

**Test: Photosynthesis and Cellular Respiration**

**Part I. Multiple Choice**

C 1. The energy of sunlight captured during photosynthesis is stored in which of the following molecules?

- a. ATP      b. oxygen      c. glucose      d. NADPH

C 2. Which of the following pigments is most important in the process of photosynthesis?

- a. xanthophyll      b. carotene      c. chlorophyll a      d. chlorophyll b

D 3. Carotene pigment:

- a. makes leaves turn green      c. absorbs orange light  
b. gives the sun its yellow color      d. reflects orange light

C 4. Which of the following best describes a chloroplast?

- a. an outer membrane containing stomata inside  
b. grana which are made up of stroma surrounded by a membrane  
c. grana made up of thylakoid discs, surrounded by fluid stroma, surrounded by an outer membrane  
d. stomata with thylakoid discs made up of grana, containing stroma, with a membrane inside

D 5. Which statement is true concerning photosynthesis?

- a. plants convert light energy into chemical energy  
b. all producers are able to perform photosynthesis  
c. the hydrogen in water is used to produce glucose  
d. all of the above are correct

A 6. The tiny pores in leaves that allow gases to pass through them are called:

- a. stomata      b. stroma      c. grana      d. thylakoid discs

B 7. The wavelengths most absorbed by chlorophyll are:

- a. green and blue      b. red and blue      c. green and yellow      d. orange and yellow

C 8. In which part of the plant does the most photosynthesis occur?

- a. stems      b. roots      c. leaves      d. flowers

C 9. Which pigments are seen mostly during the fall months (autumn)?

- a. chlorophyll and xanthophyll      c. xanthophyll and carotenes  
b. chlorophyll and carotene      d. chlorophyll a and chlorophyll b

D 10. Which of the following organisms WOULD perform cellular respiration?  
a. a rose bush      b. an elephant      c. *Amoeba*      d. all of these

D 11. Radiant energy waves with the longest wavelength:  
a. have the most energy      c. are dangerous  
b. include gamma rays      d. have the least energy

A 12. Which statement concerning photosynthesis is FALSE?  
a. the basic photosynthesis process is the same in animals and plants  
b. the carbon from carbon dioxide is used to produce glucose  
c. plants convert light energy to chemical energy  
d. oxygen is released as a waste product

**Part II. Matching**

- |             |              |              |                 |
|-------------|--------------|--------------|-----------------|
| a. longer   | b. shorter   | c. black     | d. white        |
| e. less     | ab. more     | ac. carotene | ad. xanthophyll |
| ae. radiant | bc. magnetic | bd. absorbed | be. reflected   |

AE 13. Energy that travels in waves is called \_\_\_?\_\_\_ energy.

AB 14. The shorter the wavelength, the \_\_\_?\_\_\_ energy that wave has.

D 15. When a pigment reflects all wavelengths of light, the color \_\_\_?\_\_\_ is seen.

BD 16. The colors NOT seen are those that are \_\_\_?\_\_\_ by a pigment.

A 17. Radio waves have a \_\_\_?\_\_\_ wavelength than gamma rays.

AD 18. The pigment \_\_\_?\_\_\_ appears yellow when we look at it.

**Part III. Using a Diagram Use the choices below.**

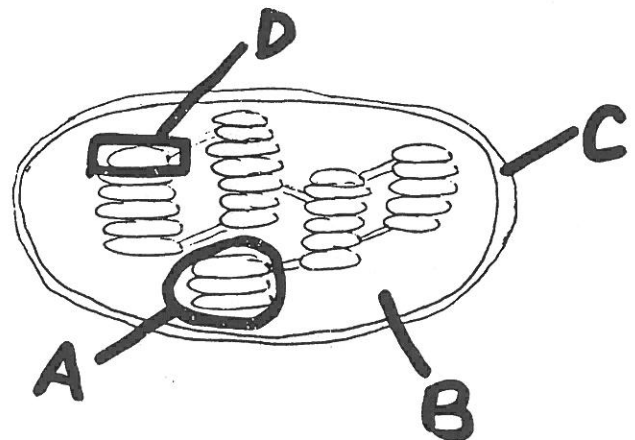
C 19. Protects and encloses the chloroplast

B 20. A fluid found inside the chloroplast

D 21. A thylakoid disc

A 22. A granum

D 23. Chlorophyll molecules are found embedded here.  
(be specific)



#### Part IV. Matching

- B 24. occurs in the stroma                      a. light-dependent reaction of photosynthesis
- A 25. requires water                              b. light-independent reaction of photosynthesis
- B 26. requires carbon dioxide
- A 27. occurs on the thylakoid membranes
- A 28. releases H atoms
- B 29. makes glucose
- A 30. requires sunlight

