**Ch. 2 homework – Chemistry of Life (Anatomy & Physiology)**

Name and date submitted (3 pts):

Create space in the Word document below, and write or type your answers. Turn in your completed work as an email attachment. Check your class emails for the due date.

(20 questions, 100 points possible)

1. Table 2.1 in your book lists the main chemical elements in the body. Fill in the missing information below. Each line should have 3 pieces of information. There are 11 lines.

Element Symbol % of total body mass

Oxygen

H

Sulfur 0.25%

Fe

Carbon

N 3.2%

Ca

Phosphorus

Na

Mg 0.1%

Potassium

1. Structure of atoms (p. 30)
   1. What is an atom?
   2. What is the nucleus of an atom
   3. What is a proton
   4. What is a neutron
   5. What is an electron
2. Atomic number (p. 30)
   1. What determines the atomic number of an atom?
   2. What determines the mass number of an atom
   3. What is meant by “radioactive isotope”
3. Atomic mass (p. 30-31)
   1. What is meant by “atomic mass”?
   2. Compare the size of an electron to the size of a proton or neutron
4. Figure 2.2: State the 1) atomic number, and 2) atomic mass of the following elements
   1. Hydrogen
   2. Carbon
   3. Nitrogen
   4. Oxygen
5. Ions, molecules, and compounds (p. 32)
   1. What is an ion?
   2. What is a molecule?
   3. What is a compound?
   4. What is a free radical?
6. Table 2.2: Identify the name of the following (10) ionic compounds in the body
   1. H+ (example: hydrogen ion)
   2. Ca2+
   3. Na+
   4. Mg2+
   5. Fe2+
   6. Fe3+
   7. Cl-
   8. OH-
   9. SO42-
   10. PO43-
7. Covalent bonds (p. 34): Describe how a covalent bond is formed between atoms
8. Hydrogen bonds (p. 35)
   1. When does a hydrogen bond form?
   2. Why does water have high surface tension?
9. Water (p. 39) is the most important inorganic compound in all living systems.

a. Explain why water is an excellent solvent in living systems. Elaborate.

b. In a hurry one day, you merely rinse your lunch dishes with water. As you are drying your salad bowl, you notice that it still has an oily film. Why was the water alone not effective in cleaning the bowl? Explain, using the chemical properties of water.

1. Solutions, colloids, and suspensions (p. 40): Sally mixes up a batch of pancake batter, then stirs in some chocolate chips. As she is waiting for the first few pancakes to cook, she notices the chocolate chips sinking to the bottom of the clear glass mixing bowl. The chocolate-chip batter is an example of a
2. Solvent
3. Solute
4. Solution
5. Suspension
6. The concept of pH (p. 41): Jake is three years old and as a result of a “stomach bug” has been vomiting for about 24 hours. His blood pH is 7.48. What does this mean?
7. His blood is slightly acidic
8. His blood is slightly alkaline
9. His blood is highly acidic
10. His blood is within the normal range (refer to Table 2.4)
11. pH, continued (p. 42)
    1. Explain the function of buffer systems in the body
    2. Describe how the “carbonic acid-bicarbonate buffer system” works in the body
12. Organic compounds (starting p. 43): The major categories of organic molecules in your body are…. (Choose the best answer. Refer to the lecture PowerPoint posted in the Unit if you can’t remember)
13. Proteins, lipids, water, blood plasma
14. Carbohydrates, proteins, sugars, saliva
15. Proteins, carbohydrates, lipids, nucleic acids
16. Water, blood, saliva, proteins
17. Simple carbohydrates (starting p. 44):
18. Blood sugar is glucose. A way to visualize glucose is to think about corn syrup, which is pretty much pure glucose. (high-fructose corn syrup is a different product). Sketch a molecule of glucose in all its glory. You can find a picture on p. 45 and even better pictures on the Internet. DO A NEAT SKETCH. Your sketch should depict the “structural formula”.
19. Fruit sugar is fructose. Sketch a molecule of fructose. TAKE PRIDE IN YOUR SKETCHES.
20. Table sugar is sucrose. This is the sugar in soda pop. Sucrose is actually made up of glucose and fructose bonded together. Carefully sketch a molecule of sucrose.
21. Lipids (starting p. 46)
    1. What is meant by “lipid”?
    2. What is meant by “fatty acid”?
    3. What is meant by “triglyceride”?
22. Proteins (starting p. 50)
    1. Define “proteins”
    2. What are “amino acids”, and how are they connected with proteins?
    3. Explain to an intelligent 5th grader what an “enzyme” is, and what it does (p. 53)
23. Nucleic acids (starting p. 54)
    1. Name the two types of nucleic acids found in the body
    2. Explain what Watson and Crick discovered in 1953 which is really important in understanding how our bodies function (beginning p. 54)
24. Enzymes (p. 53): Chewing a bite of bread mixes it with saliva and facilitates its chemical breakdown. This is most likely due to the fact that
25. The inside of the mouth maintains a very high temperature
26. Chewing stores potential energy
27. Chewing facilitates synthesis reactions
28. Saliva contains amylase
29. In question #1, you described eleven (11) chemical elements in the body. Choose any one of the eleven; do Internet research and explain how the body obtains that element, and what function that element performs in the body (what does it do, chemically speaking?). Include pictures and diagrams, chemical equations, and any other information which helps explain its source & function in the body. I’m looking for about ½ page of information.