Chem. 100

Practice Exam 5

What are the parts and functions and uses of each of the following: See your biochem notes
a) Triglycerides b) Phosphoglycerides c) Sphingolipids d) Glycolipids e) Steroids
How does melting point of a fatty acid change with its degree of saturation? More unsat (fewer H's) means a lower melting point (more likely to be a liquid.)
What are fatty acids? Long hydrocarbon chain with a carboxyl tail
How are saturated, unsaturated and polyunsaturated the same and different? It's related to the # of double bonds saturated has none, unsaturated has at least one and polyunsaturated has many.
What is the affect of each of these reactions on a fatty acid?
hydrolysis, doesn't do anything to a fatty acid- but it does break down a fat or oil into fatty acids + glycerol.
Addition only happens to unsat. Fatty acids. It makes them sat if H2 or a halogen is added.
Oxidation happens readily on unsat fats. It makes them rancid, making aldehydes and carboxylic acids.
Saponification the basic hydrolysis of fats (not fatty acids) that makes salts of fatty acids (soap)
Draw the structure of the steroid nucleus? See your text
What is a fatty acid? Long hydrocarbon chain with a carboxyl tail
What is a fat? A triglyceride that is a solid at room temp, is generally composed of saturated fatty acids, and usually comes from animals.
What is an oil? A triglyceride that is a liquid at room temp, is generally composed of unsaturated fatty acids, and usually comes from plants. What is the difference? Please read above.
What is a saturated fatty acid and an unsaturated fatty acid how are they different? Has the max # of Hydrogens, unsat has fewer than the max.
What is amphipathic? Something that both loves and hates water on the same molecule- it is both nonpolar and either polar or ionic.
What is a lipid bilayer? A layer that forms cells and keeps the inside and outside of a cell separate, but both in water. It is made up of lipids and has the polar part both facing the center and the outside, while the nonpolar parts are in the middle of the layer.
What is a pentose, (5 carbon sugar) hexose, (6 carbon sugar) tetrose, (4 carbon sugar) aldose, (sugar with an aldehyde functional group) ketose, (sugar with an ketone functional group)) D and L-isomers, (look at the second to the last carbon and see if the OH is to the left (L) or right (D)) draw one of each.(see book)
Draw glucose and fructose. (see book)
How do you figure out how many stereo isomers exist for a structure? Find the number of stereocenters=n (ignore all carbons above the C=O and the bottom C and count all the others). Then use the formula 2^n
What is a reducing sugar, how do you test for them (add tollens reagent (Ag+) or Benedicts reagent (Cu+)).
Which sugars are reducing (all monosaccharides and many disaccharides) and nonreducing (all polysaccharides and some disaccharides like sucrose) sugars?
What monosaccharides are in each of the 3 disaccharides? See your notes
What is a ketohexose (6 carbon sugar with an ketone functional group) , an aldohexose(6 carbon sugar with an aldehyde functional group) ?
For each of the following polysaccharides
a) starch b) glycogen c) cellulose
What are the functions of each, where are they found? (see book)
How are they held together? (glycosidic bonds)
What are the smaller parts of each polysaccharide? glucose
Which polysaccharides can (a can, starch and glycogen) and cannot (B cannot, cellulose) be hydrolyzed internally by humans?
What is the structure of each polysaccharide? (look at the linkages- either a or B and 1,4 or 1,6
What is denaturing a protein (breaking down the shape a protein- its 2^o,3^o,4^o structure but leaving the order of the amino acids intact as 1^o structure.how is it done? See book.

What is a polymer? (a long repeating chain.)What are some examples? Starch, glycogen, cellulose, proteins.)
What is a polypeptide? A polymer made of amino acids joined by peptide bonds.
What is the difference between alpha helix (a coiled structure) and beta sheet (a flat plate with folds)?
What is the difference between hydrophilic (water loving amino acids that tend to be polar or ionic and found on the exterior of proteins) and hydrophobic(water hating amino acids that are nonpolar and found on the interior of proteins) amino acids, where are they found?
What are proteins? Polypeptide chains
What is the difference between primary (sequence of amino acids –held by peptide bonds (amide linkages)), secondary (special repeating patterns found in the protein held by hydrogen bonds) and tertiary structure (the overall shape of a single polypeptide chain held by hydrogen bonds nonpolar interactions disulfide bonds, and ionic(electrostatic) forces) quaternary structure (two polypeptide are joined together to act together the overall shape and structure is held by disulfide, ionic, hydrogen and nonpolar interactions) of proteins?
What is a globular protein (a polypeptide that usually is mobile and blob shaped it has many functions one of which is as) an enzyme (used to catalyze reactions), fibrous protein (a polypeptide chain with one type of secondary structure that is not water soluble and tends to be immobile mostly used for structural support)? What are their functions?
What are nucleic acids? Long chains composed of nucleotides. What is their function? (the are used for storage (DNA) and transport (RNA) of genetic material)
Draw a peptide bond? See book
What are zwitterions? Molecules that have both (+) and (-) ions on the same molecule.
What is amphoteric? Something that can behave as both an acid and a base.
Study the vocabulary on the study sheet 5 handed out in class