This study guide is meant to be a review over concepts taught and applications practiced. Your test may be a few knowledge/comprehension but the majority will be application/analysis and synthesis/evaluation questions.

**Know these terms**:

1. **Chemiosmosis** – An energy-coupling mechanism that uses energy stored in the form of a hydrogen ion gradient across a membrane to drive cellular work, such as the synthesis of ATP. Under aerobic conditions, most ATP synthesis in cells occurs by chemiosmosis.
2. **Oxidative phosphorylation** – The production of ATP using energy derived from the redox reactions of an electron transport chain; the third major stage of cellular respiration.
3. **Substrate-level phosphorylation** – The enzyme-catalyzed formation of ATP by direct transfer of a phosphate group to ADP from an intermediate substrate in catabolism.
4. **Catabolic pathway** – A metabolic pathway that releases energy by breaking down complex molecules to simpler molecules.
5. **Obligate anaerobes** – Organisms that carry out only fermentation or anaerobic respiration. These organisms cannot survive in the presence of oxygen, some forms of which can actually be toxic if protective systems are not present in the cell.
6. **Facultative anaerobe** – An organism that makes ATP by aerobic respiration if oxygen is present but that switches to anaerobic respiration or fermentation if oxygen is not present. (Examples – yeasts and bacteria)
7. **Electronegativity** – The attraction of a given atom for the electrons of a covalent bond.
8. **What is the immediate energy source that drives ATP synthesis by ATP synthase during oxidative phosphorylation?**
9. **What metabolic pathway is common to both fermentation and cellular respiration of a glucose molecule?**
10. **What is the final electron acceptor of the electron transport chain that functions in aerobic oxidative phosphorylation?**
11. **Most CO2 is released during which catabolic reaction?**
12. **Where do each of the stages of cellular respiration take place in the cell?**

**Glycolysis** -

**Citric Acid Cycle -**

**Oxidative Phosphorylation –**

1. **What are the products of glycolysis?**
2. **What are the electron carriers in the citric acid cycle?**
3. **What are the products of the citric acid cycle?**
4. **What is the product of pyruvate oxidation?**
5. **In cellular respiration, what process is driven by chemiosmosis?**
6. **Where are the proteins in the electron transport chain located?**
7. **For each mole of glucose (C6H12O6) oxidized by cellular respiration, how many moles of CO2 are released? How many ATP?**
8. **Which electron carrier has a lower energy level? Compare the amount of ATP’s produced for each electron carrier.**
9. **The inner mitochondrial membrane is about 5 times the area of the outer mitochondrial membrane. Why?**
10. **What process generates a proton-motive force in the mitochondrion?**