**Unit 2: Biochemistry Study Guide**

**Vocabulary:**

Define the following words on a separate sheet of paper.

Hydrogen Bond Monomer Enzyme

Acid Polymer Substrate

Base Polypeptide Active Site

Buffer Polysaccharide Activation Energy

Metabolism Covalent Bond Ionic Bond

**Short Answer:**

1. Indicate whether or not the following pHs would be considered a weak acid or base, a strong acid or base, or neutral.



\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 7 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 6

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 8 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_12

2. Acids release \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ions in solution.

3. Bases release \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ions in solution.

3. The left side of the arrow lists the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a chemical reaction.

4. The right side of the arrow lists the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a chemical reaction.

5. Organic molecules contain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atoms.

6. One carbon atom can make \_\_\_\_\_\_\_\_\_\_\_\_\_\_ bonds with other atoms.

7. Fill in the table below

|  |  |  |  |
| --- | --- | --- | --- |
| **Polymer** | **Monomer** | **Function(s)** | **Elements Found In It** |
| **Carbohydrates** |  |  |  |
| **Lipids** |  |  |  |
| **Proteins** |  |  |  |
| **Nucleic Acids** |  |  |  |

8. What are some examples of the four macromolecules?

Carbohydrates –

Proteins –

Lipids –

Nucleic Acids –

9. How do monosaccharides differ from disaccharides?

10. After plants make glucose through photosynthesis, they can either store it for energy as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or use it for structure to make cell walls as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

11. Animals store excess glucose in their bodies in the form of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

12. Why can’t lipids dissolve in water?

13. What is the difference between saturated and unsaturated fatty acid chains? (Hint: Think about bonds).

14. A triglyceride (aka lipid) consists of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecule attached to \_\_\_\_\_\_\_ fatty acid chains.

15. Proteins are by far the most DIVERSE organic compounds in the body. List as many functions of proteins as you can.

16. In a protein (aka polypeptide), amino acids are held together by a special type of covalent bond called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bond.

17. What are the 3 main parts of a nucleotide?

18. What are the 2 types of nucleic acids?

19. What does an enzyme do to the rate of chemical reactions?

20. Which of the following organic compounds is an enzyme?
A) Carbohydrates B) Proteins C) Lipids D) Nucleic acids

21. Without knowing anything about their structure or function, how can you tell that lactase, fructase and protease are enzymes?

22. Which of the following would you expect to break down lactose?
A) Maltase B) Lipase
C) Lactase D) Protease

23. Label the parts of the reaction below using the terms enzyme, substrate, products, active site, ES complex.



24. What two factors have the greatest impact on how well an enzyme functions?

25. Use the graph below to answer the questions:



A. What is the *optimum temperature* for this enzyme?

B. What would happen if the reaction took place at 65°C?

26. Explain the “lock-and-key” model of enzymes being specific to substrates.

27. Complete the following table about testing for organic compounds.

|  |  |  |
| --- | --- | --- |
| **Chemical Test** | **Compound Testing For** | **Positive Reaction Looks Like…** |
| **Benedict’s** |  |  |
| **Iodine/Lugol’s** |  |  |
| **Biuret** |  |  |
| **Brown Paper Bag** |  |  |