Biology 48 - Human Physiology
Spring 2008

Chemistry Pre-Test Worksheet

✯ The following problems are designed to evaluate your understanding and competence in basic chemistry. You should be able to solve these types of problems. If you are having difficulty them you should seek help. Understanding the chemistry reflected in these questions is essential for creating the basis for understanding many physiological fundamentals.

1. Define : a. Molecular weight
   b. Gram molecular weight :

2. Define : a. Mole
   b. Molality
   c. Solution
   d. Solvent
   e. Solute

3. Define : a. Ion – Anion / Cation
   b. Isotope
   c. Salt

4. Define : a. Acid
   b. Base
   c. Buffer

5. Carbon has an atomic number of 6.
   a. How many protons, electrons, and neutrons does this atom contain ?
   b. What is its overall atomic weight ?
   c. What is its overall atomic charge ?
   d. How many valences does an UNREACTED carbon have ?
   e. How many bonds is carbon likely to form ? Why ?

6. Chlorine has an atomic number of 17.
   a. How many valences does an UNREACTED Chlorine have ?
   b. What *type* of bond (Polar Covalent, Non-Polar Covalent, Ionic, Hydrogen) is Chlorine likely to form ? Why ?

7. Water is described as a polar molecule. Diagram a water molecule and indicate the polar bonds.

8. Calculate the pH and then list the following in order of increasing acidity :

   pH 8, $[H+] = 10^{-4}$, $[OH-] = 10^{-7}$, pH 3

9. What is the valence of the following ions : Sodium, Potassium, Calcium, Chloride, Hydrogen.

10. Determine the molecular weight of the following :
    a. Water : H_2O
    b. Sodium chloride : NaCl
    c. Calcium Chloride : $CaCl_2$

d. Glucose ($C_6H_{12}O_6$)

11. How much solute is in :
    a. 1 liter of a 1 Molal (*m*) solution
    b. 500 mls of a 1 Molal (*m*) solution
    c. 500 mls of a 2 Molal (*m*) solution

12. Given 22 grams of NaCl : determine
    a. The number of moles
    b. The number of molecules
    c. If dissolved in 1 (kilogram) liter of water (4°C) : Molality (*m*)

13. Convert from grams to moles :
    a. 0.9 g H2O = _____ moles
    b. 1 g glucose = _____ moles
    c. 13 g KCl = _____ moles

14. Convert from moles to grams :
    a. 0.2 moles NaCl = _____ grams
    b. 25 millimoles glucose = _____ grams
    c. 1.2 moles glucose = _____grams

15. Convert the following :
    a. 1 *m* (molal) glucose solution contains _____ grams glucose per liter
    b. 1 *m* (molal) glucose solution = _____ osmoles
    c. 0.2 *m* (molal) NaCl solution contains _____ grams NaCl per liter
    d. 0.2 *m* (molal) NaCl solution = _____ osmoles

16. 25 grams of sodium chloride (NaCl) are dissolved in one liter of water. What is the molality (*m*) of this solution?

17. 45 grams of glucose are dissolved in 500 mls of water. What is the molality (*m*) of this solution?

18. How many grams of glucose are in 2 liters of a 2.0 *m* (molal) glucose solution?