BIOLOGY

BOOKS - FULL MARKS BIOLOGY (TAMIL ENGLISH)

PHOTOSYNTHESIS

Textbook Evaluation Questions Solved

1. Assertion (A): Increase in Proton gradient inside lumen reponsible for ATP synthesis

Reason (R): Oxygen evolving complex of PS I located on thylakoid membrane facing Stroma, releases H^+ ions

A. Both Assertion and Reason are True

B. Assertion is True and Reason is False .

C. Reason is True and Assertion in False

D. Both Assertion and Reason are False .

Answer: B

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2. Which chlorophyll molecule does not have a phytol tail?

A. Chl - a

B. CHl - b

C. Chl- c

D. Chl - d

Answer: C

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3. Identify the correct sequence of flow of electrons in the light reaction is

A. PS - II, plastoquinone , cytochromes , PS - I , ferredoxin.

B. PS- I, Plastoquinone , cytochrome, PS- II ferredoxin.

C. PS - II, ferrodoxin, plastoquinone , cythrome , PS -I.

D. PS - I, platoquinone , cytochromes PS - II, ferredoxin .

Answer: A

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4. For every CO_2 molecule entering the C_3 cycle, the number of ATP and NADPH required is

A. 2ATP + 2NADPH

B. 2ATP + 3NADPH

C. 3ATP + 2NADPH

D. 3ATP + 3NADPH

Answer: C

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5. Identify true statement regarding light reaction of photosynthesis

A. Splitting of water molecule is assoicated with PS I

B. PS I and PS II involved in the formation of NDPH + H^+

C. The reaction centre of PS I is Chlorophyll a with absorption peak at 680 nm

D. The reaction center of PS II is Chlorophyll a with absorption peak at 700 nm.

Answer: D

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6. Two groups (A & B) of bean plants 450nm & Group B to light of wave of similar size and same leaf area were length of 500-550nm. Compare the placed in identical conditions. Group A photosynthetic rate of the2 groups givwas exposed to light of wavelength 400 reasons.

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7. A tree is believed to be releasing oxygen during night time. Do you believe the truthfulness of this statement?

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8. Grasses have anadaptive mechanism to compensate photorespiratory lossesName and describe the mechanism.

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9. In Botany class, teacher explains, Synthesis of one glucose requires 30 ATPs in C_4 plants and only 18ATPs in C_3 plants. The

same teacher explains C_4 plants are more advantageous than C_3 plants. Can you identify the reason for this cont

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10. When there is plenty of light and higher concentration of O_2, what kind of pathway does the plant undergo? Anaylse the reasons.

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11. Photosynthetic organisms use only ___ of incident solar light on earth.

A. 0.2

B. 0.6

C. 0.1

D. 0.8

Answer: A

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Addition Questionn Solved Choose The Correct Answer

1. Who is called as father of plant physiology ?

A. Joseph priestlely

B. Lavoisier

C. Stephen Hales

D. Van Helmont

Answer: C

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2. In the green sulphur bacteria the hydrogen donor is H2S and the process of pigment is called _____ .

A. H_2O

B. H_2S

C. H_2O_2

D. HCl

Answer: B

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3. Ruben & Kamen used.....radioactive oxygen to prove evolution of oxygen from water .

A. ^{18}O

B. ^{16}O

C. ^{14}O

D. ^{12}O

Answer: A

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4. In photosynthesis.....is reduced into carbohydrates .

A. H_2O

B. Chlorophyll

C. CO_2

D. O_2

Answer: C

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5. Which of the folloiwng performs anaerobic photosynthesis ?

A. Green sulphur bacteria

B. Cyanobacteria

C. Purple sulphur bacteria

D. Green filamentous bacteria

Answer: B

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6. The colloidal proteinaceous matrix of chloroplast is..... .

A. Thylakoid

B. Stroma

C. Grana

D. Lamellae

Answer: B

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7. Each granum has.....thyalkoids.

