RAVEN CHAPTER 7 GUIDED NOTES: HOW CELLS HARVEST ENERGY

Raven 9th edition

1. Define the following terms

   a. autotrophs _____

   b. heterotrophs _____

   c. digestion _____

   d. catabolism _____

   e. aerobic respiration _____

   f. anaerobic respiration _____

   g. fermentation _____

2. How is energy stored in chemical bonds?
   _____
   _____

3. Identify some activities for which the cell uses ATP.
   _____
   _____

6. How does ATP drive endergonic reactions? How does ATP function in “coupled reactions”?
   _____
   _____
   _____

7. Explain how ATP synthase produces ATP.
   _____
   _____

8. Briefly distinguish between the two methods of producing ATP in respiration:

   a. substrate-level phosphorylation

   _____
   _____

   b. aerobic respiration

   _____
   _____

9. List the four stages of cellular respiration:

   a. _____

   b. _____

   c. _____

   d. _____

10. List two classes of prokaryotes that utilize anaerobic respiration and explain what molecules they use as electron acceptors (instead of oxygen).

    a. _____

    b. _____

11. **STAGE 1: Glycolysis**

    a. Occurs where? _____

    b. Starts with? _____

    c. Produces? _____

    d. Yields how much ATP? _____

    e. Produces ATP through what process? _____

12. Why is glycolysis thought to be one of the earliest of all biochemical processes to have evolved?

_____

_____

13. **STAGE 2: Oxidation of Pyruvate**

a. Occurs where? _____

b. Starts with? _____

c. Produces? _____

d. Yields how much ATP? _____

14. If the body has enough ATP, what is the fate of acetyl-CoA?

_____

15. **STAGE 3: The Krebs Cycle**

a. Occurs where? _____

b. Starts with? _____

c. Produces? _____

d. Yields how much ATP? _____

e. Produces ATP through what process? _____

16. What is the major function of the Kreb's cycle?

_____

_____

17. Define each of the following:

a. oxidation _____

b. reduction_____

18. What are the roles of NAD^{+} & FAD^{+2} in respiration?

_____

_____

19. **STAGE 4: The Electron Transport Chain**

a. Occurs where? _____

b. Starts with? _____

c. Produces? _____

d. Yields how much ATP? _____

e. Produces ATP through what process? _____

20. What is the final electron acceptor in the Electron Transport Chain?

_____

21. Describe the role of the Electron Transport Chain. What happens to the electrons and H^{+}?

_____

_____

22. What is chemiosmosis and how is it generated?

_____

_____

23. Explain why respiration is considered exergonic.

_____
_____

24. What is the main reason energy is harvested in stages in respiration

_____
_____

25. What happens to most of the energy released during cell respiration?

_____
_____

26. What is the theoretical ATP yield of aerobic respiration? ...the actual yield? Explain why they differ.

_____
_____

27. Identify examples of each of the following feedback mechanisms in aerobic respiration:

    a. negative feedback _____

    b. positive feedback _____

28. Write the summary equation for cellular respiration:

a. Where did the glucose come from? Where did it go?

b. Where did the O_2 come from? Where did it go?

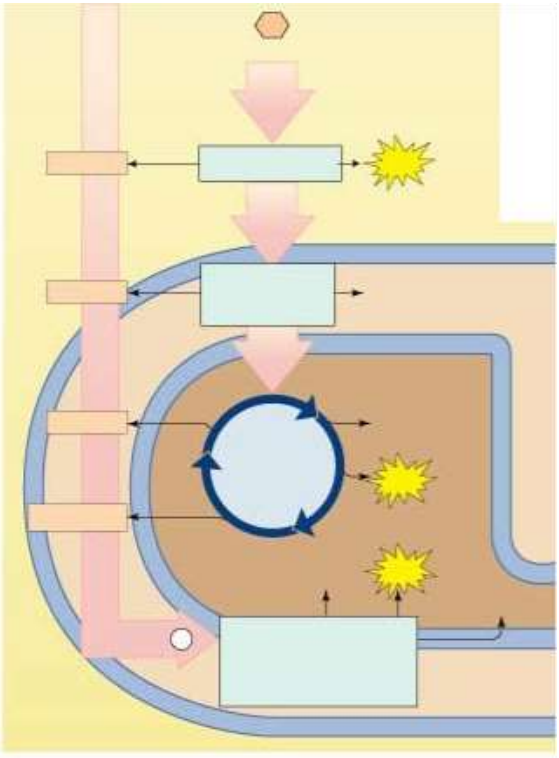
c. Where did the CO_2 come from? Where did it go?

d. Where did the H2O come from?

e. Where did the ATP come from?

f. What else is produced that is not listed in this equation?

29. Label the diagram.



30. What is the fate of these other organic molecules when they are used as fuel molecules:

a. proteins

_____

_____

b. fats

_____

_____

31. **Fermentation**

a. Alcoholic fermentation converts glucose to _____

b. Alcoholic fermentation is utilized by what organisms?

_____

c. Lactic acid fermentation converts glucose to _____

d. Lactic acid fermentation is utilized by what organisms?

_____

32. **Big Picture Thought Questions**

a. Why do we eat?

_____

_____

_____

b. Why do we breathe?

_____

_____

_____