Biology 205 **Study Guide** **Moyer**

Highlights from Chapter 9, Cellular Respiration

Concepts to Ponder Thoroughly:

Metabolic Disequilibrium, Good: True Equilibrium, Bad
Glycolysis – Carbon Count, ATP & NADH considerations
Fermentation....why do it at all?
Pyruvate Oxidation....what tax?
Citric Acid Cycle – Carbon Count, ATP & NADH considerations
Substrate level vs. OxPhos: What difference does it make?
Electron Transport Chain: e- donors and acceptors
Energy Yields in Gross and Net ATP
Regulation of Metabolic pathways: Anabolic & Catabolic
Key Enzymes involved in Metabolic Pathways in terms of Regulation
Location, Location, Location

Sample Multiple Choice Questions:

1. Consider what happens when wood burns. The potential energy in the glucose monomers which comprise cellulose is released as heat and light. This reaction is correctly described as:

a. endergonic
b. exergonic
c. spontaneous

2. A fatty acid is partly oxidized to form 8 molecules of acetyl CoA. Starting with these 8 molecules, how many molecules of ATP will be made *exclusively* by the Citric Acid cycle?

a. 8
b. 16
c. 22
d. 32
e. 36

3. Isocitrate dehydrogenase is an enzyme of the citric acid cycle. Where in the cell is this enzyme located?

a. In the thylakoids
b. In the cytoplasm
c. In the chloroplast
d. In the mitochondrial matrix
e. In the plasma membrane

Sample Short Answer Questions:

4. During anaerobic conditions, why is fermentation a necessary addition to glycolysis?

5. Match the proper catabolic stage(s) of glucose catabolism:

_____ At which stage(s) does NADH + H^+ get oxidized to NAD^+?

_____ At which stage(s) is the carbon skeleton of glucose split?

_____ Which stage(s) occur inside the mitochondrion of the eukaryotic cell?

_____ Which stage(s) will occur whether or not oxygen is present?

_____ At which stage in aerobic respiration is the first molecule of CO_2 produced?

Answer Choices: **(A)** Glycolysis; **(B)** Oxidation of Pyruvate to Acetyl CoA; **(C)** Citric Acid Cycle; **(D)** Oxidative Phosphorylation; **(E)** Electron Transport Chain.

6. What is the significance of $FADH_2$ **AND** how many ATP molecules can it produce?