A. $8 - 30$

B. $40 - 80$

C. $5 - 30$

D. $40 - 70$

Answer: C

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8. Which of the following is a primary pigment ?

A. Chlorophyll a

B. Carotene

C. Xanthophyll

D. Phyocerythrin

Answer: A

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9. The chlorophyll pigment found in xanthophycean alge is ..... .

A. Chlorophyll b

B. Chlorophyll c

C. Chlorophyll d

D. Chorophyll c

Answer: D

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10. The nature of phytol tail in chlorophyll is ..... .

A. Hydrophilic

B. Lipophilic

C. Hydrophobic

D. Lipophobic

Answer: B

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11. The porphyrin head of chlorophyll has .....pyrrole rings.

A. 1

B. 2

C. 3

D. 4

Answer: D

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12. Which of the following is NOT required for the biosynthesis of chlorophyll a?

A. Mn

B. Mg

C. Mo

D. Cu

Answer: C

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13. In chlorophyll C, which of the following component is absent ?

A. Prophyrin head

B. Phytol tail

C. Pyrrole ring

D. Methyl group

Answer: B

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14. .....pigments are also called as shield pigments.

A. Carotenoids

B. Chlorophyll b

C. Chlorophyll b

D. Phycobilines

Answer: A

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15. _____ is responsible for yllow colour change of leaves during autumn season.

A. Cutin

B. Lutein

C. Phycobilin

D. Carotein

Answer: B

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16. The color of the light is determined by its . . . . . .

A. Intensity

B. Refractive power

C. Wave length

D. Reflection

Answer: C

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17. The visible spectrum ranges between

A. 390-763 nm

B. 370-700nm

C. 450-700 nm

D. 357-736 nm

Answer: A

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18. Electro magnetic spectrum consists of ..... types of radiation.

A. 2

B. 4

C. 6

D. 8

Answer: D

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19. Light as a particles is called ..... .

A. Nutron

B. Quantum

C. Photon

D. Quantasome

Answer: C

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20. Usually ..... chlorophyll molecules are considered as physiological units of photosynthesis.

A. 300-700

B. 200-300

C. 240-750

D. 200-280

Answer: B

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21. Who coined the term Quantasome?

A. Steinmann

B. Park & Biggins

C. Emerson & Arnold

D. Von Mayer

Answer: B

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22. In Emerson's first effect, the photosynthetic yield was dropped in the region above _____.

A. 720 nm

B. 620 nm

C. 680 nm

D. 600 nm

Answer: C

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23. In photosynthetic reactions .....is consider as assimilatory power.

A. NADPH2

B. FADPH

C. ATP

D. GTP

Answer: C

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24. Antenna molecules refers to .

A. Light harvesting complex

B. Central core complex

C. PS II

D. Oxygen evolving complex

Answer: A

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25. Chlorophyll and caroteniod ratio in PS H II is ..... .

A. 3 to 7:1

B. 20 to 30:1

C. 7 to 30:1

D. 10 to 30:1

Answer: A

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26. Phosphorylation taking place during respiariton is called ..... .

A. Substrate level phosphorylation

B. Oxidative phosphorylation

C. Reductive phosphorylation

D. Photophosphorylation

Answer: B

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27. Which of the following statement is NOT true regarding cyclic photophosphorylation ?

A. The primary electron accepton is FRS

B. It produces only ATP molecules

C. It produces only NADPH + H^+ molecules

D. Electron ejected from PSI again cycled back to PSI

Answer: C

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28. Chemiosmotic theory was proposed by ____

A. Mitchell

B. Hatch & Slack

C. Calvin

D. Priestly

Answer: A

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29. How many ATP molecules are utilized by C_3 plants to evolve one oxygen molecule.

A. 3

B. 4

C. 8

D. 12

Answer: A

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30. The first formed product of C_3 cycle is ..... .

