

NEET PHOTOSYNTHESIS IN HIGHER PLANTS — CYCLIC AND NON-CYCLIC PHOTOPHOSPHORYLATION, CHEMIOSMOTIC HYPOTHESIS — PYQS

Max. Marks: 40

Questions: 10

Section A (MCQ) — 10 questions

Q.1 Which of the following combinations is required for chemiosmosis? [NEET (UG) 2023]

- (1) Membrane, proton pump, proton gradient, NADP synthase
- (2) Proton pump, electron gradient, ATP synthase
- (3) Proton pump, electron gradient, NADP synthase
- (4) Membrane, proton pump, proton gradient, ATP synthase

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Q.2 Which one of the following is not true regarding the release of energy during ATP synthesis through chemiosmosis? It involves: [NEET (UG) 2022]

- (1) Breakdown of proton gradient
- (2) Breakdown of electron gradient
- (3) Movement of protons across the membrane to the stroma
- (4) Reduction of NADP to NADPH₂ on the stroma side of the membrane

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Q.3 Identify the correct statements regarding chemiosmotic hypothesis:
Choose the correct answer from the options given below:

- A. Splitting of the water molecule takes place on the inner side of the membrane.
- B. Protons accumulate within the lumen of the thylakoids.
- C. Primary acceptor of electron transfers the electrons to an electron carrier.
- D. NADP reductase enzyme is located on the stroma side of the membrane.
- E. Protons increase in number in stroma.

[NEET (UG) 2022 (Phase 2)]

- (1) B, C and E only
- (2) A, B and E only
- (3) A, B and D only
- (4) B, C and D only

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Q.4 Which of the following statements is incorrect?

[NEET (UG) 2021]

- (1) Cyclic photophosphorylation involves both PS I and PS II
- (2) Both ATP and NADPH + H⁺ are synthesized during non-cyclic photophosphorylation.
- (3) Stroma lamellae have PS I only and lack NADP reductase
- (4) Grana lamellae have both PS I and PS II

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Q.5 In a chloroplast the highest number of protons are found in [NEET 2016 (Phase 1)]

- (1) intermembrane space
- (2) antennae complex
- (3) stroma
- (4) lumen of thylakoids.

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Q.6 Read the following four statements (A – D).
How many of the above statements are right?

- A. Both photophosphorylation and oxidative phosphorylation involve uphill transport of protons across the membrane.
- B. In dicot stems, a new cambium originates from cells of pericycle at the time of secondary growth.
- C. Stamens in flowers of *Gloriosa* and *Petunia* are polyandrous.
- D. Symbiotic nitrogen fixers occur in free-living state also in soil.

[AIPMT 2012 (Mains)]

- (1) Two
- (2) Three
- (3) Four
- (4) One

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Q.7 Read the following four statements, (i), (ii), (iii) and (iv) and select the right option having both correct statements.

Statements : [AIPMT 2010 (Mains)]

- (i) Z scheme of light reaction takes place in presence of PS I only.
- (ii) Only PS I is functional in cyclic photophosphorylation.
- (iii) Cyclic photophosphorylation results into synthesis of ATP and NADPH₂.

(iv) Stroma lamellae lack PS II as well as NADP reductase.

- (1) (ii) and (iv) (2) (i) and (ii)
(3) (ii) and (iii) (4) (iii) and (iv)

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Q.8 Cyclic photophosphorylation results in the formation of [AIPMT 2009]

- (1) ATP and NADPH (2) ATP, NADPH and O₂
(3) ATP (4) NADPH.

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Q.9 Chemiosmotic theory of ATP synthesis in the chloroplasts and mitochondria is based on

[AIPMT 2005]

- (1) Proton gradient
(2) Membrane potential
(3) Accumulation of Na⁺ ions
(4) Accumulation of K⁺ ions

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Q.10 Which one of the following concerns photophosphorylation? [AIPMT 2003]

- (1) $\text{ADP} + \text{AMP} \xrightarrow{\text{Light energy}} \text{ATP}$
(2) $\text{ADP} + \text{Inorganic PO}_4 \xrightarrow{\text{Light energy}} \text{ATP}$
(3) $\text{ADP} + \text{Inorganic PO}_4 \longrightarrow \text{ATP}$
(4) $\text{AMP} + \text{Inorganic PO}_4 \xrightarrow{\text{Light energy}} \text{ATP}$

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ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	
Ans.	4	2	3	1	4	1	1	3	1	2	