PHOTOSYNTHESIS IN HIGHER PLANTS

90 MINUTES
SPECIALISED PYQ

Q1. The reaction centre in PS II has an absorption maxima at: **NEET - 2023**

1.	780 nm	2.	680 nm
3.	700 nm	4.	660 nm

Q2.How many ATP and $NADPH_2$ are required for the synthesis of one molecule of Glucose during Calvin cycle? **NEET - 2023**

1.	**18 ATP and 16 $NADPH_2$**	**2.**	**12 ATP and 12 $NADPH_2$**
3.	**18 ATP and 12 $NADPH_2$**	**4.**	**12 ATP and 16 $NADPH_2$**

Q3. Which of the following combinations is required for chemiosmosis? **NEET - 2023**

1.	**Proton pump, electron gradient, NADP synthase.**
2.	**Membrane, proton pump, proton gradient, ATP synthase.**
3.	**Membrane, proton pump, proton gradient, NADP synthase**
4.	**Proton pump, electron gradient, ATP synthase**

Q4. Match List - I with List - II **NEET - 2023**

	List - I		List - II
(A)	Chlorophyll a	(I)	Yellow to yellow orange
(B)	Chlorophyll b	(II)	Yellow green
(C)	Xanthophyll	(III)	Blue green
(D)	Carotenoids	(IV)	Yellow

Choose the correct answer from the options given below:

Options:	(A)	(B)	(C)	(D)

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1.	III	II	IV	I
2.	III	I	IV	II
3.	II	III	I	IV
4.	IV	III	II	I

Q5. Given below are two statements : **NEET - 2023**

Statement I:	**RuBisCO is the most abundant enzyme in the world.**
Statement II:	**Photorespiration does not occur in C_4 plants.**

In the light of the above statements, choose the most appropriate answer from the options given below:
1. Statement I is correct but Statement II is incorrect
2. Statement I is incorrect but Statement II is correct
3. Both Statement I and Statement II are correct
4. Both Statement I and Statement II are incorrect

Q6. Which out of the following statements is incorrect?

1.	**Grana lamellae have both PS I and PS II**
2.	**Cyclic photophosphorylation involved both PS I and PS II**
3.	**Both ATP and NADPH + H^+ are synthesised during non-cyclic photophosphorylation**
4.	**Stroma lamellae lack PS II and NAP reductase**

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Q7. Which one of the following is not true regarding the release of energy during ATP synthesis through chemiosmosis? **NEET - 2022**

It involves:

1.	Reduction of NADP to $NADPH_2$ on the stroma side of the membrane
2.	Breakdown of proton gradient
3.	Breakdown of electron gradient
4.	Movement of protons across the membrane to the stroma

Q8. Given below are two statements: **NEET - 2022**

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Statement I:	The primary co2 acceptor in c4 plants is phosphoenolpyurate and is found in the mesophyll cells .
Statement II:	Mesophyll cells in c4 plants lack RuBisCo enzyme .

In the light of the above statements, choose the correct answer from the options given below :

1. Statement I is incorrect but Statement II is correct.

2. Both Statement I and Statement II are correct.

3. Both Statement I and Statement II are incorrect.

4. Statement I is correct but Statement II is incorrect.

Q9. "Girdling Experiment" was performed by Plant Physiologists to identify the plant tissue through which: **NEET - 2022**

1. osmosis is observed

2. water is transported

3. food is transported

4. for both water and food transportation

Q10. What is the role of large bundle sheath cells found around the vascular bundles in C_4 plants? **NEET - 2022**

1.	**To protect the vascular tissue from high light intensity.**
2.	**To provide the site for photorespiratory pathway.**
3.	**To increase the number of chloroplast for the operation of Calvin cycle.**
4.	**To enable the plant to tolerate high temperature.**

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Q11. The products of light reaction in photosynthesis are: **NEET - 2022**

1. ATP , NADPH , and O2
2. ATP , NADPH , O2 and H2O
3. ATP , NADPH And H2O
4. ATP , NADPH and CO2

Q12. The ratio of carbon dioxide fixation between C_4 plants and C_3 plants is :

