0.17850 meters to mm |  |
| D 1258.025kg to cg |  | H 0.15214mg to kg |  |

Part III: Determine the atomic structure of the following atoms and provide the shorthand notation.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Element** | **Nuclear Shorthand Notation** | **#p+** | **#n0** | **#e-** | **Number of valence electrons** | **Lewis dot diagram** |
| **Sodium** |  |  |  |  |  |  |
| **Chlorine** |  |  |  |  |  |  |
| **Barium** |  |  |  |  |  |  |
| **Neon** |  |  |  |  |  |  |

Nomenclature:

Give the name for the following:

|  |  |  |  |
| --- | --- | --- | --- |
| 19. KCN |  | 23 N2O3 |  |
| 20. Cu(OH)2 |  | 24. NH4Br |  |
| 21 Al2(SO4)3 |  | 25 Zn3(PO4)2 |  |
| 22 . PbSO4 |  | 26. PbCl4 |  |
| C2P5 |  | CaS |  |
| Na2SO4 |  | FeCl4 |  |

Give the formula for the following:

|  |  |  |  |
| --- | --- | --- | --- |
| copper II nitrate |  | Arsenic trichloride |  |
| sodium nitride |  | Lead II oxide |  |
| zinc hydroxide |  | barium sulfide |  |
| silver phosphate |  | aluminum cyanide |  |
| Tricarbon Dintride |  | Iron III Bromide |  |
| Ammonium Nitrate |  | Sodium Carbonate |  |

Part VII: Open Reponses

1. Define the following terms: Element, compound, homogeneous mixture and heterogeneous mixture. Classify the following using the previous terms and explain your reasoning: chocolate chip cookie, lead, Sugar (C6H12O6), and salt water solution.
2. What are the 3 main states of Matter and discuss their properties with respect to Particle interactions, Particle Motion, Volume and Shape.
3. Describe the 3 particles that make up an Atom in terms of charge, mass, and location in side of the atom.

4) Cindy is unsure how to tell if a chemical reaction has occurred. Please explain at least **three** different physical **observational indicators** she should look for?

5) What three general physical properties could a chemist use to determine which element was a metal or a non-metal?

6) Cindy finds a waste container in a stock room. It is labeled: **nickel, carbon, and salt,** She needs to separate all the components (parts). Please design an **experimen**t to achieve the separation of each from the waste container. **Please classify the matter as homogeneous, heterogeneous, element, compound at EACH STEP and the physical property that allowed the separation.** (You may use a flow chart **)**

**Chemistry I CP Mid-Semester Exam Math Review**

1. Carbon tetrachloride is a solvent used for degreasing electronic parts. If 25.0mL of carbon tetrachloride has a mass of 39.75g, what is the density of the liquid? (1.59g/mL)
2. An automobile battery contains 1275mL of sulfuric acid. If the density of battery acid is 1.84g/mL, how many grams of acid are in the battery? (2350g)
3. A  piece of wood that measures 3.0 cm by  6.0 cm by 4.0 cm has a [mass](javascript:def('/Glossary/glossaryterm.aspx?word=Mass',%20500,%20500);) of 80.0 grams. What is the [density](javascript:def('/Glossary/glossaryterm.aspx?word=Density',%20500,%20500);) of the wood? Would the piece of wood float in water?  (0.11 g/cm3)
4. What is the molar mass of Al2(SO4)3? What is the Molar mass of Ca(OH)2 ( 278.14g/mol 74.08g/mol)
5. Trinitrotoluene, TNT, is a white crystalline substance that explodes at 240°C. Calculate the percent composition of TNT, C7H5(NO2)3. (37.01% C, 2.22% H, 18.50% N, & 42.26%O)
6. A quadrillion is approximately the number of red blood cells in 50,000 people. Which is greater: a quadrillion, 1x1015, red blood cells or the number of nickel atoms in a 5g nickel coin? (5g nickel coin, 5x1022 atoms Ni)
7. **2.15 x 1024 atoms** of magnesium are used in anexperiment, how many **grams** were consumed?
8. Small amounts of phosphoric acid, H3PO4, are used in common soft drinks. Calculate the mass of acid present in 0.731 moles of acid. (71.6g H3PO4)
9. How many atoms are in 55.0 grams of Nitrogen? (1.38 x 1024 atoms)
10. How many atoms of Mg3N2 are in 4.56g of Mg3N2?(2.72x1022 atoms Mg3N2)