Study Guide, Final Exam, Chemistry 5700

One half of the material for the Final Exam (75 points) will be material covered since exam 3 (i.e. lectures 34-39 on syllabus; amino acid catabolism and mitochondrial e- transfer, ATP synthesis. NOTE-we will NOT cover photosynthesis this semester). One half of the material will be comprehensive (lectures 1-33). The questions on the comprehensive section will be MULTIPLE CHOICE and will reemphasize material covered on your three midterms and quizzes 2-10 plus the extra credit timed quiz (probably ~8 multiple choice questions from each of three sections, worth 3 points each for 75 points total). Concepts that were covered on quizzes but not emphasized in lecture (e.g. Edman degradation, sequencing peptides) will NOT be covered on the final exam. I recommend that you look at the previous years' exams for examples of what type of material you might be asked on the final.

Regarding the NEW material- here is a list of terms/concepts you should understand at the level presented in class.

- be able to draw structures of all fatty acid beta oxidation intermediates and the three ketone bodies (acetoacetate, beta-hydroxybutyrate, acetone)
- strategy of fatty acid transport from cytosol to mitochondrion
- fatty acyl-CoA synthetase
- Enzymes and pathway of ß-oxidation using even chain saturated fatty acids
- explain/outline general strategy for oxidizing a monounsaturated fatty acid such as oleic acid
- explain/outline the general strategy for dealing with propionyl-CoA formed from odd-chain fatty acid oxidation, including the cofactor roles of biotin and B12 in the process (mechanistic details not required)
- dietary fat absorption and catabolism
- stored fat mobilization and catabolism
- ketone bodies: synthesis and purpose
- Describe pathways of dietary amino acid assimilation
- myocyte, hepatocyte, adipocyte
- synthase vs. synthetase
- homolytic vs. heterolytic bond cleavage
- function and mechanism of action of pyridoxal phosphate in transamination reactions.
- oxidative deamination; glutamate dehydrogenase reaction and mechanism
- oxidation numbers of carbon atoms in amino acids and central metabolites
- transport of amino groups from tissue to liver; gln vs. ala transport
- glutamine synthetase reaction and mechanism
- glutaminase reaction and mechanism
- nitrogen excretion: carbamoyl phosphate synthetase reaction and mechanism, enzymes and reactions of urea cycle
- role of ATP “hydrolysis” in converting a poor leaving group to a good leaving group
- outline how the urea cycle and citric acid cycle are linked
- ketogenic vs. glucogenic AAs
- strategies for activation of tetrahydrofolate with a C1 unit
- cofactor roles of biotin, tetrahydrofolate, S-adenosylmethionine. Oxidation states of C1 compounds carried by C1 cofactors.
- strategy for transfer of C1 groups from THF to organic acceptor, and means of forming and regenerating S-adenosylmethionine in this process

•features of mitochondrion
•reduction potential, relation of E and ΔG
•electron transfer: hydride, hydrogen atom, direct
•electron transfer cofactors: NAD, FAD, CoQ, FMN, iron-sulfur clusters, cytochromes, copper
•complexes I-IV
•Q cycle
•chemiosmotic hypothesis
•proton pumping, transmembrane electrical potential, protonmotive force
•protonophores, ionophores, uncouplers, respiratory chain inhibitors
•ATP synthase, F_1, F_0
•adenine nucleotide translocase
•phosphate translocase
•malate-aspartate shuttle
•glycerol-3-phosphate shuttle