Biology 150: 3rd in-class examination **Name_____**
October 29, 2012

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 20 questions worth a total of 50 points (plus three points in bonus questions). The point value of individual questions appears in parentheses.

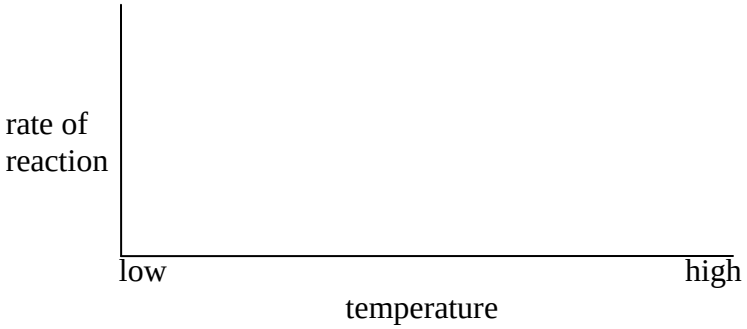
1) If, for a specific reaction, at chemical equilibrium, the concentration of the products is 4M and the concentration of the reactants is 2 M: (2)
   a) is the reaction endergonic or exergonic?

   b) what is K_{eq}?

2) Which one(s) of these are changed when a reaction is catalyzed by an enzyme: ΔG, ΔH, ΔS, E_a? (1)

3) The concentration of isoleucine in cells is kept constant because isoleucine can bind reversibly to the initial enzyme of the isoleucine synthesis pathway and slow enzyme activity. This form of enzyme regulation is referred to as _____ . (1)

4) Enzymes are temperature sensitive. In the chart below plot the effect of temperature on enzyme activity. (2)



5) What is meant by allosteric enzyme regulation. (2)

6) How does competitive inhibition differ from non-competitive enzyme regulation? (2)

7) Glutamic acid conversion to glutamine (glutamic acid + NH_3 → glutamine) is an endergonic reaction made possible when it is part of a so-called coupled reaction. Explain how energy coupling actually makes this reaction possible. (2)

8) In enzyme regulation, what is cooperativity? (2)

9) Define catabolism. (1)

10) Oxidation and reduction, which releases energy? (1)

11) Starting with a molecule of glucose, outline glycolysis. Name (and indicate quantities) of two intermediate molecules and the end molecules and the involvement of all energy carrier molecules. (4)

12) In aerobic respiration where (and how many) CO_2 molecules are produced from each glucose entering glycolysis? (2)

13) How many of each type of energy carrier molecule are produced by each turn of the citric acid cycle? (3)

14) Define chemiosmosis. (2)

15) Complete respiration of a glucose molecule is currently thought to yield 30 – 32 molecules of ATP. Explain exactly where those numbers come from. (4)

16) Cyanide and DNP (2,4-dinitrophenol) have dissimilar effects on respiration. Explain what each does and the consequences. (4)

17) There are two forms of fermentation. Who does which? What are the products in each case? (4)

18) What is the function of fermentation? (1)

19) Outline the path of electrons in cyclic photophosporylation. (6)

20) Describe the experiment conducted by Avery, Macleod, and McCarty to determine the chemical basis of bacterial transformation. (4)

Bonus questions:

(1) Which important microbiologist was killed when a bomb struck his lab during WWII? (1)

(2) Name Alfred Hershey's assistant for his 1952 experiment demonstrating the role of DNA in bacterial infection by phages. (1)

(3) Who produced the X-ray crystallography image that solve the structure of DNA? (1)