Homework Questions: Chapter 1-5 BSC1010

Chapter 1

1. List the properties of life.
2. What is evolution and relate the concept to Charles Darwin's Theory of Natural Selection.
3. Explain each of the levels of Biological Organization (refer also to lab manual)
4. Explain figure 1.5
5. Compare and contrast Eukaryotic with prokaryotic cells (Be able to draw and label a picture).
6. Define: DNA, gene, chromosome, genome, and explain the relation of them all to each other.
7. Distinguish between positive and negative feedback regulation.
8. What are the 3 domains of life, and how do you classify life (broadest to narrowest). What are the eukaryotic Kingdoms.
9. What are the two main types of inquiry and give a brief explanation of each.

Chapter 2

1. Define matter.
2. Are trace elements essential elements?
3. What are the subatomic particles of an atom?
4.The difference between the mass number and the atomic number of an atom is equal to the number of _____. An atom of phosphorus, P, contains _____ protons, _____electrons, and _____neutrons. The atomic weight of phosphorus is _____.
5. To move to a shell farther from the nucleus, and electron must (absorb/ release) energy; energy is (absorbed/ released) when an electron moves to a closer shell. (circle correct terms).
6. Distinguish between orbitals, valence electrons, valence shell, and valence.
7. What are the valences of H, O, N, and C.
8. Draw the electron configuration of : N, Mg, O, Cl.
9. Explain whether the following molecules contain nonpolar or polar covalent bonds. (Hint: N and O both have high electronegativities).
   a. Methane
   b. Ammonia
10. Calcium and chlorine can combine to form the salt calcium chloride. Based on the number of electron in their valence shells and their bonding capacities, what would the molecular formula for this salt be? Which atom becomes the cation?

Chapter 3

1. What must absorb or release a relatively large quantity of heat in order for its temperature to change. Heat must be (absorbed/released) to break hydrogen bonds before water molecules can move faster and the temperature can rise, and

conversely, heat is (absorbed/released) when hydrogen bonds form as the temperature of water drops.
2. Complete the following:
If pH =3, then [H+]=?, and [OH-]=?
If $[H+]=10^{-8}$, then [OH-]=?, and pH=?
If $[OH-]=10^{-7}$, then [H+] and pH=?
3. What is the definition of evaporative cooling.
4. At what temperature is water most dense?
5. Explain the carbonic acid/bicarbonate biological buffer system. Indicate in which direction will the reaction proceed when the pH of a solution beings to fall, and when the pH rises above normal level.
6. Define: hydrophilic, hydrophobic, cohesion, adhesion and give an example of each.

Chapter 4
1. What are isomers: explain the difference between the three types of isomers.
2. Be able to give an example and draw each of the functional groups.
3. Which functional groups acts as a base? As an acid?
4. Which functional group forms disulfide bonds?
5. What functional groups do amino acids possess?

Chapter5

1. What are the four main molecules of study?
2. Explain how a monomer can form a polymer, and how a polymer can become a monomeric subunit.
3. What is the difference between condensation (dehydration) and hydrolysis reactions?
4. What is the formula of a Carbohydrate?
5. Explain the difference between a monosaccharide, disaccharide, and polysaccharide.
6. What type of bond forms between disaccharides?
7. What are the storage and structural polysaccharides?
8. Describe the difference between fats, phospholipids, and steroids.
9. How do amino acids form into a protein (talk about primary, secondary, tertiary, and quaternary structure)?
10. What is a peptide bond?
11. Be able to label the N and C terminus of a polypeptide.
12. What makes each amino acid distinct from one another?
13. What helps in the proper folding of proteins?
14. What describes the flow of information in eukaryotic cells?
15. What is the monomeric subunit of nucleic acids? What is it composed of?
16. Explain the difference between a purine and pyrimidine.
17. What are enzymes?