A. Succinic acid

B. Phosphoglyceric acid

C. Oxalo Acetic acic

D. Malic acid

Answer: B

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31. RUBP is a .....carbon compound.

A. Three

B. Four

C. Five

D. Seven

Answer: C

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32. Number of diecot species performing C_4 pathway is

A. 200

B. 300

C. 800

D. 1000

Answer: B

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33. The CO_2 acceptor molecule in C_3 plants is ..... .

A. PEP

B. PGA

C. OAA

D. RUBP

Answer: D

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34. C_2 cycle refers to ..... .

A. CAM cycle

B. PCO cycle

C. PCR cycle

D. DCA cycle

Answer: B

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35. Identify the mismatched pair .

(i)Phosphoryl reaction $-$ phosphorous

(ii) Photolysis of water $-$ Mangnese & Chlorine

(iii) Plastocyanin formation $-$ Copper and Zinc

(iv) Chlorophyll formation $-$ Magnesium , Iron , Nitrogen

A. (i) only

B. (iii) only

C. Both (i) & (iii)

D. All the above

Answer: B

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36. Photosynthetically Active Radiation (PAR) is between ..... .

A. 700-760 nm

B. 400-700 nm

C. 500-600 nm

D. 350-760 nm

Answer: B

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37. In atmosphere the percentage of CO_2 is ..... .

A. 0.003

B. 0.007

C. 0.001

D. 0.006

Answer: A

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38. The inhibitory effect of oxygen in photosynthesis was first discovered by ..... .

A. Warburg

B. Van Helmont

C. Dutrochet

D. Desaussure

Answer: A

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39. In general, the optimum temperature for photosynthesis is .....

A. 26° to $39^\circ C$

B. 25° to$40^\circ C$

C. $55^\circ C$

D. $25^\circ C$ to $35^\circ C$

Answer: D

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Addition Questionn Solved Very Short Answer Type Questions

1. Who was Stephen Hales ?

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2. Given the overall equation of photosynthesis.

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3. What happens to water & carbondioxide during photosynthesis /

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4. Define anaerobic photosynthesis .

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5. What is bioluminescence?

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6. What are Quantasomes?

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7. Define the term photosynthetic pigment .

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8. Apart from chlorophyll a, other pigment are called accessory pigments . Why ?

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9. What is Phytol tail ? Mentoin its role .

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10. Mention the minerals used in the biosynthesis of Chlorophyll a.

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11. How chlorophyll b differs from chlorophyll a ?

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12. Carotenoids are shield pigments - Comment.

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13. Given an account of Xanthophylls .

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14. Name the two forms of phycobilins and also give an example.

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15. Define Quantum.

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16. How will you define Quantasomes ?

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17. Mention the events occuring in photo-oxidation phase of light reaction.

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18. Mention the events of Photochemical phase of light reaction.

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19. Define Photophosphorylation .

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20. a. Is there any difference between fluorescence and phosphorescence ?

b. If so, what is the difference ?

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21. Draw the diagram representing oxygen evolving complex.

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22. Compare oxidative phosphorylation with substrate level phosphorylation.

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23. Briefly explain the chemiosmotic theory.

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24. What are the assimilatory powers produced during light reactions ?

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25. Why PCR cycle is called as C_3 cycle ?

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26. Name the three stages of dark reaction.

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27. Give an account on RUBISCO.

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28. C_4 plants are of ecological benefit - Commnet.

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29. Compare the features of dimorphic chlorophasts.

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30. Define Photophosphorylation .

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31. What is CO_2 compensation point?

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32. State Blackman's law of limiting factor.

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33. List out the external and internal factors that affect photosynthesis.

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34. Enumerate the anatomical features of leaf that affects photosynthesis.

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35. Name the photosynthetic apparatus of bacteria .

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36. Give an account on bio-synthesis of chlorophyll .

