



Biology Test #2

Name \_\_\_\_\_

I. True/False: Mark T for true, F for false and leave value judgments blank (1).

- \_\_\_\_\_ 1. Fossil fuels are stored potential energy resulting from photosynthesis millions of years ago.
- \_\_\_\_\_ 2. An example of potential energy is a thoroughbred horse racing around the track.
- \_\_\_\_\_ 3. All organisms release heat during their metabolic processes.
- \_\_\_\_\_ 4. Since humans cannot photosynthesize, photosynthesis is not as important a chemical pathway as cellular respiration.
- \_\_\_\_\_ 5. A cell oxidizes glucose into ATP and therefore cells do not obey the first Law of Thermodynamics.
- \_\_\_\_\_ 6. The organelle that is active in ATP synthesis is the mitochondrion.
- \_\_\_\_\_ 7. The overall chemical pathway of photosynthesis is an example of an endergonic reaction.
- \_\_\_\_\_ 8. All enzymes will operate best at a pH of 8.
- \_\_\_\_\_ 9. The Light Dependent phase of photosynthesis occurs in the stroma of the mitochondrion.
- \_\_\_\_\_ 10. Wavelengths of light absorbed by chlorophylls a and b include those wavelengths in the green range.
- \_\_\_\_\_ 11. The light independent reaction of photosynthesis follows the light dependent reaction.
- \_\_\_\_\_ 12. An enzyme is completely used up during a chemical reaction.
- \_\_\_\_\_ 13. Competitive inhibition occurs between substrate and product at an allosteric site.
- \_\_\_\_\_ 14. Desert plants use the same type of photosynthesis as plants that grow in the Ozarks during the spring and fall months.
- \_\_\_\_\_ 15. During carbon dioxide fixation, carbon dioxide joins with RuBP.
- \_\_\_\_\_ 16. Exergonic reactions require an input of energy to form a more energy rich product.
- \_\_\_\_\_ 17. Overall, the oxidation of glucose into ATP has an efficiency percentage of 39%.
- \_\_\_\_\_ 18. The first product of the Calvin Cycle in CAM plants is PGAL, a 3 Carbon molecule.
- \_\_\_\_\_ 19. Enzymes lower the energy of activation of a reaction by binding the substrate in the Enzyme-Substrate complex.

III.

1. Draw and label the mitochondrion using these terms: cristae, inner membrane, inter-membrane space, matrix, outer membrane. On which structure does the ETS take place? \_\_\_\_\_ (6 pts.)
  
2. Draw and label the parts of a chloroplast including: outer membrane, thylakoid membrane, granum, stroma.
  
3. Draw a diagram of the important components of an enzyme and the reaction it catalyzes using the terms: Active Site, Enzyme, Enzyme-Substrate Complex, Product, Substrate (Reactant). Is this a synthesis (endergonic) or degradative (exergonic) reaction?  
\_\_\_\_\_ (6 pts.)

IV. Matching: match the term in Column A with its definition or description in Column B (10 pts.)

<u>Column A</u>	<u>Column B</u>
_____ 1. Kinetic energy	A. By-product of photosynthesis B. First reactant in forming organic molecules such as glucose, fatty acids, amino acids, etc.
_____ 2. Potential energy	C. Energy in motion, energy in use.
_____ 3. Entropy	D. Contains grana and stroma E. Non-protein required by an enzyme in order to assist in chemical reactions by accepting electrons
_____ 4. Co-enzyme	F. Stored energy that can be used later
_____ 5. Thylakoid	G. Attaches to CO <sub>2</sub> , forming an unstable 6-carbon molecule
_____ 6. Oxygen	H. Measure of randomness or disorder in a system
_____ 7. PGAL	I. Captures sunlight energy
_____ 8. Chloroplast	J. Reactant of the light-dependent reaction
_____ 9. Water	
_____ 10. RuBP	

V. Short Answer: Answer the following with a brief description, list, drawing, etc. (2 pts. each)

1. Can energy be created or destroyed? When energy changes form, what is released? What is the energy change that takes place during the Light Dependent Reaction of Photosynthesis?

2. Why do you need oxygen?
  
3. Why is lactic acid fermentation an important pathway for multi-cellular organisms with muscles?
  
4. Look at the following sequence and fill in the blanks concerning this pathway:  
A – B – C – D – E – F  
A-B-C-D-E all represent \_\_\_\_\_ in this pathway; B-C-D-E-F represent \_\_\_\_\_ in this pathway. At each step a specific \_\_\_\_\_ is used to lower the activation energy required for the reaction to proceed.
  
5. Explain why the consumption of excess carbohydrate makes us fat?

VI. Discussion/Essay: Answer three of the following thoroughly. You may answer a fourth for extra credit. (5 pts. each)

1. Start with something you ate for supper (or lunch) yesterday and explain how solar energy through photosynthesis is the ultimate source of your energy.

2. Discuss three ways in which the activity of an enzyme can be speeded up? Some people think that the increase in carbon dioxide to the atmosphere due to the burning of fossil fuel will increase the rate of photosynthesis in the biosphere. From your knowledge of enzymes and enzyme inhibition, discuss why this may produce minimal results.
  
3. Some people think that if we pollute or destroy enough of the Earth's systems, we can always go to outer space to live. What do you think of this possibility? Before we are able to live on another planet, what systems must be developed to support life on that planet? Think of what you have learned about photosynthesis, energy, and enzymes in answering this question.
  
4. List the four stages of aerobic cellular respiration. Which of the stage(s) is/are used by anaerobic organisms such as the bacteria that causes tetanus? How does yeast differ from this anaerobic organism in its energy transactions?

6. Compare and contrast the processes of photosynthesis and cellular respiration as to sequence of steps, location of each separate reaction, reactants and products of each reaction.