

## STUDY GUIDE: ORGANIC CHEMISTRY

### KEY TERMS

organic chemistry	monomer	cellulose
denatured proteins	1st Law of Thermodynamics	enzyme
carbon	polymer	chitin
conjugated proteins	2nd Law of Thermodynamics	substrate
hydrocarbon	monosaccharide	fatty acid
nucleic acids	exergonic	product
isomer	glucose	saturated
DNA	endergonic	active site
single bond	disaccharide	unsaturated
parts of a nucleic acid	free energy	induced fit hypothesis
double bond	dehydration synthesis	phospholipid
purines	back reaction	coenzymes and cofactors
functional group	maltose	steroid
adenine	kinetic energy	competitive inhibition
hydroxyl	sucrose	amino acid
guanine	thermal energy	noncompetitive inhibition
carbonyl	lactose	peptide bond
pyrimidines	equilibrium constant	feedback inhibition
aldehyde	hydrolysis	polypeptide
cytosine	activation energy	disulfide bond
ketone	polysaccharide	primary structure
thymine	coupled reactions	alpha helix
amino	starch	secondary structure
uracil	catalyst	fibrous proteins
phosphate	glycogen	keratins
RNA	activation energy	pleated sheet
macromolecule		tertiary structure
free energy		quaternary structure

### QUESTIONS

1. What is the role of carbon in the molecular diversity of life?
2. Identify the functional groups. Given an unknown organic molecule, recognize and name the functional groups.
3. Describe the structure of a typical monosaccharide such as glucose. Write out a condensation reaction between two glucose molecules, and explain hydrolysis.
4. Explain the difference between a saturated and an unsaturated fatty acid. Explain how three fatty acids can react with glycerol to make a fat.
5. Diagram a phospholipid molecule and point out the polar and nonpolar ends. Identify the hydrophobic and hydrophilic ends of this molecule.
6. Identify the alpha-carbon, the carboxyl group, the amino group and the R group of an amino acid.
7. Differentiate between the various levels of protein structure-primary, secondary, tertiary and quaternary. Explain why proteins are so sensitive to changes in temperature and pH.
8. Diagram an individual nucleotide, identify the five-carbon sugar, the phosphate group and the nitrogenous base.

9. Identify examples of each of the four main classes of organic molecules and the building block components of each.
10. Explain what is meant by activation energy and why the activation-energy barrier provides stability for high energy molecules.
11. Explain why the three dimensional structure of enzymes is the key to their function.
12. List and discuss factors affecting enzyme activity.
13. How do cells synthesize and break down macromolecules?
14. How do structures of biologically important molecules(e.g. proteins, nucleic acids, carbohydrates and lipids) account for their functions?