1.	2:1	2.	2: 3
3.	1:1	4.	1:2

Q13. When one CO_2 molecule is fixed as one molecule of triose phosphate, which of the following photochemically made, high energy chemical intermediates are used in the reduction phase? **NEET - 2022**

1. 1 ATP + 1 NADPH

2. 1 ATP + 2 NADPH

3. 2 ATP + 1 NADPH

4. 2 ATP + 2 NADPH

Q14. Identify the correct statements regarding chemiosmotic hypothesis: **NEET - 2022**

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.	The primary acceptor of electrons transfers the electrons to an electron carrier.
d.	NADP reductase enzyme is located on the stroma side of the membrane.

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e.	Protons increase in number in stroma.

Choose the correct answer from the options given below:

1.	(a), (b) and (e)	2.	(a), (b) and (d)
3.	(b), (c) and (d)	4.	(b), (c) and (e)

Q15. The first stable product of CO_2 fixation in sorghum is: **NEET - 2021**

1. Succinic acid

2. Phosphoglyceric acid

3. Pyruvic acid

4. Oxaloacetic acid

Q16. Which of the following statements is incorrect? NEET - 2021

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

Q17. In light reaction, plastoquinone facilitates the transfer of electrons from: **NEET - 2020**
1. $Cytb_6f$ complex to PS-I

2. PS-I to $NADP^+$

3. PS-I to ATP synthase

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4. PS-II to Cytb6f complex

Q18. The oxygenation activity of RuBisCo enzyme in photorespiration leads to the formation of:

NEET - 2020

1.	1 molecule of the 3-C compound
2.	1 molecule of the 6-C compound
3.	1 molecule of a 4-C compound and 1 molecule of the 2-C compound
4.	2 molecules of the 3-C compound

Q19. During non-cyclic photophosphorylation, when electrons are lost from the reaction center at PS II, what is the source which replaces these electrons? NEET - 2020

1.	Oxygen	2.	Water
3.	Carbon dioxide	4.	Light

Q20. Which of the following statements is incorrect? **NEET - 2020**

1.	RuBisCO is a bifunctional enzyme
2.	In C4 plants, the site of RuBisCO activity is mesophyll cell
3.	The substrate molecule for RuBisCO activity is a 5-carbon compound
4.	RuBisCO action requires ATP and NADPH

Q21. In Hatch and Slack pathway, the primary CO_2 acceptor is - NEET - 2019

1. Oxaloacetic acid

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2. Phosphoglyceric acid

3. Phosphoenol pyruvate

4. Rubisco

Q22. One scientist cultured *Cladophora* in a suspension of *Azotobacter* and illuminated the culture by splitting light through a prism. He observed that bacteria accumulated mainly in the region of: **NEET - 2019**

1. Violet and green light

2. Indigo and green light

3. Orange and yellow light

4. Blue and red light

Q23. Which of the following is *not* a product of light reaction of photosynthesis? **NEET - 2018**

1.	ATP	2.	NADH
3.	NADPH	4.	Oxygen

Q24. Oxygen is *not* produced during photosynthesis by: **NEET - 2018**

1.	Green sulphur bacteria	2.	*Nostoc*
3.	*Cycas*	4.	*Chara*

Q25. With reference to factors affecting the rate of photosynthesis, which of the following statements is not correct? **NEET - 2017**

(1) Light saturation for CO_2-fixation occurs at 10% of full sunlight.

(2) Increasing atmospheric CO_2 concentration upto 0.05% can enhance the CO_2-fixation rate

(3) C_3 plants respond to higher temperature with enhanced photosynthesis, while C_4 plants have a much lower temperature optimum.

(4) Tomato is a greenhouse crop, which can be grown in a CO_2-enriched atmosphere for higher yield.

