

Biochemistry Test Review

Terms:

Organic	Inorganic	Biochemistry
Isotope	Valence	Bonding Capacity
Ionic Bond	Covalent Bond	Polar
Nonpolar	Intramolecular bonds	Immiscible
Intermolecular bonds	van der Waals forces	Dipole-dipole
Hydrogen bond	London Dispersion Forces	Miscible
Hydrophobic	Solute	Hydrophilic
Solvent	cohesion	adhesion
Specific heat capacity	Hydrocarbon	Functional Group
Dehydration synthesis	Condensation	Anabolic
Hydrolysis	Catabolic	Monosaccharide
Disaccharide	Starch	Polysaccharide
Glycogen	Cellulose	Chitin
Glycosidic Linkage	glycerol	Fatty acid
Triglyceride	Diglyceride	Monoglyceride
Saturated fatty acid	Unsaturated fatty acids	
Essential amino acid	Ester Linkage	Conformation
Dipeptide	R group	Peptide Linkage
Polypeptide	Globular Protein	α -helix
β -sheet	Disulphide bridge	phospholipid
Lipid bilayer	Intracellular Fluid	Extracellular Fluid
Transmembrane protein	Fluid Mosaic Model	Cholesterol
Plasma membrane	Peripheral protein	glycoprotein
glycolipid	Diffusion	Concentration gradient
Turgid	Semi-permeable	Osmosis
isotonic	hypertonic	Hypotonic
lysis	plasmolysis	Vesicle
Passive transport	Active transport	Osmotic pressure
cotransport	symport	Antiport
Facilitated transport	Bulk transport	Endocytosis
phagocytosis	pinocytosis	Exocytosis
Receptor-mediated endocytosis	enzyme	Active site
Lock and key	Induced fit	Activation energy
substrate	cofactor	Coenzyme
Competitive inhibition	Noncompetitive inhibition	Allosteric site
Inhibitor	activator	Feedback inhibition

Topics:

Basic Biochemistry <ul style="list-style-type: none"> Organic vs Inorganic Types of Chemical Bonds and overall significance 	Water <ul style="list-style-type: none"> Properties of... (amoeba sisters video) 'like dissolves like' How ionic compounds dissolve
Functional Groups <ul style="list-style-type: none"> Hydrocarbons – saturated and unsaturated Naming and recognizing functional groups: <ul style="list-style-type: none"> Hydroxyl, carboxyl, amino, sulfhydryl, phosphate Significance of functional groups 	Building and Breaking Macromolecules <ul style="list-style-type: none"> Know monomer (subunits) and polymers for each macromolecule Dehydration synthesis reactions <ul style="list-style-type: none"> What is it? Three types of linkages/functional groups involved Hydrolysis Reactions

Lipids <ul style="list-style-type: none"> recognizing and identifying Glycerides/Ester linkages Saturated vs unsaturated fats <ul style="list-style-type: none"> States of matter Phospholipids <ul style="list-style-type: none"> Structure and relevance Sterols (that they're a lipid) Waxes (that they're a lipid) 	Carbohydrates <ul style="list-style-type: none"> Classification Monosaccharides <ul style="list-style-type: none"> recognizing and identifying α-glucose, β-glucose, α-galactose, β-galactose Identifying glycosidic linkages Disaccharides <ul style="list-style-type: none"> Maltose, sucrose and lactose Polysaccharides <ul style="list-style-type: none"> Structure related to function Composition of starch vs composition of glycogen Cellulose structure/What is unique about cellulose? What role does this play in human digestion? Chitin – recognize/what is it used for?
Proteins <ul style="list-style-type: none"> Amino acids <ul style="list-style-type: none"> Basic structure Role of R groups Protein Structure <ul style="list-style-type: none"> recognizing and identifying peptide bonds Primary Structure Secondary Structure Tertiary Structure <ul style="list-style-type: none"> Possible interactions that solidify protein shape Quaternary Structure Denaturation <ul style="list-style-type: none"> What is it? Examples 	
Enzymes <ul style="list-style-type: none"> Basic concept of function Factors that affect enzyme function Enzyme inhibition Feedback inhibition 	Cell membrane <ul style="list-style-type: none"> Structure of cell membrane Fluid Mosaic Model Parts and Functions of cell membrane (lipid bilayer, cholesterol, the different proteins, etc.)
Cell Transport <ul style="list-style-type: none"> Simple Diffusion Facilitated Diffusion Osmosis/tonicity Active Transport Bulk Transport/Membrane Assisted Transport 	