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Addition Questionn Solved Short Answer Type Questions

1. List the radiations present in electromagnetic spectrum.

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2. Write notes on Emerson's enhancement effect.

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3. Write notes on Emerson's enhancement effect.

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4. Give the conclusion of Hills Reactions.

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5. Define Dark Reaction.

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6. Illustrate S' state mechansm.

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7. Kranzz Anatony - Define.

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8. What is the significance of C_4 cycle?

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9. What is the significance of photorespiration?

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10. What is the role of light in photosynthesis?

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11. Classify photosynthetic bacteria and give example .

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12. Mention the significance of photosynthesis.

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Addition Questionn Solved Long Answer Type Questions

1. Describe the structure of chloroplast.

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2. Tabulate the different types of photosynthetic pigments .

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3. Given an account of Chlorophyll.

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4. Explain the step involved in paper chromatography .

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5. Mention the properties of light.

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6. Differentiate betrween Photosystem I and Photosystem II.

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7. Explain the various complexes in Electron transport chain.

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8. Explain cyclic photosphosphorylation .

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9. Explain non-cyclic photophosphorylation.

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10. List out the bioenergetics of light reaction.

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11. Tabulate any two differences between Cyclic and Non-Cyclic photphosphorylation.

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12. Explain the Calvin Cycle (Flow chart only).

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13. Explain the three phase of Dark reaction .

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14. Explain the phases of C_4 pathway.

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15. Differentiate C_3 Plants and C_4 Plants.

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16. Explain in detail about Crassulacean Acid Metabolism.

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17. Write the difference between Dark respiration and photorespiration

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18. Name the internal factors affecting photosynthesis.

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19. Compare photosynthesis in plants & bacteria.

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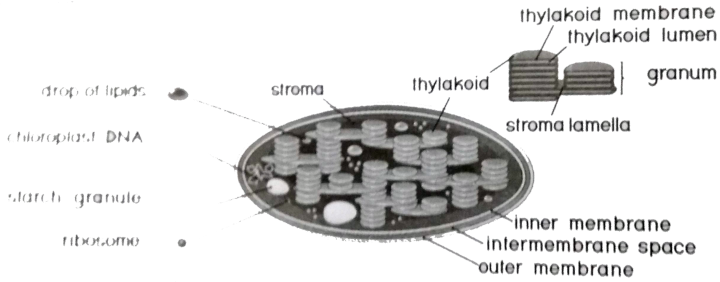
20. The picture given below is an organelle of plant cell . Identify the picture and answer then questions .



Sectional view of chloroplast

(a) Name the organelle .

(b) Mention the role of the organelle in the cell .

(c) How do you call the stack of coin like structures present on it ?

(d) Whether is shows semi - autonomy ?If yes how ? If no , why ?

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Addition Questionn Solved Higher Order Thinking Skills

1. Succelents are know to keep their stomata closed during the day to check transpiration . How do they meet their photosyntheitc CO_2 requirements ?

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2. Increase in temperature decreases photosynthetic rale - Justify.

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3. 'Photosynthesis is a redox reaction ". Comment .

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4. Carrots, Capsicum , Tomatoes etc are organe / rod coloured fruits .

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5. Paddy is a C_3 plant utilise ATP and $NADPH_2$ molecules to generate oxygen molecules . How many ATP and $NADPH_2$ molecules would a C_3 plants consume to generate 12 molecules.

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6. Give the meaning for the following terminologies :

(a) Decarboxylation (b) Phosphorylaiton (c) Photolysis.

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7. $RUBP + O_2 \xrightarrow{RUBSICO} \text{Phosphoglycolate} + PGA$.

The above equation represent the first step of a cyclic pathways occuring in plants cells .

(a)Name the pathways.

(b) Where does this pathways occurs inside the cell ?

(c) How many carbon molecules are seen in RUBP & PGA.

(d) State the role of RUBISCO in this step .

(e) Under which condition does this pathway proceed.

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