



## HEAD OFFICE

208, CD, LOCAL SHOPPING CENTER  
AGGARWAL SHOPPING PLAZA,

## BRANCH -1

AYODHYA CHOWK SEC -3  
ROHINI

## BRANCH -2

DC CHOWK SEC- 9, ROHINI

9<sup>TH</sup> & 10<sup>TH</sup> MATHS / SCIENCE  
11<sup>TH</sup> & 12<sup>TH</sup> – PHYSICS / CHEMISTRY / MATHS / BIOLOGY  
EXCLUSIVE BATCH FOR NEET / JEE ASPIRANTS  
Ph no. 9696 500 500 / 9696 400 400

## Ch- 13 Photosynthesis

1. Why is the lumen of the thylakoids acidic, while the stroma is alkaline?  
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2. (a) NADP reductase enzyme is located on .....  
(b) Breakdown of proton gradient leads to release of .....,  
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3. Why is C<sub>3</sub> pathway of photosynthesis also known as Calvin cycle?  
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4. How many turns of Calvin cycle are required to generate one molecule of glucose?  
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5. What is the basis for designating C<sub>3</sub> and C<sub>4</sub> pathways of photosynthesis?  
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6. By looking at a plant externally , can you tell whether a plant is C<sub>3</sub> or C<sub>4</sub>? Why and how?  
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7. Who first showed that only the green parts of plants could releases oxygen?  
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8. Name the organism Englemann used in his experiment.  
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9. Why is proton gradient important in photosynthesis?

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10. Define photolysis of water.

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**2 marks**

11. Why is the colour of a leaf kept in the dark frequently become yellow or pale green? Which pigment do you think is more stable?

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12. Look at the leaves of the same plant on the shady side and compare it with the leaves on the sunny side or compare the potted plants kept in the sunlight with those in the shade. Which of them has leaves that are darker green. Why?

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13. Two groups (A and B) of bean plants of similar size and same leaf area were placed in identical conditions. Group A was exposed to light of wavelength 400-450 nm and Group B to light of wavelength of 500-550 nm. Compare the photosynthetic rate of the two groups giving reason.

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14. Suppose there were plants that had a high concentration of chlorophyll b, but lacked chlorophyll a, would it carry out photosynthesis? Then why do plants have chlorophyll b and other accessory pigments?

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15. Differentiate between absorption spectrum and action spectrum.

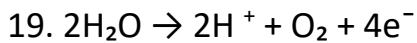
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16. Why are the reaction centres of photosystems named as P<sub>700</sub> and P<sub>680</sub> respectively?

17. Mention the four important events/processes associated with the photochemical phase or light reaction of photosynthesis.

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18. What is Z-scheme in light reaction of photosynthesis? Why is it called so?

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On the basis of the above equation, answer the following questions:

- (a) Where does this reaction take place in plants during photosynthesis?
- (b) What is the significance of this reaction?

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20. Give any four differences between cyclic and non-cyclic photophosphorylation.

Or

Give a comparison between cyclic and non-cyclic photophosphorylation.

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21. Cyclic photophosphorylation results in the production of ATPs and not NADPH. Give reasons.

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22. Mention the four requirements for chemiosmosis to occur.

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23. Where is NADP-reductase enzyme located in the chloroplasts? What is the role of this enzyme in proton gradient development?

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24. Name the most crucial step of Calvin cycle. What happens in it?

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25.  $3\text{CO}_2 + 9\text{ATP} + 6\text{NADPH} + \text{Water} \rightarrow \text{Glyceraldehyde, 3-phosphate} + 9\text{ADP} + 6\text{NADP} + 6\text{P}_i$ .

Analyse the above reaction and answer the following questions:

- (a) How many molecules of ATP and NADPH are required to fix one molecule of  $\text{CO}_2$ ?
- (b) Where in the chloroplast does this process occur?

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**3 marks**

26. What can we conclude from the statement that the action and absorption spectra of photosynthesis overlap? At which wavelength, do they show peaks?

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27. ATP synthetase enzyme consists of two parts. What are those two parts? How are they arranged in the thylakoid membrane? Conformational changes occur in which part of the enzyme?

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28. Differentiate between the mesophyll cells and bundle sheath cells of a  $\text{C}_1$  plant/maize leaf with regard to photosynthesis.

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29. Give a comparison between the  $\text{C}_3$  and  $\text{C}_4$  pathways.

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30. A cyclic process is occurring in  $\text{C}_3$  plants, which is light-dependent and needs  $\text{O}_2$ . This process does not produce energy, but rather consumes energy.

- (a) Can you name the given process?
- (b) Is it essential for survival?

- (c) What are the end products of the process?
- (d) Where does it occur?

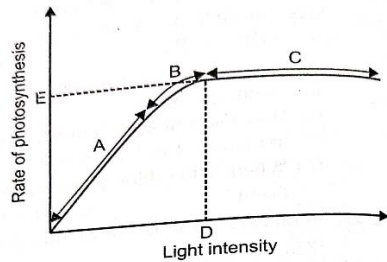
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31. Figure given shows the effect of light on the rate of photosynthesis Based on the graph, answer the following questions:

- (a) At which point(s), (A, B or C), in the curve is light a limiting factor?
- (b) What could be the limiting factor(s) in region A?
- (c) What do C and D represent on the curve?



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**5 marks**

32. Describe the basic characteristics of a photosystem and explain how photosystem I differs from photosystem II.

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33. Where does non-cyclic photophosphorylation take place? Describe this process. Why is this process called so?

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34. Where does cyclic photophosphorylation take place in leaves? Explain the events in sequence. Why is this process called cyclic?

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35. Where does Calvin cycle take place in chloroplast? Describe the three phases of calvin cycle.

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36. Ramu and Sonu are reading the chapter on photosynthesis and the structure of chloroplast as part of it. Ramu's elder brother, Shiv, interrupted them and asked 'do you know there is division of labour in a chloroplast too'? The boys answered, no, only cells



- (a) What is the third product of light reaction?
- (b) Can we say that calling the biosynthetic phase, dark reaction a misnomer? Justify.
- (c) Name the first stable product of photosynthesis.
- (d) Mention the value you get from these reactions.

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