BIO 1 EXAM 1 ESSAY QUESTIONS: Four of these essay questions will be on the exam and you will choose to write on three out of the four. Each of the three questions will be worth 10 exam points.

1. A) State what a hypothesis is and what the scientific method is.
   B) State the difference between a scientific theory and the everyday use of the word “theory”.
   C) State the three scientific principles having to do with the scientific process.

2. State 5 characteristics that living things possess.

3. A) Diagram and label the 3 main subatomic particles of an atom. Also, state the charge of each particle.
   B) Name and define the two types of chemical bonds that we discussed.

4. A) Define what an isotope is and state what they emit.
   B) State four ways in which radioactive isotopes are used today.
   C) Briefly and generally describe how carbon-14 is used to determine the age of fossils.

5. A) State three of the four life supporting properties of water that we discussed.
   B) Describe why water is so good at providing each property that you previously stated.
   C) Give one specific example describing why each property is important to life.

6. A) Give an example of each type of solution: acidic, neutral, and alkaline (basic).
   B) State what the pH scale measures and state the range of numbers that represents acids, neutral solutions, and bases.
   C) Describe what can happen to cells if their pH levels are too acidic or if it goes outside normal limits. And, what organisms produce in order to keep their internal pH within normal limits.

7. Name the four types of large organic molecules found in cells. For each large organic molecule type state:
   A) its specific monomer (if it has a specific monomer).
   B) two functions that it provides to a cell.
   C) one specific example that we discussed.

8. The four polysaccharides (complex carbohydrates) that we discussed were 1) starch, 2) glycogen, 3) cellulose, and 4) chitin.
   A) State the function that each is used for and whether it is used by plants or animals.
   B) State which polysaccharide is the most abundant on earth.

9. A) Name (do not abbreviate) the two types of lipoproteins that we discussed.
   B) State which type is called the “bad cholesterol” and which is the “good cholesterol”.
   C) Explain why high amounts of the “bad cholesterol” is unhealthy and why the “good cholesterol” is healthier to have in one’s body.

10. A) Describe the structure and shape of saturated and unsaturated fats and state which is solid and which is liquid at room temperature.
    B) State how: 1) Monounsaturated & Polyunsaturated Fats 2) Saturated Fats, 3) and Trans fats, affect LDL and HDL levels.
    C) State the type of foods 1) Monounsaturated & Polyunsaturated Fats 2) Saturated Fats, 3) and Trans fats can be found in.

11. Read the online article “Rebuilding the Food Pyramid” and answer the following questions:
    A) According to the article, describe why the rate of coronary heart disease is so much lower in the Greek island of Crete even though the people there tend to have a high fat diet.
    B) Describe how the old food pyramid is different from the new food pyramid regarding the amount of meat (saturated fats) and plant oil (unsaturated fats) one should eat.
    C) According to the article, state the best way to avoid obesity.

MORE QUESTIONS ON BACK OF THIS PAGE
12. A) Name the two main types of cells and state four ways that they are different from each other.
   B) Using what you learned about surface area to volume ratios, explain why cells are so small and limited to how large they can be.

13. Name the five structures involved in the production of a protein in a eukaryotic cell and describe the step in protein production that occurs within each structure.

14. State the function of 1) the smooth endoplasmic reticulum, 2) lysosomes, 3) mitochondria, 4) the cytoskeleton, and 5) cilia and flagella.

15. Name the three structures that plant cells have but animal cells do not and describe the main function of these three structures.

16. A) State two functions that the plasma membrane provides.
   B) Name the 4 main components of the plasma membrane and state one function of each.

17. A) Name and describe the three types of passive transport and that we discussed.
   B) Briefly describe how passive transport differs from active transport.

18. A) Describe what a hypertonic, isotonic, and hypotonic solution is.
   B) Describe what would happen to the water concentration of an animal cell if it was placed in each of these solutions.

19. A) State what the endosymbiotic theory explains.
   B) Describe how some larger prokaryotes may have taken in smaller prokaryotes and state what kinds of organelles these smaller prokaryotes may have evolved into overtime.
   C) State the four lines of evidence that support this theory.