**Chapter 8 Photosynthesis Test** *Student: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

**Fill in the Blank Questions**

1. \_\_\_\_\_\_\_\_\_\_ is the process by which certain organisms capture energy from sunlight and use it to build energy-rich food molecules.   
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. In the \_\_\_\_\_ reactions of photosynthesis, electron carrier molecules are reduced and ATP is synthesized.   
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Each pigment molecule has a characteristic \_\_\_\_\_\_\_\_ spectrum.   
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. The wavelengths absorbed by a particular pigment depend on the available \_\_\_\_\_\_ levels to which the light-excited electrons can be absorbed.   
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Plants and algae use a two-stage \_\_\_\_\_\_\_\_\_ in the light dependent reactions.   
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. The Calvin cycle is driven by ATP and \_\_\_\_\_ produced in the light reactions.   
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. Even though the Calvin cycle reactions require the products of the light reactions, its reactions can occur in the \_\_\_\_\_\_\_\_.   
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. In eukaryotes, photosynthesis takes place inside the \_\_\_\_\_\_\_\_\_.   
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 9. Clusters of chlorophyll and accessory pigments are called \_\_\_\_\_\_\_\_\_.   
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. Carbon fixation occurs during the dark reactions, or the \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_, in photosynthesis.   
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Multiple Choice Questions**

11. When Carbon atoms of CO2 are incorporated into organic molecules in a series of dark reactions this is called 

A. carbon reduction.

B. carbon synthesis.

C. carbon fixation.

D. carbon activation.

E. carbon oxidation.

12. Most plants incorporate carbon dioxide into sugars by means of a cycle of reactions called the 

A. CAM cycle.

B. carbon cycle.

C. Calvin cycle.

D. Krebs cycle.

E. electron transport cycle.

13. Flattened sacs of internal membranes associated with photosynthesis are called 

A. chloroplasts.

B. photosystems.

C. the stroma.

D. thylakoids.

E. cristae.

14. In green plant photosynthesis, the electron donor for the light dependent reaction is 

A. carbon dioxide.

B. oxygen.

C. RuBP.

D. chlorophyll II.

E. water.

15. Which of the following statements describes the relationship between Photosynthesis and Cellular Respiration?

A. Photosynthesis occurs in only in autotrophs; Cellular Respiration Occurs in Heterotrophs.

B. Photosynthesis uses solar Energy to make carbohydrates from inorganic substances.; Respiration breaks

down carbohydrates into inorganic substances and ATP.

C. Photosynthesis involves the oxidation of glucose; Respiration involves the reduction of CO2.

D. The main function of Photosynthesis is to use solar energy to make ATP; The primary function of

respiration is to break down ATP and release energy.

E. Photosynthesis and Respiration Never occur in the same cell at the same time.

16. In the dark reactions of photosynthesis, CO2 is added to a five-carbon sugar-phosphate known as 

A. cyclic AMP.

B. NADH.

C. NAD+.

D. RuBP.

17. Molecules that absorb light, such as Chlorophyll a or b, are called 

A. enzymes.

B. electron carriers.

C. pigments.

D. photosynthesizers.

E. absorbers.

18. The connection between carrots and vision is that the β-carotene of carrots can produce two molecules of vitamin A and oxidation of vitamin A produces a pigment used in vertebrate vision. This pigment's name is   
(Think eyes!!)

A. chlorophyll.

B. ferredoxin.

C. cytochrome.

D. carotene.

E. retinal.

19. Chlorophyll *b* absorbs in green wavelengths of light that chlorophyll *a* cannot absorb. In this respect, chlorophyll *b* acts as 

A. an accessory pigment.

B. an energizer for photosynthetic bacteria.

C. a light absorber in the green light.

D. a more efficient pigment.

20. Photosystem II differs from photosystem I in that \_\_\_\_\_\_\_\_\_\_\_\_\_ is not made directly from the process. 

A. ATP

B. NADH

C. NADPH

D. carbohydrates

E. water

21. The dark reactions of photosynthesis are those that 

A. convert chlorophylls into enzymes.

B. convert enzymes into chlorophylls.

C. convert water into hydrogen and oxygen.

D. convert CO2 into reduced molecules (sugars).

E. only occur in the dark.

22. In dark reactions, when CO2 is added, the end product is 

A. citric acid.

B. glucose.

C. glyceraldehyde-3-phosphate.

D. phosphoglycerate.

E. pyruvate.

23. How many revolutions of the Calvin cycle are required to produce the sugar glucose? 

A. 2

B. 3

C. 4

D. 5

E. 6

24. In the overall equation for photosynthesis, water is

A. just a reactant.

B. just a product.

C. both a product and reactant.

D. neither a product nor a reactant.

25. The photosynthetic electron transport causes the accumulation of protons in which part of the chloroplast? 

A. matrix

B. stroma

C. envelope

D. outer membrane

E. internal thylakoid space

26. What products of light reactions of photosynthesis are used in the Calvin cycle? 

A. oxygen and protons

B. carbon dioxide and water

C. ATP and NADPH

D. ADP and NADP

E. glucose and oxygen

27. The primary pigment, for the absorbtion of light during photosynthesis is

A. carbon fixation.

B. oxygen fixation.

C. photophosphorylation.

D. photorespiration.

E. photooxidation.

28. Most of the atmospheric oxygen occurs as a result of photosynthesis. From which of the following molecules is the oxygen derived? 

A. water

B. carbon dioxide

C. glucose

D. chlorophyll

29. Fall leaf color on deciduous trees is a result of 

A. the production of more accessory pigments because of the cooler temperatures.

B. the reduction in the production of accessory pigments because of the cooler temperatures.

C. cessation of chlorophyll production, which allows the accessory pigments to be revealed.

D. the increased angle of the sun during the fall, which reflects more of the accessory pigments causing the human eye to see the red, yellow, and orange colors that were masked by the green chlorophyll.

30. Which of the following is not part of the light-dependent reactions? 

A. primary photoevent

B. charge separation

C. Calvin cycle

D. electron transport

E. chemiosmosis

31. Jean Baptista van Helmont performed an experiment in which he planted a small willow tree in a pot of soil, after weighing both the plant and the soil. He watered the plant regularly. At the conclusion of the experiment five years later, the weight of the tree increased by 74.4 kg, while weight of the soil decreased by 57 kg. The primary source of the increased weight (mass) of the plant is from 

A. oxygen in the air.

B. carbohydrates absorbed through the roots.

C. the water he added.

D. CO2 in the air.

**Essay Questions**

32. Under what circumstances would increasing light intensity not result in an increase in the rate of

photosynthesis? (4pts.)