

**CBSE TEST PAPER-02**  
**CLASS - XI BIOLOGY**  
**(Photosynthesis in higher plants)**

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**General Instruction:**

- All questions are compulsory.
  - Question No. 1 to 3 carry one marks each. Question No. 4 to 6 carry two marks each. Question No. 7 and 8 carry three marks each. Question No. 9 carry five marks.
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1. Why photosynthesis important?
2. Define photosynthesis?
3. What is the site for photosynthesis in Opuntia?
4. Differentiate between respiration and photorespiration.
5. Explain the role of water in photosynthesis.
6. What is the law of limiting factor?
7. What is the advantage of having more than one pigment molecule in a photo centre?
8. Why are  $C_4$  plant preferred in the tropical region?
9. Briefly explain the chemiosmotic hypothesis?

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**[ANSWERS]**

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Ans 01. (a) Primary source of all food on earth.

(b) O<sub>2</sub> is released by green plants into the atmosphere.

Ans 02. Photosynthesis is an anabolic endergonic as well as oxidation reduction process in which green plants manufacture food by raw materials in sunlight.

Ans 03. Stem

Ans 04.

	Respiration	Photorespiration
1.	It occurs in all plants (C <sub>3</sub> and C <sub>4</sub> )	It occurs in C <sub>3</sub> plants only.
2.	Glucose is the substrate of this reaction.	Glycolate is the substrate which is connected into Glycine, NH <sub>3</sub> and CO <sub>2</sub> in peroxisomes.

Ans 05.

(i) It is a reactant in light reaction.

(ii) Water stress causes closure of stomata.

(iii) It reduces the availability of CO<sub>2</sub>

(iv) Reduces surface area of leaves.

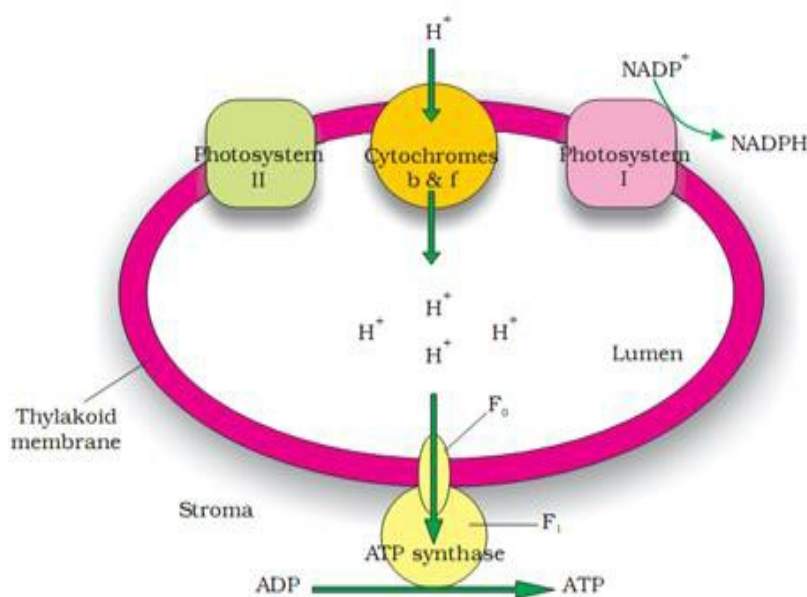
Ans 06. This law states that “if a chemical process is affected by more than one factor which is nearest to its minimal value; then the rate will be determined by the factor which is nearest to its minimal value; it is the factor that directly affects process if its quantity is changed”.

Ans 07. Light reaction depends upon the amount of solar energy trapped by the pigment. Energy trapped by a single pigment molecule is not enough to start the initial reaction which may occur in light. Hence, a number of pigment molecules provide protection to the chlorophyll molecule against photo oxidation.

Ans 08.  $C_4$  plants utilize 30 ATP's to produce one molecule of glucose favoured in tropical region. In these plants photorespiration is the mechanism not to lose the photosynthetic carbon. In the process of photorespiration RuBP is catabolised to a 3-carbon atom compound instead of combining with  $CO_2$ . More than 50%  $CO_2$  fixed by photosynthesis is lost in photorespiration. Photorespiration acts to undo the work of photosynthesis as no energy rich compound is produced during this process. Thus  $C_4$  plants are better photosynthesizers than  $C_3$  plants and  $C_4$  pathway is of adaptive advantage in tropical region and thus these plants are preferred.

Ans 09. Chemiosmotic hypothesis explained the mechanism of ATP synthesis in chloroplast. In photosynthesis, ATP synthesis is linked to development of proton gradient across a membrane. These are membrane of thylakoids. The proton accumulation is towards the inside of the membrane (in the lumen).

The processes which occur during activation of electrons and their transport to determine the steps that causes a proton gradient to develop. ATP synthesis is linked to development of proton gradient.



**Figure 13.7** ATP synthesis through chemiosmosis