**NAME \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Biochemistry Unit Homework Problems**

1. Explain six properties of water and describe the significance of each property to living organisms.

1.

2.

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4.

5.

6.

**2.** The diagrams below show various molecular structures. Name the macromolecule group that each structure belongs (carbohydrate, lipid, protein) Then identify the following molecules- glucose, ribose, amino acid



Discuss which of the previous molecules are most similar in structure. (Identify the structures and then explain)

**3.** Distinguish between saturated and unsaturated fats. (Draw each and then explain why one is

 considered saturated and the other is not.)

**4**. Describe the use of carbohydrates and lipids as energy storage in animals. (Name the carbohydrate

 in animals that stores energy. What type of energy does it store? Name the lipid that stores energy

 in animals. What type of energy does it store?)

**5**. Explain how monosaccharides are converted into polysaccharides.

**6.** Outline the production of a dipeptide by a condensation reaction. Include the structure of a generalized dipeptide in your answer.

**7**. List **four** functions of lipids.

**8.** List **four** functions of proteins, giving an example of each.

**9.** The complex structure of proteins can be explained in terms of four levels of structure, primary, secondary, tertiary and quaternary.

(a) Primary structure involves the sequence of amino acids that are bonded together to form a polypeptide. State the name of the linkage that bonds the amino acids together.

(b) Beta pleated sheets are an example of secondary structure. State **one** other example.

 (c) Tertiary structure in globular proteins involves the folding of polypeptides. State **one** type of bond that stabilizes the tertiary structure.

**10.** (a) Define the term *active site* of an enzyme.

(b) Outline how enzymes catalyze biochemical reactions. (Explain how the enzyme converts the substrate to the product) Drawing and labeling a picture is a good idea.

 (c) Explain the effects of pH and temperature on enzyme activity.

**11.** Outline the difference between competitive and non-competitive enzyme inhibitors.

**12.** Distinguish between DNA and RNA. (make a chart comparing both)

**13.** Explain how allosteric control of metabolic pathways by end-product inhibition includes negative feedback and non-competitive inhibition.