Study Guide Chapters 7, 8, 9, 10

**Write a response to each item in** **your own words**.

**Chapter 7**

Why are carbohydrates so important to our survival?

Describe carbohydrates in general, monosaccharides, disaccharides, oligosaccharides, polysaccharides, structure, stereochemistry, etc.

How does fischer projections and Haworth structures represent stereochemistry, L and D sugars, chiral carbon. Define enantimoer, diasteromers, epimers.

Describe reactions of monosaccharides; oxidation, reduction, isomerization, esterification, glycoside formation.

Describe 3 important monosaccharides. Describe 4 important disaccharides, what are monosaccharides involved, details about.

Describe polysaccharides (glycans) in terms of oligosaccharides, homoglycans, heteroglycans, starches, glycogen.

Describe glycoconjugates; proteoglycans, glycoproteins and functions

**Chapter 8**

List the energy transforming pathways of carbohydrate metabolism and their interconnections.

Describe the 2 stages of glycolysis step by step, include enzymes, products, type of reaction, net energy production.

Describe the 3 fates of pyruvate in detail, reactions, control, enzymes, importance of pathway.

Discuss control of glycolysis; allosteric conetrol by hexokinase, phosphofructokinase, pyruvate kinase.

Describe the gluconeogenesis process; what’s is it’s purpose, relationship to glycolysis, regulation.

What is the Cori cycle? What is the relationship between muscle and liver in the Cori cycle?

Describe the Pentose Phosphate Pathway; importance in production of NADPH and 5C sugars, reaction pathway, enzymes involved.

List other important sugars for vertebrates and their metabolism.

Describe glycogenesis; process of glycogen synthesis and breakdown. What is Cori’s disease?

**Chapter 9**

Write out an overview of aerobic metabolism from ingestion of nutrients to ATP production.

Discuss redox reactions in general and living systems, reduction potential.

Describe the citric acid cycle in detail; importance of, entrance into CAC, each reaction with enzymes and products; overall net reaction.

Discuss regulation of CAC from pyruvate dehydrogenase complex through 3 control points within CAC; citrate synthase, isocitrate dehydrogenase, a-ketoglutarate dehydrogenase.

List the reactions of the Glyoxylate cycle, why is it important, compare to CAC.

**Chapter 10**

What is the importance of the electron transport chain in aerobic respiration?

Describe the 4 complexes of ETC in detail, flow of electrons and protons through complexes.

What is oxidative phosphorylation? Discuss the Chemiosmotic theory as it applies to the ETC. Include evidence supporting theory.

Describe ATP synthase and it’s role in ATP synthesis. Discuss control of ATP synthesis.

Compare the glycerolphosphate shuttle and malate-aspartate shuttle. Why are they important in energy production?

List how many and where NADH, FADH2, ATP is produced from Glucose entering glycolysis to end of ETC. How many ATPs are produced from NADH and FADH2? What is total production of ATP from the complete oxidation of 1 glucose?