NEET · CLASS 11 BIOLOGY

Photosynthesis in Higher Plants — Revision Sheet

Most students lose marks here by mixing up the two photosystems and the C3 and C4 pathways. Answer these questions, read the reasons, and let the app schedule a repeat test before you forget them.

Quick NCERT recap

- Light reaction happens in the thylakoid membrane; the Calvin cycle happens in the stroma.
- PS I absorbs light at 700 nm (P700), PS II at 680 nm (P680); water splitting is linked to PS II.
- Non-cyclic photophosphorylation gives ATP, NADPH and O2; cyclic gives only ATP.
- C3 plants fix CO2 with RuBisCO into 3-PGA; C4 plants fix it first as oxaloacetic acid in mesophyll cells.
- Photorespiration happens in C3 plants when RuBisCO binds O2; there is no ATP or NADPH gain.

Exam tips

- Learn the Kranz anatomy of C4 plants — bundle sheath cells with thick walls and no intercellular spaces.
- Remember: 3 ATP and 2 NADPH are used per CO2 fixed in the Calvin cycle.
- Know the exact site of each step; NEET often asks 'where does this happen'.

Practice questions with answers

Q1. The splitting of water during photosynthesis is associated with:

(A) Photosystem I
✓ (B) Photosystem II
(C) Cytochrome b6f complex
(D) ATP synthase

Answer: (B) Photosystem II

Why: Photolysis of water happens on the inner (lumen) side of the thylakoid membrane and is linked with PS II. It releases electrons, protons and oxygen.

Q2. The primary CO2 acceptor in C4 plants is:

(A) RuBP
✓ (B) PEP (phosphoenolpyruvate)
(C) OAA
(D) PGA

Answer: (B) PEP (phosphoenolpyruvate)

Why: In C4 plants the mesophyll cells use PEP as the primary acceptor and PEP carboxylase to form the 4-carbon oxaloacetic acid. RuBP is the acceptor in the Calvin cycle inside bundle sheath cells.

Q3. How many ATP and NADPH molecules are required to fix one CO2 in the Calvin cycle?

(A) 2 ATP, 2 NADPH
✓ (B) 3 ATP, 2 NADPH
(C) 3 ATP, 3 NADPH
(D) 18 ATP, 12 NADPH

Answer: (B) 3 ATP, 2 NADPH

Why: Fixing one CO2 needs 3 ATP and 2 NADPH. For one molecule of glucose (6 CO2), that becomes 18 ATP and 12 NADPH.

Q4. Photorespiration in C3 plants is wasteful because:

(A) It produces excess sugar
✓ (B) There is no synthesis of ATP, NADPH or sugar
(C) It uses only water
(D) It doubles the rate of photosynthesis

Answer: (B) There is no synthesis of ATP, NADPH or sugar

Why: When RuBisCO binds O2 instead of CO2, RuBP forms one PGA and one phosphoglycolate. The pathway releases CO2 with no sugar, ATP or NADPH produced, so it lowers the net yield.

Revise this chapter on the right day

Study Commander AI reminds you to revise each topic on day 1, 3, 8 and 20, so you do not forget what you already learnt. Take the free 10-question test for this chapter:

https://studycommanderai.live/practice/biology/photosynthesis-in-higher-plants