



# BIOLOGY

## BOOKS - PREMIERS PUBLISHERS

### PHOTOSYNTHESIS

#### Evaluation Textbook Questions Answers

1. Assertion (A): Increase in Proton gradient inside lumen responsible for ATP synthesis

Reason (R ): Oxygen evolving complex of PS I

located on thylakoid membrane facing Stroma,  
releases  $H^+$  ions

- A. Both Assertion and Reason are True.
- B. Assertion is True and Reason is False.
- C. Reason is True and Assertion is False.
- D. Both Assertion and Reason are False.

**Answer: A**



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2. Which chlorophyll molecule does not have a phytol tail?

A. Chl-a

B. Chl-b

C. Chl-c

D. Chl-d

**Answer: C**



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3. Identify the correct sequence of flow of electrons in the light reaction is

A. PS II, plastoquinone, cytochrome, PS I, ferredoxin.

B. PS I, plastoquinone, cytochrome, PS II ferredoxin.

C. PS II, ferredoxin, plastoquinone, cytochrome, PS I.

D.

**Answer: A**



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4. For every  $CO_2$  molecule entering the  $C_3$  cycle, the number of ATP and NADPH required is

A. 2ATP + 2DPH

B. 2ATP + 3DPH

C. 3ATP + 2DPH

D. 3ATP + DPH

**Answer: C**



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5. Identify true statement regarding light reaction of photosynthesis

A. Splitting of water molecule is associate with PS I.

B. PS I and PS II involved in the formation of  $NADPH + H_+$ .

C. The reaction center of PS I is Chlorophyll a with absorption peak at 680 nm.

D. The reaction center of PS II is Chlorophyll  
a with absorption peak at 700 nm.

**Answer: B**



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6. Two groups (A & B) of bean plants 450nm & Group B to light of wave of similar size and same leaf area were length of 500-550nm. Compare the placed in identical conditions. Group A photosynthetic rate of the2 groups

givwas exposed to light of wavelength 400 reasons.



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7. A tree is believed to be releasing oxygen during night time. Do you believe the truthfulness of this statement?



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8. Grasses have an adaptive mechanism to compensate photorespiratory losses and describe the mechanism.



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9. In Botany class, teacher explains, Synthesis of one glucose requires 30 ATPs in  $C_4$  plants and only 18ATPs in  $C_3$  plants. The same teacher explains  $C_4$  plants are more

advantageous than  $C_3$  plants. Can you identify the reason for this cont



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10. When there is plenty of light and higher concentration of  $O_2$ , what kind of pathway does the plant undergo? Analyse the reasons.



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**Other Important Questions Answers Choose The Correct Answer 1 Mark**

1. Photosynthesis is the major:

A. endothermic reaction

B. exothermic reaction

C. endergonic reaction

D. exergonic reaction

**Answer: C**



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2. Who explained the importance of chlorophyll in photosynthesis?

A. Joseph Priestly

B. Dutrochet

C. Stephen Hales

D. Lavoisier

**Answer: B**



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3. How many million tonnes of dry matter produced annually by photosynthesis?

- A. 1700 million tonnes
- B. 1900 million tonnes
- C. 1400 million tonnes
- D. 2000 million tonnes

**Answer: A**



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4. Who received 1988 Nobel prize for his work on photosynthesis in Rhodobacter:

A. Emerson and Arnold

B. Ruben and kamem

C. Arnon, Allen and Whatley

D. Huber, Michael and Dissenhofer

**Answer: D**



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5. Thylakoid disc diameter is:

A. 0.35 to 0.75 microns

B. 0.25 to 0.8 microns

C. 0.45 to 0.8 microns

D. 0.50 to 0.9 microns

**Answer: B**



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6. Indicate the correct statement:

A. Gra lamellae have only PS I

B. Stroma lamellae have only PS II

C. Gra lamellae have both PS I and PS II

D. Stroma lamellae have both PS I and PS II

**Answer: C**



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## 7. Match the following:

A. Cyanobacteria	(i) Chlorophyll D
B. Green algae	(ii) Chlorophyll C
C. Brown algae	(iii) Chlorophyll A
D. Red algae	(iv) Chlorophyll B

