



BIOLOGY

BOOKS - NIKITA PUBLICATION

Photosynthesis

Exercise

1. In this primary activity of metabolism, green plants convert light energy into chemical energy

- A. Protein synthesis
- B. Photosynthesis
- C. Biosynthesis
- D. lipid synthesis

Answer:



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2. Which of the following acts as bridge between inorganic and organic world

- A. Protein synthesis
- B. Photosynthesis
- C. Biosynthesis
- D. lipid synthesis

Answer:



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3. The organisms convert simple inorganic substances into organic compound directly are called as

- A. photosynthetic-autotrophs

B. decomposers

C. chemosynthetic-autotrophs

D. autotrophs

Answer:



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4. Read the statements (A) Chemosynthetic autotrophs like hydrogen bacteria oxidize molecular hydrogen to water are called as organotrophs (B) Chemosynthetic bacteria do not have photosynthetic pigments (C) Chemosynthetic autotrophs like iron bacteria oxidize ferrous to ferric are called as lithotrophs

A. A,B, correct C wrong

B. A, C, correct B wrong

C. C, B, correct A wrong

D. A, B, C correct

Answer:



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5. The organisms which utilize solar energy and convert it into food are called as

- A. photosynthetic-autotrophs
- B. decomposers
- C. chemosynthetic-autotrophs
- D. autotrophs

Answer:



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6. Amount of solar energy used for synthesis of carbohydrate food by photosynthetic organisms is

- A. 1%-2%
- B. 0.0003 %
- C. 0.04%
- D. 0.03%

Answer:

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7. Match the columns and find out the correct combination:

Scientist	Process	Discovery
A. Ingenhousz	Photosynthesis	Importance of light
B. Blackman	Respiration	Importance of CO ₂
C. Melvin Calvin	Photosynthesis	Reduction of CO ₂
D. Deassure	Photosynthesis	Role of soil

- A. B and D
- B. B and C
- C. A and C

D. A and D

Answer:



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8. The photosynthesis in marine water is... and on land ...takes place

A. 10%, 80%

B. 20%, 80%

C. 5.0%, 95%

D. 90%, 10%

Answer:



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9. Morphology and anatomy of a leaf, is more useful during photosynthesis for

- A. to get maximum water
- B. to get maximum CO_2
- C. to release maximum O_2
- D. receive maximum sunlight

Answer:



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10. The CO_2 content in the atmosphere is

- A. 0.0003
- B. 0.033
- C. 0.003
- D. 4.5

Answer:



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11. All of the following are true except

- A. Chemosynthetic autotrophs are first autotrophs
- B. Green sulphur bacteria perform non oxygenic photosynthesis
- C. Purple sulphur bacteria perform oxygenic photosynthesis
- D. cyanobacteria are prokaryotes perform oxygenic photosynthesis

Answer:



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12. Which of the following process prepare food of all organisms directly or indirectly?

- A. respiration
- B. transpiration
- C. catabolic process
- D. photosynthesis

Answer:



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13. The water absorbed by the plants for the process of photosynthesis is hardly

- A. 1
- B. 3
- C. 0.01
- D. 2

Answer:

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14. Most autotrophs store energy in the form of

- A. organic acids
- B. fats
- C. Strach
- D. Proteins

Answer:

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15. Photosynthesis is a

- A. reductive, endergonic, catabolic process
- B. reductive, endergonic, anabolic process
- C. reductive, exergonic, anabolic process

D. oxidative, exergonic, catabolic process

Answer:



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16. A cell that lacks chloroplast does notin higher plants

A. evolve CO_2

B. require water

C. liberate O_2

D. utilize carbohydrates

Answer:



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17. During photosynthesis.....

- A. Carbondioxide and water both get reduced
- B. Carbondioxide and water both get oxidized
- C. Water gets reduced and carbondioxide oxidized
- D. Carondioxide gets reduced and water oxidized

Answer:



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18. During day light hours, the rate of photosynthesis is higher than that of respiration and the ration of O_2 produced to consumed is

- A. 10 : 1
- B. 5:1
- C. 1:1
- D. 50:1

Answer:

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19. Photosynthesis is mainly responsible for the existence of

- A. Animals of this earth
- B. Plants on this earth
- C. Both plants and animals
- D. None of the above

Answer:

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20. H_2S is used as hydrogen donor in

- A. B.G.A.
- B. euglena
- C. ferro-bacillus

D. purple sulphur bacteria

Answer:



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21. Chlorobium chlorophyll is found in

- A. green sulphur bacteria
- B. purple non sulphur bacteria
- C. purple sulphur bacteria
- D. all bacteria

Answer:



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22. In photosynthetic prokaryotes

- A. chromatophores are present
- B. thylakoids naked in cytoplasm
- C. bacteriochlorophyll-a
- D. all of these

Answer:

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23. Bacteria show photosynthesis in

- A. blue region
- B. green region
- C. red region
- D. far red, infra-red

Answer:

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24. In bacterial photosynthesis which of the following takes place

- A. bacteriochlorophyll, bacterioviridin pigments involved
- B. H_2S used as raw material
- C. cyclic photophosphorylation prominent and O_2 not released
- D. all of these

Answer:



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25. In cyanobacteria-which of the following is not true

- A. thylakoids are present
- B. both PS-I and PS-II present
- C. H_2O is used and O_2 released

D. H_2S is used and O_2 not released

Answer:



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26. The bacterial photosynthesis is different from that of higher plants as

A. solar energy is not fixed

B. Oxygen is not released

C. CO_2 is not required

D. H_2S is not required

Answer:



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27. Which of the following are first photosynthetic organisms

- A. all prokaryotes
- B. cyanobacteria
- C. chemosynthetic-autotrophs
- D. photosynthetic bacteria using H_2S

Answer:

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28. Why O_2 is not released in photosynthetic bacteria

- A. They use H_2O as raw material
- B. They use CO_2 as raw material
- C. They use H_2S as raw material
- D. They use NH_3 as raw material

Answer:

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29. The examples of photosynthetic bacteria are

- A. green sulphur bacteria
- B. purple sulphur bacteria
- C. cyanobacteria
- D. all of these

Answer:



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30. What is difference between other photosynthetic bacteria and cyanobacteria

- A. Cyanobacteria utilize H_2S
- B. Cyanobacteria utilize CO_2
- C. Cyanobacteria utilize H_2O and release O_2

D. Cyanobacteria utilize light

Answer:



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31. The first process of photosynthesis was.... Oxygenic photosynthesis was first started in

- A. non oxygenic, cyanobacteria
- B. oxygenic, cyanobacteria
- C. water dependent, cyanobacteria
- D. $NADPH_2$ dependent, cyanobacteria

Answer:



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32. During photosynthesis, oxygen in glucose comes from

- A. air
- B. water
- C. carbon dioxide
- D. proteins

Answer:



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33. The purple non sulphur bacteria like Rhodospirillum are

- A. photosynthetic-autotrophs
- B. heterotrophic
- C. producers
- D. decomposers

Answer:



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34. Which plastid contain photosynthetic pigments and perform the process of photosynthesis

- A. chloroplast
- B. chromoplast
- C. leucoplast
- D. phragmoplast

Answer:



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35. The site of oxygen evolution and photosynthetic phosphorylation in chloroplast is:-

A. Grana

B. Matrix

C. Surface of chloroplast

D. Inner wall of chloroplast

Answer:



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36. For chlorophyll formation in plants elements needed are

A. Sodium and copper

B. Calcium and potassium

C. Iron and magnesium

D. Iron and calcium

Answer:



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37. Which one is the precursor of chlorophyll ?

- A. Tryptophan
- B. Protochlorophyll
- C. Bacterio chlorophyll
- D. Bacterioviridin

Answer:



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38. In higher plants chloroplasts are present in

- A. only in leaves
- B. stem
- C. reproductive organs

D. any green part of the plant

Answer:



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39. In leaves the chloroplasts are present in

A. epidermis

B. hypodermis

C. mesophylls

D. conducting elements

Answer:



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40. In dicot leaves upper surface is dark green in colour due to

- A. less number of chloroplasts
- B. less number of chromoplast
- C. more number of chloroplasts
- D. more number of chromoplasts

Answer:

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41. The chloroplasts are

- A. polymorphic in shape
- B. 4-10 micron in length and 2-4 micron in diameter
- C. number fixed in algae and variable in higher plants
- D. all of these

Answer:

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42. Generally the photosynthetic cell contains

- A. 40-60 chloroplasts
- B. 20-100 chloroplasts
- C. 10-30 chloroplasts
- D. 30-40 chloroplasts

Answer:



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43. Which of the following applicable to chemical composition of chloroplast

- A. 50-60% protein
- B. 20-30% lipids
- C. 5-10% chlorophylls

D. all of these

Answer:



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44. The chloroplast contain

A. 5-10% chlorophylls

B. 1-2% carotenoids

C. 3-4% nucleic acids

D. all of these

Answer:



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45. The chloroplast is covered by

A. lipoproteinaceous plasma membrane

B. lipoproteinaceous tonoplast

C. lipoproteinaceous perimetricum

D. lipoproteinaceous peristromium

Answer:

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46. Which of the following is true for membrane of chloroplast?