#### Part V. Multiple Choice

- D 31. How are ADP and ATP related?
- they are identical except ADP has more energy
  - ADP has one more phosphate group and more stored energy than ATP
  - ADP contains the sugar ribose; ATP does not
  - ATP has one more phosphate group and more stored energy than ADP
- C 32. In order, the 4 stages of aerobic cellular respiration are:
- glycolysis, fermentation, Krebs cycle, transition stage
  - light dependent reaction, light independent reaction, glycolysis, Krebs cycle
  - glycolysis, transition stage, Krebs cycle, electron transport system
  - Krebs cycle, transition stage, glycolysis, electron transport system
- C 33. Which of the following releases the greatest amount of energy?
- |                                      |  |
|--------------------------------------|--|
| a. converting glucose to lactic acid | c. converting glucose to CO <sub>2</sub> and water |
| b. converting glucose to ethanol     | d. converting glucose to pyruvic acid              |
- D 34. Which of the following molecules can be used in cellular respiration by entering the stages at intermediate points?
- |             |                |                |                 |
|-------------|----------------|----------------|-----------------|
| a. glycerol | b. fatty acids | c. amino acids | d. all of these |
|-------------|----------------|----------------|-----------------|
- A 35. What is the NET number of ATP produced during glycolysis?
- |      |      |      |       |       |
|------|------|------|-------|-------|
| a. 2 | b. 4 | c. 6 | d. 38 | e. 34 |
|------|------|------|-------|-------|

D 36. Under which of the following conditions might some cells in your body undergo lactic acid fermentation?

- a. after long periods of rest
- b. after eating a high-carbohydrate meal
- c. after a period of starvation
- d. after long periods of exercise

A 37. Which of the following contains the highest amount of potential energy?

- a. glucose
- b. ATP
- c. ADP
- d. pyruvic acid

B 38. Where does cellular respiration occur in a cell?

- 1. cytoplasm
- 2. chloroplast
- 3. mitochondria
- 4. nucleus

- a. 1 and 2
- b. 1 and 3
- c. 3 only
- d. 1, 2, and 3

C 39. Which stage of aerobic cellular respiration requires  $O_2$ ?

- a. Krebs cycle
- b. glycolysis
- c. electron transport system
- d. fermentation

B 40. Which of the following is true?

- a. Anaerobic respiration requires oxygen from the air; aerobic does not.
- b. Anaerobic respiration produces fewer ATP molecules than aerobic does.
- c. Anaerobic respiration is how are cells USUALLY get energy from food.
- d. Yeast cells are used in baking and brewing because they perform aerobic respiration.

D 41. Which of the following molecules helps to carry hydrogen atoms to the stage of the electron transport system during aerobic cellular respiration?

- a. carbon dioxide
- b. glucose
- c. ATP
- d. NADH

C 42. When glucose is first broken down during respiration, what are the products of its breakdown?

- a. lactic acid
- b. ethanol
- c. pyruvic acid
- d. ADP

D 43. What do aerobic and anaerobic respiration have in common?

- a. both break down glucose to release its energy
- b. both involve glycolysis as the first of many reactions
- c. both produce ATP
- d. all of these

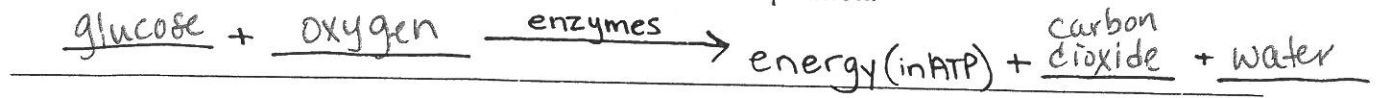
D 44. Which of the following could a plant do with the glucose it produces during photosynthesis?

- a. store it - for example, in starch
- b. use it - release its energy through cellular respiration
- c. change it - use it to make other compounds for the cell, for example cellulose
- d. all of these
- e. none of these

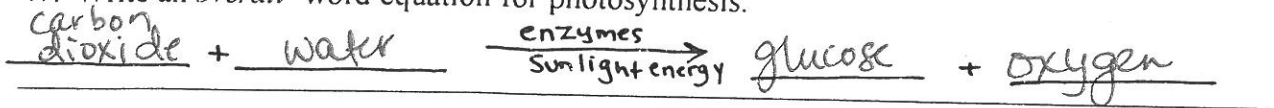
A 45. Where in the cell does fermentation occur?  
a. cytoplasm      b. chloroplast      c. mitochondria      d. ribosomes

**Part VI. Short Answer** Write brief but complete answers in the spaces provided.

46. Write an *overall* word equation for aerobic cellular respiration.



47. Write an *overall* word equation for photosynthesis.



2 48-49. Briefly describe how photosynthesis and aerobic cellular respiration are dependent upon each other, forming a cycle. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3 50-52. What might happen to a plant's photosynthesis rate if it was placed in an environment without carbon dioxide? Why? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3 53-55. Explain in your own words why the cell uses the energy from glucose to make ATP, which is then used to power cellular activities. Why not just directly use the energy released from glucose to power cellular activities? \_\_\_\_\_

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