A. A-(iii), B(i), C-(iv), D-(ii)

B. A-(ii), B(iii), C-(iv), D-(i)

C. A-(iii), B(iv), C-(i), D-(ii)

D. A-(iii), B(iv), C-(ii), D-(i)

**Answer: D**



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8. Each pyrrole ring comprises of:

- A. six carbons and one nitrogen atom
- B. three carbons and one nitrogen atom
- C. four carbons and one nitrogen atom
- D. four carbons and two nitrogen atom

**Answer: C**



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9. Biosynthesis of chlorophyll 'a' requires:

- A. Mg, Fe, Cu, Zn, Mn, K and nitrogen
- B. Mg, Fe, Cu Mo, Mn, K and nitrogen
- C. Mg, Cu, Zn, Mo, Mn, K and nitrogen
- D. Mg, Fe, Cu, Zn, Mo, K and nitrogen

**Answer: A**



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10. Pheophytin resembles chlorophyll except that it lacks \_\_\_\_\_

A. Fe atom

B. Mn atom

C. Mg atom

D. Cu atom

**Answer: C**



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11. Almost all carotenoid pigments have:

A. 50 carbon atoms

B. 40 carbon atoms

C. 30 carbon atoms

D. 60 carbon atoms

**Answer: B**



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12. Which one of the photosynthetic pigments is called shield pigment:

A. carotenes

B. carotenes chlorophyll 'b'

C. pheophytin

D. carotenoids

**Answer: D**



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13. The visible spectrum ranges between

A. 200 to 2800 nm

B. 300 to 2600 nm

C. 200 to 800 nm

D. 300 to 2400 nm

**Answer: B**



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**14.** Photosynthetic rate of red light (650 nm) is equal to:

A. 42.5

B. 10

C. 43.5

D. 40.8

**Answer: C**



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**15.** Indicate the correct statement in respect to Hill' reaction:

(i) During photosynthesis oxygen is evolved from water  
During photosynthesis oxygen is evolved from  $CO_2$

Electrons fro the reduction of  $CO_2$  are obtained from water

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iv)

D. (ii) and (iv)

**Answer: C**



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**16.** Phosphorylation taking place during respiration is called .....

- A. Photophorylation
- B. Oxidative phosphorylation
- C. Reductive phosphorylation
- D. None of the above

**Answer: B**



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**17. Find out the odd one:**

A. Ferredoxin

B. Succite

C. Cytochrome  $b_6 - f$

D. Plastocyanin

**Answer: B**



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**18.** In bio-energetics of light reaction, to release one electron from pigment system it requires:

- A. two quanta of light
- B. four quanta of light
- C. one quanta of light
- D. eight quanta of light

**Answer: A**



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19. Chemiosmotic theory was proposed by \_\_\_\_\_

A. S. Michael

B. R. Hill

C. P. Mitchell

D. G. Root

**Answer: C**



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20. In  $C_4$  plants, how many ATPs and  $DPH + H^+$  are utilised for the release of one oxygen molecule:

A.  $3ATPs$  and  $2DPH + H^+$

B.  $4ATPs$  and  $3DPH + H^+$

C.  $2ATPs$  and  $2DPH + H^+$

D.  $5ATPs$  and  $2DPH + H^+$

**Answer: D**



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21. The key enzyme in the carboxylation reaction is:

A. Ribulose dehydrogenase

B. Carboxylase

C. Carboxylase oxygenase

D. Carboxyl anhydrase

**Answer: C**



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22. In sugarcane plant, the dicarboxylic acid pathway was first discovered by:

- A. Hatch and Slack
- B. Kortschak, Hart and Burr
- C. Calvin and Benson
- D. Mitchell and Root

**Answer: B**



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23. In bundle sheath cells, malic acid undergoes decarboxylation and produces 3 carbon compound:

- A. Glyceric acid and  $CO_2$
- B. Glyceraldehyde and  $CO_2$
- C. Pyruvic acid and  $CO_2$
- D. None of the above

**Answer: C**



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24. Indicate the correct answer:

