MULTIPLE CHOICE

Choose the letter of the best answer. (15 credits)

1. In photosynthesis, what molecule carries chemical energy that cells use for their functions?
   a. ADP
   b. ATP
   c. NAD$^+$
   d. NADP$^+$

2. Which of the following molecules found in the food we eat is most commonly broken down to make ATP?
   a. carbohydrates
   b. lipids
   c. proteins
   d. vitamins

3. Which of the following directly provides the energy needed for cell functions?
   a. A phosphate group is removed from ATP.
   b. ADP loses a phosphate group.
   c. Electrons are passed to proteins.
   d. Oxygen picks up electrons.

4. Chemosynthesis is a process through which some organisms use energy from chemicals in their environment to build sugars in the absence of
   a. ATP.
   b. water.
   c. glucose.
   d. sunlight.

5. The water molecules labeled A in Figure 4.1 are going to the thylakoids to take part in which process?
   a. light-dependent reactions
   b. Krebs cycle
   c. Calvin cycle
   d. light-independent reactions

6. Which of the following is a reactant in photosynthesis?
   a. O$_2$
   b. C$_6$H$_{12}$O$_6$
   c. CO$_2$
   d. COOH

7. Where in plant cells are the energy-absorbing molecules for photosynthesis located?
   a. stroma
   b. thylakoids
   c. ATP synthase
   d. mitochondria
8. What happens to the sugars that are made during photosynthesis?
   a. They move directly into an electron transport chain.
   b. They go back into the Calvin cycle.
   c. They can be used for cellular respiration.
   d. They make ATP by bonding together.

9. The part of cellular respiration that needs oxygen takes place inside the
   a. nucleus.
   b. mitochondria.
   c. thylakoid.
   d. cytoplasm.

10. Which process is best represented by the following chemical equation?
    \[ C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O \]
   a. cellular respiration
   b. photosynthesis
   c. glycolysis
   d. fermentation

11. Which of the following is best shown by Figure 4.2 below?

   ![Diagram of electron transport chain]

   FIG. 4.2
   a. glycolysis
   b. diffusion
   c. the Krebs cycle
   d. electron transport chain

12. An electron transport chain that produces ATP is part of both the cellular respiration process and
    a. glycolysis.
    b. fermentation.
    c. photosynthesis.
    d. the Krebs cycle.

13. In which process is lactic acid formed when there is not enough oxygen present for cellular respiration to take place?
    a. ATP synthase
    b. photosystem I
    c. glycolysis
    d. fermentation

14. Before cellular respiration, glucose must be broken down by the process of
    a. photosynthesis.
    b. glycolysis.
    c. electron transport.
    d. fermentation.

15. Which of the following is a product of the Krebs cycle?
    a. carbon dioxide
    b. oxygen
    c. lactic acid
    d. glucose
Short Answer Use the diagram below to answer items 16–20. (5 credits)

FIG. 4.3

16. Write a simple title for the diagram above.

__________________________________________________________

17. What does the large zigzagging arrow represent?

__________________________________________________________

18. Name one high-energy molecule shown in the diagram that is used as an energy-carrier.

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19. Name the structure in the figure in which an electron transport chain is located. Describe the main function of the processes that occur in this structure.

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20. What is the name of the cycle represented by a circle in the diagram? Where does the carbon dioxide necessary for this process come from?

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Use the diagram below to answer items 21–25. (5 credits)

FIG. 4.4

21. Write a simple title for the diagram above.

22. Name one place in the diagram where a high-energy molecule is transferring energy.

23. Where does the reactant for glycolysis come from?

24. What is the name of the cycle represented by the circle in the diagram? Name two molecules that come from this cycle.

25. Describe a real-life situation in which the anaerobic part of the process above might take place. Use the term fermentation in your answer.