AP Bio Unit 3: Enzymes, Photosynthesis & Cellular Respiration

Test Study Guide

**I. Multiple Choice & Short Answer: Bulleted Lists**

1. Energy:
2. Types of Energy… & when used
3. Free Energy
4. Energy coupling
5. phosphorylation
6. paired exergonic & endergonic rxn
7. ATP regeneration & use
8. Enzymes:
9. Biological pathways:

a. 2 types of metabolic pathways & how enzymes are involved

1. Enzymes & Energy of Activation:

a. describe how enzymes would effect EA of an exothermic (exergonic) reaction

1. Enzyme structure:
2. describe structure
3. describe how the active site is involved in enzyme activity

1) basic steps & what options for what happens when substrate/s enter the active site

1. describe specificity (use a “lock-and-key” analogy & induced fit)
2. Environmental effects on enzymes:
3. be able to list and state effect of different environmental conditions on the effectiveness of enzymes (i.e. from pH to competitive & non-competitive inhibitors)
4. Cellular Respiration:
5. redox reactions:

a. describe the gain/loss of e- and gain/loss of H+

1. anaerobic cellular respiration:
2. 2 types of anaerobic cellular respiration
3. describe where occurs & the inputs/outputs
4. state which organisms can perform (i.e. humans & yeast) which type
5. aerobic cellular respiration:
6. write out the overall equation & relate to equation for photosynthesis
7. describe where each of the steps (4) occur in a eukaryotic cell
8. explain the process of glycolysis using phosphorylation, lysis, oxidation & ATP production
9. describe the “link reaction”… conversion of pyruvate to acetyl-CoA (and how many CO2 this produces)
10. relate oxidative phosphorylation & chemiosmosis
11. Photosynthesis:
12. Overall equation:

a. write & relate to how photosynthesis & aerobic cellular respiration are cyclical in the earth’s ecosystems

1. Light:
2. discuss how light is a particle & electromagnetic energy wave
3. discuss photosynthetic pigments (3 types) & how they relate to the absorption of photons & the transformation of light E into chemical E
4. Light Dependent Reactions:
5. outline the two parts, their inputs/outputs, & where they occur
6. state what photolysis is, why it occurs & where it occurs
7. differentiate cyclic & non-cyclic e- flow through the photosystems
8. Light Independent Reactions:
9. describe the 3 phases… being sure to include RuBP, RuBP Carboxylase (Rubisco), TP, NADH + H+, subsequent complex carbohydrates
10. explain how factors limit the process of photosynthesis (discuss light intensity, to, and CO2 concentration… relating to photorespiration)
11. **Short Answer: Paragraphs**
12. Sketch & label a drawing of a chloroplast based on electron micrographs. Label where the light dependent rxns (both parts), photolysis, light independent rxns, and photophosphorylation occurs. Lastly, explain how the large surface area of the thylakoid membranes & lamellae, the small space inside the thylakoid sacs, and fluid stroma help increase efficiency of these processes.
13. Describe the process that occurs during chemiosmosis. State when this occurs during aerobic cellular respiration & photosynthesis. Make sure to state the cell parts involved & how they relate to the function of chemiosmosis.
14. Explain specificity in enzymes. Use the “lock-and-key” analogy to describe & discuss. Finally, sketch and label the steps of a simplified enzyme working on a substrate.
15. **Essay:**
16. Materials cycle within ecosystems & even within certain organisms within ecosystems. Describe how photosynthesis & aerobic cellular respiration fit into this process of cycling materials using a comprehensive description of these two processes. Make sure to include locations, inputs & outputs to show the path of materials movement through and between these biological pathways.
17. **Test Format:**
18. Multiple Choice & Short Answer: Bullets 50pts
19. Short Answer: Paragraphs 30pts
20. Essay 20pts

TOTAL = 100pts