

Review for Chem 30B Midterm Exam 2 (McMurry Chapters 16-19)

Ch 16. Aldehydes and ketones and Ch 17. Carboxylic acids, esters, and amides

1. Give IUPAC names and/or IUPAC-accepted common names, and draw structures when names are given. [Resources: Naming Handout, know also widely-used common names]
2. Predict boiling point and solubility trends.
3. Know general properties of the classes of compounds.
4. Know reactions: Be able to predict products given substrates, predict substrates given products, know catalysts needed.
 - Aldehydes and ketone reactions: oxidation and reduction (only reduction for ketones), acetal/hemiacetal formation and hydrolysis
 - Carboxylic acid, ester, and amide reactions: esterification, amidation, acid-base reaction (only for carboxylic acids)
5. Be able to identify carbonyl compounds based on results of chromic acid oxidation, Tollen's test, Benedict's test, iodoform test, and acidity.

Ch 18. Amino acids and proteins

6. Know different classifications of proteins by their functions.
7. Be able to draw the 20 different amino acids, and classify them into the categories: nonpolar, neutral polar, acidic, and basic.
8. Draw predominant forms of amino acids (protonated/deprotonated states) in neutral, extremely basic, and extremely acidic pHs.
9. Define chirality, handedness, and enantiomers. What are the similarities and differences between enantiomers? Identify chiral carbons.
10. Be able to draw peptides, given the primary sequence.
11. Know and recognize the different levels of protein structure.
12. Explain the interactive forces that stabilize 3-dimensional protein structures. Given amino acids, identify the interactive forces between them.
13. Know peptide hydrolysis reaction.
14. List protein denaturing agents and explain how each works.

Ch 19. Enzymes and vitamins

15. Define enzyme, cofactor, coenzyme, vitamin, and how they are related.
16. Know the six general categories of enzymes based on their function: Given an enzyme name, predict the reaction; given a reaction, name the type of enzyme that catalyzes that reaction.
17. Explain enzyme specificity.
18. Explain lock and key model and induced fit model.
19. Explain how enzymes catalyze (speed up) reactions– the ways they accomplish this. Draw energy diagrams of catalyzed and uncatalyzed reactions.
20. Predict effects of changes in substrate concentration, enzyme concentration, temperature, and pH on enzyme activity.
21. Explain and recognize the different ways enzymes are regulated: Feedback control (through allosteric regulation), inhibition, covalent modification (through zymogen and phosphorylation/dephosphorylation), and genetic control.
22. Recognize and distinguish among the different types of inhibition: uncompetitive inhibition (reversible), competitive inhibition (reversible), and irreversible inhibition. Know and explain plots of enzyme activity rate vs. $[S]$ for the two reversible competition types.

23. Identify fat-soluble and water-soluble vitamins through their structures.

Check out Prof. Fossum's website for a sample exam:

Midterm exam 2: <http://www.laney.edu/wp/cheli-fossum/files/2012/01/30B-Ex-2-S12503.pdf> (Exclude questions #23-30)

Key to midterm exam2: <http://www.laney.edu/wp/cheli-fossum/files/2012/01/30B-Ex2-S12-Key645.pdf>