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Q26. Phosphoenol pyruvate (PEP) is the primary CO_2 acceptor in: **NEET - 2017**

1. C_4 plants

2. C_2 plants

3. C_3 and C_4 plants

4. C_3 plants

Q27. Water vapour comes out from the plant leaf through the stomatal opening. Through the same stomatal opening carbon dioxide diffuses into the plant during photosynthesis. Reason out the above statements using the following options. **NEET - 2016**

1. Both process can happen together because the diffusion coefficient of water and CO_2 is different.

2. The above processes happen only during night time

3. One process occurs during the day time and the other night

4. Both processes cannot happen simultaneously

Q28. A plant in your garden avoids photorespiratory losses, has improved water use efficiency, shows high rates of photosynthesis at high temperatures and has improved efficiency of nitrogen utilization. In which of the following physiological groups would you assign this plant? **NEET - 2016**

(1) C_4

(2) CAM

(3) Nitrogen-fixer

(4) C_3

Q29. The process which makes a major difference between C_3 and C_4 plants is: **NEET - 2016**

1.	glycolysis	2.	Calvin cycle
3.	photorespiration	4.	respiration

Q30. Water-soluble pigments found in plant cell vacuoles are: **NEET - 2016**

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1.	chlorophylls	2.	carotenoids
3.	anthocyanins	4.	xanthophylls

Q31. Emerson's enhancement effect and red drop have been instrumental in the discovery of?

NEET - 2016

1.	two photosystems operating simultaneously
2.	photophosphorylation and cyclic electron transport
3.	oxidative photophosphorylation
4.	photophosphorylation and non-cyclic electron transpor

Q32. In chloroplast, the highest number of protons are found in? **NEET - 2016**
1. lumen of thylakoids
2. intermembrane space
3. antennae complex
4. stroma

Q33.In photosynthesis, the light-independent reactions take place at? **NEET - 2015**

1. Thylakoid lumen

2. photosystem I

3. photosystem II

4. Stromal matrix

Q34. Anoxygenic photosynthesis is characteristic of: **AIPMT - 2014**

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1. *Rhodospirillum*

2. *Spirogyra*

3. *Chlamydomonas*

4. Ulva

Q35. Bundle sheath cells: **NEET - 2013**

1. are rich in PEP carboxylase

2. lack RuBisCo

3. lack both RuBisCo and PEP carboxylase

4. are rich in RuBisCo

Q36. The correct sequence of cell organelles during photorespiration is: **AIPMT - 2012**

1. chloroplast-Golgi bodies-mitochondria

2. chloroplast-rough endoplasmic reticulum-dictyosomes

3. chloroplast-mitochondria-peroxisome

4. chloroplast-vacuole-peroxisome

Q37. CAM helps the plants in: **AIPMT - 2011**

1.	secondary growth	2.	disease resistance
3.	reproduction	4.	conserving water

Q38. In Kranz anatomy, the bundle sheath cells have: **AIPMT - 2011**

1.	thick walls, many intercellular spaces and few chloroplasts
2.	thin walls, many intercellular spaces and no chloroplasts
3.	thick walls, no intercellular spaces and a large number of chloroplasts

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4.	thin walls, no intercellular spaces and several chloroplasts

Q39. PGA as the first CO_2 fixation product was discovered in photosynthesis of: **AIPMT - 2010**

1. Bryophyte

2. Gymnosperm

3. Angiosperm

4. Algae

Q40. C_4-plants are more efficient in photosynthesis than C_3-plants due to: **AIPMT - 2010**

1.	higher leaf area
2.	presence of larger number of chloroplasts in the leaf cells
3.	presence of thin cuticle
4.	lower rate of photorespiration

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ANSWER KEY

1.	(2)	11.	(1)	21.	(3)	31.	(1)
2.	(3)	12.	(1)	22.	(4)	32.	(1)
3.	(2)	13.	(1)	23.	(2)	33.	(4)
4.	(1)	14.	(2)	24.	(1)	34.	(1)
5.	(3)	15.	(4)	25.	(3)	35.	(4)
6.	(2)	16.	(2)	26.	(1)	36.	(3)
7.	(3)	17.	(4)	27.	(1)	37.	(4)
8.	(2)	18.	(1)	28.	(1)	38.	(3)
9.	(3)	19.	(2)	29.	(3)	39.	(4)
10.	(4)	20.	(2)	30.	(3)	40.	(4)

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