A.  $C_4$  plants are adapted to only rainy conditions

B.  $C_4$  plants are partially adapted to drought condition

C.  $C_4$  plants are excclusively adapted to desert condition

D.  $C_4$  plants are adapted to aquatic condition

**Answer: B**



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**25.** Crassulacean acid metabolism or CAM cycle was first observed in:

A. sugarcane

B. bryophyllum

C. mango

D. ba

**Answer: B**



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**26.** Glycolated protects plant cells from:

A. Photophosphorylation

B. Photo reduction

C. Photo oxidation

D. Photolysis

**Answer: C**



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27. The important external factors affecting photosynthesis are:

- A. light, chlorophyll, temperature
- B. light, stomatal opening, oxygen
- C. light, protoplasmic factor, oxygen
- D. light,  $CO_2$  and oxygen

**Answer: D**



28. Hormones like gibberellin:

- A. increases the rate of photosynthesis
- B. increase respiration
- C. decrease the rate of photosynthesis
- D. decrease the rate of transpiration

**Answer: A**



29. Bacterial photosynthesis differs from higher plants in evolution of \_\_\_\_\_

A. utilizing water as electron donor

B. releasing  $O_2$

C. releasing sulphur instead of oxygen

D. utilizing  $SO_2$  as electron donor

**Answer: C**



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30. Splitting of water molecule (photolysis)

produces:

A. hydrogen and oxygen

B. electrons, protons and oxygen

C. electrons and oxygen

D. hydrogen, carbon di oxide and oxygen

**Answer: B**



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## Other Important Questions Answers | Answer The Following 2 Marks

1. What is the function of plant in the universe?



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2. Define photosynthesis.



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3. What is the site of photosynthesis?



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4. What is thylakoid?



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5. Endosymbiotic hypothesis says that chloroplasts evolved from bacteria.

Substantiate the statement.



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6. Define the term photosynthetic pigment .



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7. Match the following:

A. Xanthophyll	(i) Lycopene
B. Phycocyanin	(ii) Red algae
C. Carotene	(iii) Brown algae
D. Phycoerythin	(iv) Cyanobacteria



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**8.** What are Xanthophylls?



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**9.** List any five properties of light.



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**10.** Define absorption spectrum.



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**11.** Define the term fluorescence.



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**12.** What is substrate level phosphorylation?



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**13.** Define Photophosphorylation .



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14. Explain the three phase of Dark reaction .



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15. What is the significance of photorespiration?



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16. What is meant by carbon dioxide compensation point?





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17. Name the internal factors affecting photosynthesis.



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18. What are the air pollutants, that affect rate of photosynthesis?



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19. How does water affect the rate of photosynthesis?



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20. Name any three photosynthetic bacteria.



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**Other Important Questions Answers iii Answer  
The Following 3 Marks**



1. Mention the significance of photosynthesis.



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2. How is chlorophyll 'a' synthesized?



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3. What are phycobilins?



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4. List the conclusions obtained by Hill's reaction.



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5. What is ground state?



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6. Explain the term phosphorescence.



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7. Describe the method of carboxylation.



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8. Explain the three phase of Dark reaction .



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9. What is meant by dicarboxylic acid pathway?



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10. Mention the significances of  $C_4$  cycle.



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11. What is the type of carbon pathway in xerophytic plants?



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12. What is the significance of CAM cycle?



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## Other Important Questions Answers Iv Answer The Following 5 Marks

1. Explain in detail about absorption spectrum and action spectrum of light.



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2. Distinguish between Photo system-I and photo system-II.



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**3.** Explain the process of photolysis of water with suitable diagram.



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**4.** Explain non-cyclic photophosphorylation.



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5. Explain chemiosmotic theory with suitable diagram.



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6. Compare and contrast the photosynthetic processes in  $C_3$  and  $C_4$  plants.



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7. Give the schematic diagram of photorespiration.



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8. Differentiate photorespiration and Dark respiration.



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**Other Important Questions Answers Check Your Grasp**



1. Name the products produced from Non-Cyclic photophosphorylation?



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2. Why does PS II require electrons from water?



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**3.** Can you find the difference in the Pathway of electrons during PS I and PS II?



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