Biology 150: 3rd in-class examination **Name**_____
November 2, 2011

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, 3-4:50** _____

Answer the questions in the space provided and you may also use the back of the page to complete your response. There are 26 questions worth a total of 50 points (plus three one point bonus questions). The point value of individual questions appears in parentheses.

1. Name three forms of endocytosis and indicating how they differ from each other. (3)

2. State the 1st law of thermodynamics. (1)

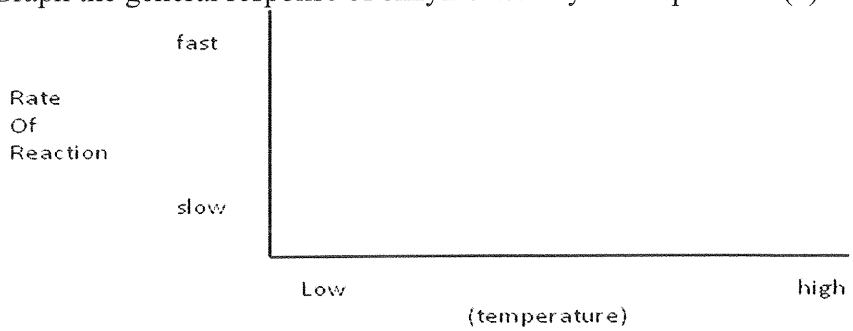
3. You strike a match. For the resulting combustion circle all term(s) that apply: exothermic, endothermic, spontaneous, endergonic, and/or exergonic. (1)

4. You strike a match. For the resulting combustion indicate whether each of the following are positive, zero, or negative: ΔG _____, ΔH _____, ΔS _____. (1)

5. Consider the reaction $Y \rightarrow Z$. The K_{eq} of this reaction is 10. If, at chemical equilibrium, the concentration of Z is 1 M, what is the concentration of Y? (1)

6. Indicate whether the effect of an enzyme is to (a) raise, (b) lower, or (c) leave unchanged each of the following: ΔG _____, ΔH _____, ΔS _____, E_a_____. (1)

7. Graph the general response of enzyme activity to temperature.(2)



8. Distinguish between competitive and non-competitive enzyme inhibition. Which of these is a form of allosteric regulation? What is meant by allosteric regulation? (3)

9. What is meant by "coupled reactions"? (1)

10. Distinguish between anabolism and catabolism. (2)

11. Diagram glycolysis indicating the starting fuel molecule, the involvement of energy carrier molecules the names and relative numbers of two intermediate molecules and the final product(s). Give an accounting of the harvested energy. (5)

12. Describe/illustrate pyruvate oxidation. Where does it occur? (3)

13. To begin the Kreb's cycle, a molecule of _____ donates two carbons to a molecule of _____ to yield a molecule of _____. (3)

14. In a single turn of the Kreb's cycle, how many molecules of each of the following are produced: NADH _____, $FADH_2$_____, ATP _____, CO_2 _____. (1)

15. During fermentation yeast cells convert each pyruvate molecule into_____. (1)

16. What vital function does fermentation serve? How? (1)

17. The chemical 2,4-dinitrophenol (DNP) was sold as a diet aid beginning about 1933 but was soon banned in 1938 following the occurrence of a number of fatal overdoses. Explain, first, how DNP "uncouples" respiration from energy harvest. Second explain, with reference to feedback inhibition, how DNP increase respiration rate. (4)

18. Describe the structure/composition of a light harvesting complex. (1)

19. In an experiment first performed in the 1960's, Peter Michel ground up spinach and isolated a solution rich in chloroplasts. He then shone a light on the solution while measuring the pH. What do imagine happened? (1)

20. Which of the following correctly outlines the path of electrons in non-cyclic photophosphorylation: (1)
    a) $H_20 \rightarrow$ NADPH $\rightarrow$ electron transport $\rightarrow$ photosystem I $\rightarrow$ electron transport $\rightarrow$ photosystem II
    b) $H_20 \rightarrow$ photosystem II $\rightarrow$ electron transport $\rightarrow$ NADPH $\rightarrow$ electron transport $\rightarrow$ photosystem I
    c) $H_20 \rightarrow$ photosystem II $\rightarrow$ electron transport $\rightarrow$ photosystem I $\rightarrow$ electron transport $\rightarrow$ NADPH
    d) NADPH $\rightarrow$ photosystem II $\rightarrow$ electron transport $\rightarrow$ photosystem I $\rightarrow$ electron transport $\rightarrow H_20$
    e) $H_20 \rightarrow$ photosystem I $\rightarrow$ electron transport $\rightarrow$ photosystem II $\rightarrow$ electron transport $\rightarrow$ NADPH

21. What photosystem is involved in cyclic photophosphorylation? Describe how useful energy is captured by cyclic photophosphorylation. (3)

22. Outline the Calvin cycle. Name at least two intermediate molecules. Indicate the function of Rubisco. Show the use of energy carrier molecules. (3)

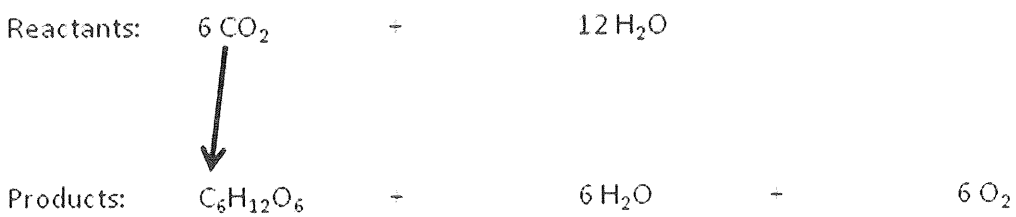
23. Who discovered bacterial transformation? (1)

24. Briefly describe the experiment conducted by Avery, MacLeod, and McCarty to determine the chemical basis of bacterial transformation. (3)

25. Briefly explain the famous Hershey and Chase experiment. (3)

Bonus questions:

(1) Photosynthesis: indicate with arrows the locations of the reactant atoms in the product compounds. I'll start by indicating the fate of the C atoms. (3)



(2) What is cooperativity? (2)