Biology 150: 3rd in-class examination **Name_____**
Nov 1, 2010

Indicate the lab you are registered in:

Tuesday, 8-9:50 _____ **Tuesday, 10-11:50** _____ **Tuesday, 12-1:50** _____

Tuesday, 3-4:50 _____ **Tuesday, 5-6:50** _____ **Thursday, 12-1:50** _____

Answer the questions in the space provided and you may also use the back of the page to complete your response. There are 15 questions worth a total of 50 points (plus three bonus questions). The point value of individual questions appears in parentheses.

1. E_A, ΔG, K_{eq}, and/or ΔS, which of these is (or are) altered by enzyme catalysis? (1)

2. Describe the catalytic cycle of an enzyme. What happens in what order? Roughly how fast can the cycle occur with a typical enzyme? (3)

3. Contrast competitive enzyme inhibition and non-competitive inhibition. How do they differ? Which of these is a form of allosteric regulation? (3)

4. ATP hydrolysis is frequently used to provide the energy to drive otherwise energetically unfavorable reactions in so called "coupled reactions". Explain, and/or diagram, how this actually occurs. (3)

5. Define: (3)

   a) catabolism

   b) anabolism

   c) respiration

6. Outline the events of glycolysis. Name the initial fuel molecule, two intermediate compounds, and the end product while indicating how many of each occur for a single initial fuel molecule. Show where energy storage molecules are involved and give an accounting of the numbers produced. (6)

7. In a eukaryote cell supplied with 0_2, all the carbons from the end product in the previous question are converted to molecules of CO_2. In a labeled diagram, show how and where that occurs. Name at least two intermediate molecules. Name the metabolic pathway(s) involved and indicate where energy storage molecules (and carbon carrier molecules) are involved and give an accounting of the numbers produced. (10)

8. Describe (and/or illustrate) mitochondrial electron transport. Show the electron donor molecule(s), the terminal electron acceptor, the location of transport, and coupled ion transport. (5)

9. Mitochondrial respiration produces ATP by both substrate level phosphorylation and by oxidative phosphorylation. What is the difference? Where does each occur? (3)

10. In fat metabolism, where do the fatty acid carbons enter the respiratory pathway? (1)

11. In fermentation by yeast, what becomes of the end product of gylycolysis? (2)

12. Cyclic photophosphorylation occurs in the _____ membrane where light energy is first absorbed by chlorophyll molecules attached to individual proteins which are clustered together in groups of three called _____. The light energy is passed pigment to pigment until it reaches a special chlorophyll called _____ which is attached to a reaction center protein. From here, an energized electron is passed to an electron transport chain leading back to _____. Some energy lost in this process is coupled to the transport of _____. (5)

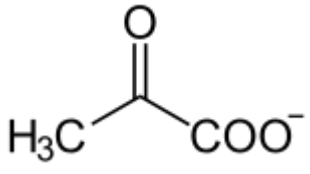
13. Outline the path of electron in non-cyclic photophosphorylation indicating the ultimate source of electrons, naming the photosystems and showing where light energy is involved. What is the terminal electron accepter on this pathway? (6)

14. Outline the Calvin cycle naming at least three molecules and one enzyme and indicating the involvement of energy carrier molecules. Where does this pathway occur? (6)

15. Who discovered DNA in what year from what source? (3)

Bonus questions:

1. Give one *specific* example of where ATP hydrolysis is involved in coupled reaction(s). (2)

2. Name this molecule:  (2)

3. Name the poor dumb schmuck that did the work but didn't get to share the Nobel Prize with Melvin Calvin? (2)