A. Outer is more permeable and inner is selectively permeable

B. both are uniform, smooth

C. each membrane are 40-60Å thick

D. all of these

Answer:

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47. Due to presence of DNA, RNA and ribosomes chloroplasts are called as

- A. Complete autonomous
- B. non autonomous
- C. semi-autonomous
- D. genetic autonomous and physiologically semiautonomous

Answer:



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48. The vitamin present in chloroplast is

- A. osmophillic granules made up of Vit-A
- B. osomphillic granules made up of Vit-B
- C. osmophillic granules made up of Vit-K

D. osmophillic granules made up of Vit-D

Answer:



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49. Each chloroplast possesses about.... & thylakoids in granum are about..

- A. 02-100 grana, 1-2 thylakoids
- B. 40-60 grana, 2-100 thylakoids
- C. 20-100 grana, 250 thylakoids
- D. 50-100 grana, 300 thylakoids

Answer:



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50. The grana are interconnected by

- A. intergrana lamellae
- B. stroma lamellae
- C. fret membrane
- D. all of these

Answer:



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51. Each granum is made up of many plate like structures placed one above the other like stack of coins.... in which photosynthetic pigments are located & spaces of thylakoid is called...

- A. fert compartments, Lumen/loculus
- B. grana compartment, Lumen/loculus
- C. thylakoids, Lumen/loculus

D. stroma, Lumen/loculus

Answer:



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52. The sites of oxygen evolution and photophosphorylation in chloroplast

A. inner membrane of chloroplast

B. outer membrane pf chloroplast

C. grana thylakoids

D. stroma and stroma lamellae Photosynthetic pigments

Answer:



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53. The site of chemiosmosis in photosynthesis is.

- A. stroma
- B. peristromium
- C. thylakoid
- D. intergrana lamellae

Answer:



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54. Chlorophylls and carotenoids are

- A. soluble in water
- B. soluble in organic solvents
- C. soluble in both water and organic solents
- D. insoluble in water

Answer:



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55. In the process of photosynthesis chlorophyll-a serves as

- A. an end-product
- B. a raw material
- C. an energy converter/reaction centre
- D. a hydrogen acceptor

Answer:



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56. Chl-a is present in

- A. all plants

B. euglena and diatoms

C. all plants and cyanobacteria

D. all oxygen evolving photoautotrophs

Answer:



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57. Which chlorophylls are present in higher plants?

A. Chl-a, Chl-b

B. Chl-a, Chl-c

C. Chl-b, Chl-d

D. Chl-c, Chl-d

Answer:



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58. Which of the following is correct

A. Chl. b is yellow green with $C_{55}H_{72}O_6N_4Mg$

B. Chl. b is yellow green with $C_{55}H_{72}O_5N_4Mg$

C. Chl. b is yellow green with $C_{55}H_{70}O_6N_4Mg$

D. Chl. b is yellow green with $C_{55}H_{70}O_5N_4Mg$

Answer:

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59. The accepted size of chlorophyll molecule is

A. Head , $10 \times 20A^{\circ}$ and Tail, $25A^{\circ}$

B. Head , $20 \times 20A^{\circ}$ and Tail, $25A^{\circ}$

C. Head , $10 \times 10A^{\circ}$ and Tail, $15A^{\circ}$

D. Head , $15 \times 15A^{\circ}$ and Tail, $20A^{\circ}$

Answer:



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60. Identify the correct one

- A. Chl. a is yellow green
- B. Chl. a is blue green
- C. Chl. b is blue green
- D. Chl. a is yellow green

Answer:



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61. The role of chlorophyll in photosynthesis is

- A. Absorption of CO_2

B. Absorption of light

C. Absorption of light and photochemical splitting of water

D. Absorption of water

Answer:



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62. Which of the following are carotenoids

A. Chl. a + Chl. b

B. Chl.b + Xanthophyll

C. Chl.b + carotene

D. Xanthophyll + Carotene

Answer:



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63. Which of the following are water soluble pigments

- A. Carotenes
- B. Phycobillins
- C. Chlorophylls
- D. Xanthophylls

Answer:



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64. Phycobilins are light absorbing pigments found in

- A. Cyanobacteria and Chlorophyceae
- B. Rhodophyceae and Chlorophyceae
- C. Cyanobacteria and Rhodophyceae
- D. Fungi

Answer:



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65. Pigment' which trap solar energy and absorb energy from antennae pigments and changes it in to chemical energy is

- A. xanthophyll
- B. chlorophyll-b
- C. chlorophyll-a
- D. accessory pigments

Answer:



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66. The xanthophyll responsible for yellow colour of autumn foliage is

A. phycoerythrin

B. lutein

C. fucoxanthin

D. lycopene

Answer:



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67. Accessory pigments trap solar energy and supply to chlorophyll-a hence they are called as

A. antennae pigments

B. vital pigments

C. essential pigments

D. subsidiary pigments

Answer:

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68. Which of the following is oxygen containing carotenoid...and carotenoid without oxygen is...

