

Chapter – 11 | Photosynthesis in Higher Plants

QUIZ
PART-04

1. Chemiosmotic hypothesis was proposed by —

- A. Melvin Calvin
- B. Peter Mitchell
- C. Joseph Priestley
- D. Engelmann (B)

Explanation : Peter Mitchell explained ATP formation through proton gradient.

2. In chloroplasts, ATP synthesis occurs due to proton gradient across the —

- A. Nuclear membrane
- B. Cell wall
- C. Thylakoid membrane
- D. Plasma membrane only (C)

Explanation : Protons accumulate across the thylakoid membrane.

3. In photosynthesis, protons accumulate mainly in the —

- A. Stroma
- B. Thylakoid lumen
- C. Nucleus
- D. Cytoplasm (B)

Explanation : Proton concentration becomes higher inside the thylakoid lumen.

4. Breakdown of water molecules occurs on the —

- A. Inner side of thylakoid membrane
- B. Outer surface of cell wall
- C. Nuclear envelope
- D. Vacuolar membrane (A)

Explanation : Water splitting releases protons into the lumen.

5. NADP reductase is located on the —

- A. Lumen side
- B. Stroma side
- C. Cell wall side
- D. Vacuole side (B)

Explanation : NADP⁺ reduction uses protons from the stroma.

6. The pH decreases in the thylakoid lumen because —

- A. CO₂ disappears
- B. Protons accumulate there
- C. Oxygen accumulates there
- D. Glucose breaks down there (B)

Explanation : High H⁺ concentration makes lumen more acidic.

7. CF₀ part of ATP synthase functions as —

- A. Transmembrane proton channel
- B. DNA carrier
- C. Glucose acceptor
- D. CO₂ pump (A)

Explanation : CF₀ allows protons to diffuse across the membrane.

8. CF₁ part of ATP synthase is involved in —

- A. ATP synthesis
- B. Water absorption
- C. Starch testing
- D. CO₂ storage (A)

Explanation : Energy from proton flow causes conformational change in CF₁ for ATP formation.

9. Chemiosmosis requires —

- A. Membrane, proton pump, proton gradient and ATP synthase
- B. Only CO₂ and water
- C. Only RuBisCO
- D. Only chlorophyll-b (A)

Explanation : All these are required for chemiosmotic ATP formation.

10. ATP and NADPH produced in light reaction are used in —

- A. Biosynthetic phase in stroma
- B. Photolysis only
- C. Water absorption only
- D. Oxygen release only (A)

Explanation : ATP and NADPH are used for CO₂ fixation and sugar formation.