FINAL EXAM MATERIAL

Exam will be on CH 1-8 (p. 1-292), CH 11 (p.363-374), CH 12(p.390-402), CH 24, CH 25 (p.933-965,970-973), CH 26 (p.979-994), CH 27 (p.1020-1054).

Chapter 1	Nothing will be 'directly' covered from chapter 1. Effectively all of this material was introduction to biochemistry. We studied everything in greater detail throughout the semester.
Chapter 2	I will be asking about **WHERE PROCESSES or EVENTS occur in a cell**. The idea will be to associate biochemical events with WHERE they are occurring. As you study, it will be helpful to brielfy think of where its occuring. For example, if I ask you about nucleosomes; I may follow that with a question like, '*where in the cell is this occurring?*' Or a question about replication may have a part where I ask, '*where in the cell is this occurring?*' Or a question about transcription may have a part where I ask, '*where in the cell is this occurring?*'. Therefore, understanding things about the cell will be very helpful.
Chapter 3	This is a review of organic and general chemistry. I expect you to know this in order to solve questions about enzymatic reaction mechanisms, functional groups, nucleophile activation, etc.
Chapter 4	Biochemistry occurs in aqueous solutions. So this will be a main point of study. Water is an amazing molecule, when you stop and think about it. All aspects of this chapter are important: hydrogen bonding, solutes, hydrophobic effect, thermodynamics, types of weak interactions (noncovalent), acid-base equilibria, pK, pH and therefore the Henderson-Hasselbach equation (yes, there will be a question on this, so **BRING A CALCULATOR!**).
Chapter 5 (p.115-129)	Be able to draw the structures of all 20 amino acids. Know which ones are capable of (de)protonation and therefore the pKa of each side chain (as applicable). (hint: I may....will ask you to draw the peptide that you translate.) Be able to use titration curves.
Chapter 6 (p.159-195)	All elements of protein structure, from peptide bonding of amino acids, primary (sequence), secondary (hydrogen bonding), tertiary (side chain interactions) to quaternary (interactions between folded proteins). Draw secondary structure motifs. Protein folding (factors that destabilize the folded 3-dimensional structure. The only thing I want you to know about chaperonins (think chaperones) are that they help proteins fold properly.
Chapter 7 (p.203-221, 228-231)	**Know the concept of cooperative binding.** Hemoglobin is NOT the only protein to do this. MOST proteins, whether they bind oxygen, DNA or steroids are either cooperative or uncooperative...*just like a lot of people*. I will not ask you to solve anything quantitatively, but I expect you to know how to write equilibria expressions for this or anything else I ask....like **ATP dependent activation of tRNA**. Understand sickle cell anemia-the result of a point mutation in the gene sequence of hemoglobin. Ligand binding. Antibody structure and antigenbinding.
Chapter 8	Enzymes: a. Energetics 1. Role of amino acids, active site and protein structure 2. Reaction coordinate diagrams b. Kinetics 1. Ways that enzymes act as catalysts 2. Michaelis-Menton (no Lineweaver-Burke) plots 3. Know all the parameters and how they are affected by inhibitors. 4. Know the types of inhibition. 5. Effects of allosteric enzymes c. Mechanisms 1. Factors that affect enzyme activity (this may be related to protein stability, (de)protonation of functional groups, etc.) 2. **Reaction mechanism for a serine kinase** Review this chapter pretty hard. Many struggled on this section in Exam 2, so if you dont understand anything, please ask in class or setup an appointment with me and we can discuss it.

Chapter 10 (p.325-346)	Be able to draw a tetranucleotide of DNA or RNA. Know how to draw an AT or GC base pair. Be able to identify/draw a schematic of DNA/RNA secondary structures. No Hoogsteen base pairing.
Chapter 24	Figure 24-2 will come in handy. Know chromosomal organization. Gene sequences (exons & introns). For DNA packaging I will ask 2 questions: (1) The structure of a nucleosome; including histone core composition, length of DNA, number of turns of DNA, electrostatic interactions present, etc. and... (2) Effect of the introduction of a nucleosome on supercoiling.
Chapter 25	Stages of replication and the events that describe each stage. Types of DNA repair systems (be able to briefly describe each). We will focus our attention on base excision repair. Look at Figure 25-22 and ensure you know the steps given and be able to provide an accompanying description of each step. For example, know the DNA glycosylase recognizes a damaged base, cleave the nucleotide at the glycosidic linkage leaving an abasic site. Then in step 2.... Be able to describe recombination and transposition in 1-2 sentences (for each).
Chapter 26 (p.979-1003)	Stages of transcription and the events that describe each stage. Assembly on the promoter. Initiation of gene transcription. For processing, know the general idea as represented by Figures 26-11 and 20 (splicing) and Figure 26-22 (alternative processing).
Chapter 27	Know the five (5) stages of translation. Assemble an active complex of the three (3) types of RNA (see Figure 27-11) or this cool image of the **RIBOSOME**. Draw it exactly like that and be able to identify the 30S & 50S subunits, etc. (bacterial system will be used here). Secondary structure of tRNA. Translation of the genetic code. Know how to make an anticodon for codons. Pages 1056-1067 cover posttranslational modifications of proteins. I will ask 2 questions: (1) give three examples (i.e. ubiquination) and the roles they play (i.e. signal to protease/proteolytic degradation). (2) **Posttranslational modification (a reaction mechanism): serine kinase.**
Notes	I will ask you to make a protein from a DNA sequence (or the reverse). This means you need to know the necessary steps between them.