**Oxford High School**

**Chemistry**

**Chapter 1-15 Cumulative Review**

1. The half-life of Iodine-131 is 8 days. If one gram of this radioisotope was present in the original sample, how much would be left after 24 days?
2. What volume of hydrogen gas is required to produce 500. L of ammonia at STP according the equation below?

N2(g) + 3H2(g) → 2NH3(g)

1. How many grams of Na2SO4, sodium sulfate, are needed to make 45 cm3 of a 0.020M solution?
2. Most materials that have a molecular weight close to that of water are gases at room temperature. Explain why water is a liquid at room temperature and not a gas like compounds of similar molecular weight.
3. What is the molarity of 100. mL of solution containing 1.01 g of potassium nitrate, KNO3?
4. Which of the following factors would not affect the rate at which a solution forms?
5. Temperature
6. Concentration
7. Stirring
8. Surface area
9. Which of the following is the reason why stirring generally increases that rate of solution formation?
10. Stirring increases the average kinetic energy of the solute raising the temperature
11. Stirring causes fresh solvent to come into contact with the solute
12. Stirring causes the solvent molecules to change their spatial orientation making them more likely to collide with the solute particles
13. None of these explanations are likely
14. A solution is made by dissolving 13.5 g of glucose (C6H12O6) in 100.0 g of water. What is the mass percent of this solution?
15. If 15.0 mL of ethanol is added to 95.0 mL of water, what is the percent volume of ethanol?
16. A. Complete the following table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Compound | Ionic Bond | Covalent Bond | Soluble in Water | Soluble in Benzene (C6H6) | Rational for solubility |
| CBr4 |  |  |  |  |  |
| C8H18  gasoline |  |  |  |  |  |
| CaCl2 |  |  |  |  |  |
| KNO3 |  |  |  |  |  |

B. NaCl and sugar (C6H12O6) both dissolve in water.

1. Which dissolves better and why?
2. Which is a good conductor when dissolved? Explain why using equations.
3. True or false

\_\_\_\_\_ Increasing the temperature will increase the solubility of a gas in water.

\_\_\_\_\_ Increasing the temperature will increase the solubility of a salt in water.

\_\_\_\_\_ Increasing surface area means making the particles bigger.

\_\_\_\_\_ Increase surface area will decrease the solubility of a salt in water.

\_\_\_\_\_ Decreasing the concentration of a material will increase the solubility of that material.

\_\_\_\_\_ Surface area has no effect on solubility.

\_\_\_\_\_ Smaller particles allow the solvent to contact more solute, thereby increasing solubility of a salt.

\_\_\_\_\_ Stirring moves fresh solvent away from solute, thereby lowering solubility of a salt in water.

\_\_\_\_\_ Temperature increases solubility because the solute falls apart at higher temperatures.

­­­\_\_\_\_\_ The periodic table is arranged on increasing atomic mass.

\_\_\_\_\_ Similar properties are the basis for the horizontal arrangement of elements on the periodic table.

1. What is the electron configuration and orbital diagram for
2. Gallium
3. Ga3+
4. Using the electron configuration for carbon, explain the distribution of electrons in terms of energy levels, orbital shapes, orbitals, and probability.
5. Using the Bohr atom, explain why copper emits a green flame when heated.
6. Complete the following table

|  |  |  |  |
| --- | --- | --- | --- |
| Elements | Valence electrons | Type of Bond | Rational for bond |
| K  Cl |  |  |  |
| C  Br |  |  |  |
| P  O |  |  |  |
| Al  S |  |  |  |

1. Why is sodium more reactive than magnesium? (hint:octet)
2. Why is chlorine more reactive than sulfur? (hint:octet)
3. Consider the element Cl, S, Ba, Li and answer the following questions

\_\_\_\_\_\_ The element with the highest (most negative) electron affinity.

\_\_\_\_\_\_ The element with the smallest radius.

\_\_\_\_\_\_ The element with the biggest radius.

\_\_\_\_\_\_ The element with the lowest electronegativity.

\_\_\_\_\_\_ Of the two metals listed, which is the most reactive?

\_\_\_\_\_\_ Of the two nonmetals listed, which is the most reactive?

\_\_\_\_\_\_ The element most likely to lose an electron.

\_\_\_\_\_\_ The element most likely to gain an electron.

\_\_\_\_\_\_ The largest element.