BIOCHEMISTRY UNIT REVIEW Questions

1. Compare and contrast the following terms:

- ☐ Polar and Non-Polar *+ 2 - charges vs.*
- ☐ London Dispersion Force, Dipole-Dipole Interaction, and Hydrogen Bond
- ☐ Hydrophobic and Hydrophilic
- ☐ Monomer and Polymer *1 subunit vs. multiple*
- ☐ Monosaccharide, Disaccharide, and Polysaccharide
- ☐ Triglyceride Lipid and Phospholipid
- ☐ Dipeptide and Polypeptide
- ☐ Conformation and Denaturation
- ☐ Condensation (Dehydration Synthesis) Reactions and Hydrolysis Reactions
- ☐ Substrate and Enzyme

- ☐ Active and Passive Transport
- ☐ Hypertonic and Hypotonic
- ☐ Endocytosis and Exocytosis
- ☐ Activation Energy and Catalyst
- ☐ Peptide Bond, Glycosidic Linkage, and Ester Linkage

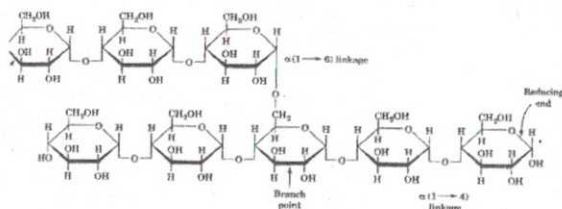
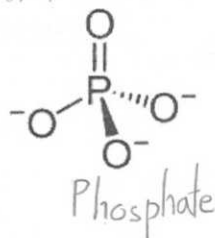
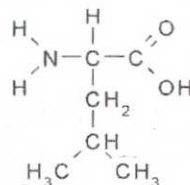
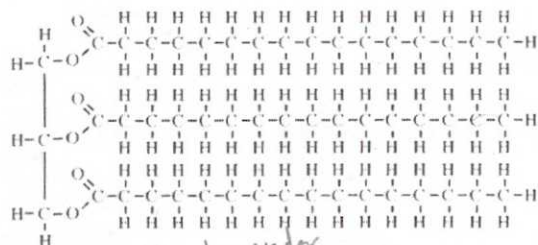
2. Explain how an enzyme can lower the activation energy of a reaction.

3. Identify the subunits or monomers which make up the following:

- i. maltose \leftarrow glucose \leftarrow saccharides
- ii. a phospholipid \leftarrow glycerides
- iii. a polypeptide \leftarrow Amino acid
- iv. starch \leftarrow glucose \leftarrow saccharides
- v. Cellulose

4. What is the difference between an anabolic reaction and a catabolic reaction? Give an example of each.

5. Identify the following molecules:



6. Draw a diagram to represent the hydrogen bonding seen in Water. What properties of water exist because of its ability to hydrogen bond with itself?

7. Match the following molecule with its class of macromolecules:

- | | |
|-------------------------|----------------|
| 1. <u>A</u> glycogen | A carbohydrate |
| 2. <u>A</u> cholesterol | |
| 3. <u>B</u> beeswax | B lipid |
| 4. <u>A</u> chitin | |
| 5. <u>C</u> an enzyme | C protein |
| 6. <u>A</u> cellulose | |
| 7. <u>B</u> glycerol | |

8. When placed in water, phospholipid molecules spontaneously form bilayers. Explain why this is so. Explain why a single layer of phospholipids would not successfully form a cell membrane.

9. Below is a list of all the major functional groups we discussed in this unit. In which molecules can each of these functional groups be found?

- Hydroxyl: Glycerol
- Carboxyl: Amino acids
- Amino: Amino acids
- Sulfhydryl: N/A
- Phosphate: Phospholipid

10. Explain what is meant by London Dispersion Forces. Using glyceride fats as an example, explain how LDFs can determine properties of a molecule.

11. Explain why a cell loses mass when placed in a hypertonic solution?

12. What differences would be seen between a plant and an animal cell placed in a hypotonic solution?

13. Why do we say there is no **NET** movement when a cell is placed in an isotonic solution?

14. A cell must perform many processes to stay functional and healthy. Describe the following processes and why they are important:

- o Exocytosis \rightarrow removal of molecules
- o Osmosis \rightarrow balances saturation
- o Simple Diffusion \rightarrow
- o Facilitated Diffusion
- o Receptor Mediated Endocytosis \rightarrow specific transport
- o Active Transport \rightarrow transport larger molecules

Application Questions Practice

1. A muscle cell needs to bring **specific** molecules in bulk into the cell. Explain how it will do this (3).
2. Explain the significance of specific intramolecular bonds and intermolecular forces in protein conformation (4).
3. **Structure determines function** is a theme of this unit. Explain what is meant by this statement using **one** of the following examples (4):
 - o Monosaccharide isomers
 - o Amino acids and proteins
 - o Saturated and unsaturated glyceride fats
 - o Phospholipid molecules

4. The graph to the right shows the rate of reaction for an enzyme-catalyzed reaction. Based on the information in the graph, would you say that ATP is an activator or an inhibitor to the enzyme? EXPLAIN (2).

Activator, heat starts to exceed protein's limits & denatures it

