STUDY GUIDE FOR FINAL EXAM

Distibution of points:

Chapters 22 and 30:	100 points
Chapters 16, 17 and 18:	075 points
Chapters 4 and 8:	075 points
TOTAL:	**250 points**

Chapter 22. Fatty Acid Metabolism

- Entry of dietary lipids into the blood stream
- The reaction catalyzed by lipases
- β-oxidation: Fatty acid activation and import into mitochondria
- β-oxidation: Pathway including structures, enzymes, cofactors and net reaction
- β-oxidation: For fatty acids with odd numbered carbon atoms.
- β-oxidation: For mono- and poly-unsaturated fatty acids
- Ketone bodies
- Fatty acid biosynthesis: Overview
- Fatty acid biosynthesis: Citrate shuttle
- Fatty acid biosynthesis: Activation of acetylCoA to malonylCoA
- Fatty acid biosynthesis: Fatty acid synthase complex
- Fatty acid biosynthesis: Pathway: structures, enzymes, cofactors and net reaction
- Fatty acid biosynthesis: Modification of Palmitate into unsaturated fatty acids
- Differences between fatty acid β-oxidation and fatty acid biosynthesis
- Regulation of fatty acid β-oxidation and fatty acid biosynthesis

Chapter 30. Integration of Metabolism

- Metabolic fates of glucose, fatty acids and amino acids
- Central themes of metabolic pathways
- Common mechanisms of metabolic regulation
- Major metabolic control sites of glycolysis, gluconeogenesis, TCA cycle and OxPhos, FA oxidation and biosynthesis
- Metabolic profiles of Brain, skeletal muscle, cardiac muscle, adipose tissue, kidney and liver
- Metabolic changes during starved-fed cycle
- Matabolic adaptation to prolonged starvation
- Metabolism in diabetics
- Obesity
- Metabolism during short-term or prolonged exercise
- Metabolism of ethanol and its effects on liver metabolism

Chapter 16. Glycolysis and gluconeogenesis

- The glycolytic pathway including structure, enzymes, cofactors and net reaction
- Different fates of pyruvate
- Regulation of glycolysis
- Gluconeogenesis including pathway, structures, enzymes, cofactors and net reaction
- Regulation of gluconeogenesis

Chapter 17. Citric Acid Cycle

Pyruvate dehydrogenase complex, its reactions and regulation
The TCA cycle including pathway, structure, enzymes, cofactors and net reaction
Regulation of the TCA cycle

Chapter 18. Oxidative Phosphorylation

Electron transport chain and Oxidative Phosphorylation
Standard reduction potential
Relationship between ΔE^{o}' and ΔG_{o}'
Components of the ETC: For each complex know the systematic name, sequence of components, net reaction, whether ATP is synthesized and whether protons are pumped.
Be able to write the electron carriers of the entire ETC in the correct sequence
ATP synthase
ATP-ADP translocase
Inhibitors of oxidative phosphorylation and Uncouplers
Glycerol-3-phosphate shuttle
Malate-Aspartate shuttle
Total yield of ATP from complete oxidation of glucose (pathway-wise breakdown)
Total yield of ATP from complete oxidation of a saturated fatty acid (pathway-wise breakdown)

Chapter 3. Protein Structure and Function

Structures and classification of amino acids
3-letter and single letter symbols of amino acids
Peptide bonds
Primary, secondary, tertiary and quaternary structure of proteins
Alpha-helix, beta-pleated sheets, bends and loops in protein structure
Disulfide linkages
Dependence of protein structure on amino acid sequence
Post-translational modification of proteins

Chapter 8. Enzymes: Basic Concepts and Kinetics

Enzyme classification
Units of enzyme activity
Mechanism of enzyme action
Models of enzyme-substrate binding
Factors affecting reaction rates
K_m and V_{max}, K_{cat}
Michaelis-Menten Equation
Line-Weaver Burk plot
Models of enzyme inhibition
Competitive, non-competitive and un-competitive inhibitors