

NEET PHOTOSYNTHESIS IN HIGHER PLANTS — C4 PATHWAY (HATCH AND SLACK), KRANZ ANATOMY — PYQS

Max. Marks: 76

Questions: 19

Section A (MCQ) — 19 questions

Q.1 Given below are two statements:

Statement-I: The primary CO_2 acceptor in C_4 plants is phosphoenolpyruvate and is found in the mesophyll cells.

Statement-II: Mesophyll cells of C_4 plants lack RuBisCO enzyme.

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

[NEET (UG) 2022]

- (1) Both Statement-I and Statement-II are correct
- (2) Both Statement-I and Statement-II are incorrect
- (3) Statement-I is correct but Statement-II is incorrect
- (4) Statement-I is incorrect but Statement-II is correct

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Q.2 What is the role of large bundle sheath cells found around the vascular bundles in C_4 plants?

[NEET (UG) 2022]

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

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Q.3 The first stable product of CO_2 fixation in *Sorghum* is

[NEET (UG) 2021]

- (1) Phosphoglyceric acid (2) Pyruvic acid
- (3) Oxaloacetic acid (4) Succinic acid

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Q.4 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

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Q.5 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 utilisation. In which of the following physiological groups would you assign this plant? [NEET 2016 (Phase 1)]

- (1) CAM (2) Nitrogen fixer
- (3) C_3 (4) C_4

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Q.6 Bundle sheath cells : [NEET 2013 (Karnataka)]

- (1) lack both RuBisCo and PEP carboxylase
- (2) are rich in PEP carboxylase
- (3) are rich in RuBisCo
- (4) lack RuBisCo

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Q.7 In Kranz anatomy, the bundle sheath cells have

[AIPMT 2011 (Mains)]

- (1) thin walls, many intercellular spaces and no chloroplasts
- (2) thick walls, no intercellular spaces and large number of chloroplasts
- (3) thin walls, no intercellular spaces and several chloroplasts
- (4) thick walls, many intercellular spaces and few chloroplasts.

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Q.8 CAM helps the plants in [AIPMT 2011 (Prelims)]

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

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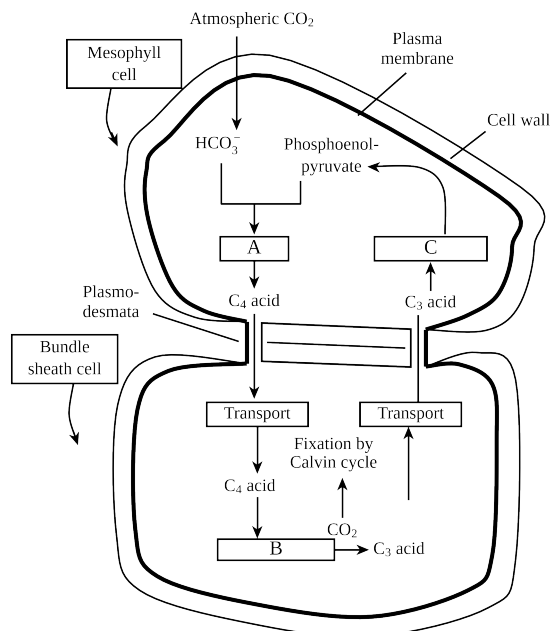
Q.9 Kranz anatomy is one of the characteristics of the leaves of [AIPMT 2010 (Mains)]

- (1) potato (2) wheat
- (3) sugarcane (4) mustard

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Q.10 Study the pathway given below:



In which of the following options correct words for all the three blanks A, B and C are indicated?

[AIPMT 2010 (Mains)]

- (1) A → Fixation, B → Transamination, C → Regeneration
- (2) A → Decarboxylation, B → Reduction, C → Regeneration
- (3) A → Carboxylation, B → Decarboxylation, C → Reduction
- (4) A → Fixation, B → Decarboxylation, C → Regeneration

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Q.11 The C₄ plants are photosynthetically more efficient than C₃ plants because [AIPMT 2008]

- (1) the CO₂ efflux is not prevented
- (2) they have more chloroplasts
- (3) the CO₂ compensation point is more
- (4) CO₂ generated during photorespiration is trapped and recycled through PEP carboxylase

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Q.12 In leaves of C₄ plants malic acid synthesis during CO₂ fixation occurs in [AIPMT 2008]

- (1) bundle sheath
- (2) guard cells
- (3) epidermal cells
- (4) mesophyll cells

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Q.13 Which is the first CO₂ acceptor enzyme in C₄ plants? [AIPMT 2000]

- (1) RuDP carboxylase
- (2) Phosphoric acid
- (3) RuBisCO
- (4) PEP- carboxylase

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Q.14 In the leaves of C₄ plants, malic acid formation during CO₂ fixation occurs in the cells of [AIPMT 2007]

- (1) bundle sheath
- (2) phloem
- (3) epidermis
- (4) mesophyll

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Q.15 As compared to a C₃-plant, how many additional molecules of ATP are needed for net production of one molecule of hexose sugar by C₄-plants? [AIPMT 2005]

- (1) Two
- (2) Six
- (3) Twelve
- (4) Zero

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Q.16 Photosynthesis in C₄ plants is relatively less limited by atmospheric CO₂ levels because [AIPMT 2005]

- (1) effective pumping of CO₂ into bundle sheath cells
- (2) RuBisCo in C₄ plants has higher affinity for CO₂
- (3) four carbon acids are the primary initial CO₂ fixation products
- (4) the primary fixation of CO₂ is mediated via PEP carboxylase.

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Q.17 In sugarcane plant ¹⁴CO₂ is fixed to malic acid, in which the enzyme that fixes CO₂ is [AIPMT 2003]

- (1) ribulose biphosphate carboxylase
- (2) phosphoenolpyruvic acid carboxylase
- (3) ribulose phosphate kinase
- (4) fructose phosphate.

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Q.18 Stomata of CAM plants [AIPMT 2003]

- (1) are always open
- (2) open during the day and close at night
- (3) open during the night and close during the day
- (4) never open.

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Q.19 Which pair is wrong? [AIPMT 2001]

- (1) C₃-maize
- (2) C₄-Kranz anatomy
- (3) Calvin cycle-PGA
- (4) Hatch and Slack cycle-OAA

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ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	1	2	3	1	4	3	2	1	3	4	2
Ques.	12	13	14	15	16	17	18	19			
Ans.	4	4	4	3	4	2	3	1			