

Exam 3 Review Topics
Chem 1020, Summer 04, Robertson
Monday, July 26

Our exam will include material from chapters 15 and parts of 16 and 18. . **Only material that I have covered in class, have assigned homework problems on, or mention on this review sheet will be tested.** I recommend the following special reading: "Distance Running" from the ChemMatters magazine. This is in the chem library notebook.

On Monday, you should be able to: (I do not claim that this is an exhaustive list.)

Chapter 15

- Define and list the different types of carbohydrates.
- Be able to draw structures for glucose, fructose, ribose, sucrose, maltose, cellulose, and amylose. Be able to describe or give the importance of the above plus galactose, lactose, glycogen, and amylopectin.
- Explain how amylose, amylopectin, and glycogen are similar and different. Contrast with cellulose.
- Define the term lipid and list and explain the different types.
- Be able to draw structures for simple waxes, fats and oils, soaps, and steroids. Name the skeletal structure of all steroids. List types of steroids.
- Explain the relationship between trans and cis fatty acids; saturated, monounsaturated, and polyunsaturated fats; cholesterol; and atherosclerosis. Explain the relationship between trans and cis fatty acids; saturated, monounsaturated, and polyunsaturated fats; cholesterol; and atherosclerosis.
- Define proteins and describe the amino acids that compose them.
- Draw the structural formula for an amino acid and draw structural formulas showing how the amino acids link to form amide (peptide) linkages.
- List the structural levels of proteins and define each.
- List, explain and give examples of the two major categories of protein reactions.
- Classify proteins by function (enzymes, transport, storage, regulatory, contractile, protective) and give examples.
- Give an equation for the action of an enzyme. Define the terms cofactor, coenzyme, apoenzyme, allosteric site.
- Define nucleic acids and list the two major types.
- Explain the functions of nucleic acids.
- Sketch the primary structure of a nucleotide and explain secondary and tertiary structure. Be able to list the names of the nitrogen bases used in nucleic acids. Be able to use the terms purine and pyrimidine and know which nitrogen bases fall in each group.
- When given the structure for adenine and ribose, sketch the nucleotide as well as ATP or ADP.
- Explain the processes by which protein synthesis occurs using the DNA template (transcription and translation). Given a nitrogen base triplet on DNA, messenger RNA, or transfer RNA determine the amino acid copied. (You will be given a table such as 15.5) Define codon and anticodon.
- Describe very simply the techniques of PCR (polymerase chain reaction) and recombinant DNA.

Chapter 16 and 18

- List the classes of nutrients and tell which are stored in the body and which are not.
- Discuss the caloric needs of Americans. Calculate BMR.
- Explain the digestion of carbohydrates, fats and oils, and proteins.
- Explain the aerobic and anaerobic metabolism of carbs and fats to produce ATP. Explain the importance of the Krebs cycle and the Embden Meyerhoff pathways. Explain the process of burning carbs and fat with exercise. Diagram % energy versus time for carbs and fats during aerobic exercise.

- List uses of proteins and problems associated with too much and too little. Explain the concept of essential amino acids.
- List uses of fats and oils and problems associated with too much and too little. Give examples of fat substitutes.
- List uses of carbs and problems associated with too much and too little.
- Be able to recognize and list uses of major minerals, electrolytes and trace minerals. Focus on those covered in class and in the homework. Be prepared to write specifically on three of your own choosing.
- Define the term vitamin. Classify by solubility. List uses, sources and deficiency diseases of various vitamins. Focus on those covered in class and on assigned homework. Be prepared to write specifically on three of your own choosing.
- Explain using examples why you should eat a balanced diet. Use the concept of phytochemical.
- List the classes of food additives and give examples of each.
- Work mathematical homework problems dealing with nutrition.