A. beta-carotene, xanthophylls

B. xanthophylls, carotene

C. lycopene, xanthophylls

D. beta carotene, xanthophylls

Answer:

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69. Which pigments protects the chlorophyll-a from undergoing photo-oxidation, when exposed to strong light and convert nascent oxygen into molecular oxygen

A. Chlorophyll-c

B. Chlorophyll-a

C. Carotenoids

D. Chlorophyll-b

Answer:



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70. Which carotene is most commonly found in plants?

A. Alpha carotene

B. phycobilin

C. Beta carotene

D. delta carotene

Answer:



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71. Chlorophyll molecules are arranged in such a way their...

- A. hydrophilic heads extend into the aqueous protein layer
- B. while lipophilic tails embed in lipid bilayer
- C. head extends into outer periplasm
- D. Both A and B

Answer:



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72. Which photosynthetic pigments help photosynthesis in deep water..

- A. xanthophylls
- B. carotene
- C. phycobilins

D. Zeaxanthin

Answer:



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73. Which is the ultimate source of energy

A. food

B. sun

C. algae

D. higher plants

Answer:



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74. The invisible radiations are

A. directly comes on earth

B. not emitted by sun

C. absorbed by ozone

D. absorbed by plants

Answer:



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75. Visible light comes on earth is lies between

A. U.V. rays and Cosmic rays

B. U.V. rays and gamma rays

C. U.V. rays and radio waves

D. U.V. rays and infra red

Answer:



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76. Water splitting complex is present in

- A. PS II located on outer side of thylakoid membrane
- B. PS I located on inner side of the thylakoid membrane
- C. PS I located on outer side of the thylakoid membrane
- D. PS II located on inner side of the thylakoid membrane

Answer:



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77. The quantum of energy in a photon is

- A. directly proportional to wavelength
- B. inversely proportional to wavelength
- C. not proportional to wavelength

D. independent of wavelength

Answer:



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78. The rate of photosynthesis decreases if the wavelength of visible light exceeds 680 nm. This was shown by which scientist and what is its reason?

- A. Blackman-Law of limiting factors
- B. Calvin and Benson-Photo-oxidation
- C. Emerson and Arnold-Red drop
- D. Ruben and Kamen-Photolysis

Answer:



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79. One quantum of red light is equivalent to... & bluephoton is....

- A. 70 kcal, 40 kcal
- B. 50 kcal, 70 kcal
- C. 40 kcal, 70 kcal
- D. 30 kcal, 70 kcal

Answer:



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80. Photosynthesis is fastest in

- A. blue light
- B. red light
- C. sunlight
- D. green light

Answer:



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81. The most effective wavelength of visible light in photosynthesis is the region of which of the following?

- A. Green
- B. Yellow
- C. Red
- D. Violet

Answer:



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82. Why the green light is least effective in photosynthesis is

- A. chlorophylls have high affinity to this wavelength
- B. chlorophylls do not have affinity of green light & reflect green light
- C. chlorophylls are green in colour & reflect green colour
- D. green light is harmful to chlorophyll

Answer:

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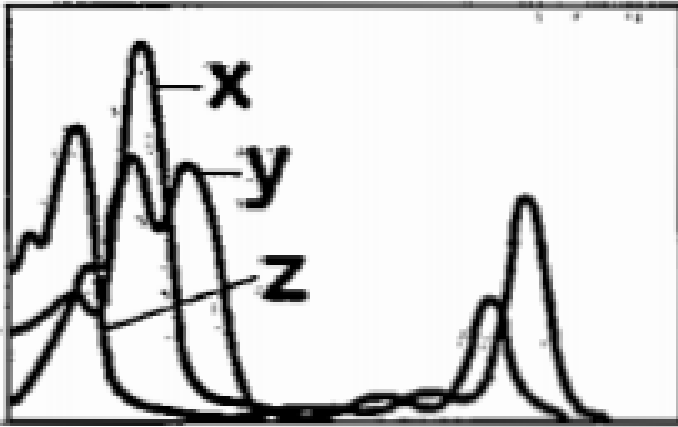
83. Maximum absorption peaks are in the region

- A. blue green
- B. blue, red
- C. orange
- D. far red

Answer:

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84. Recognise the figure and find out the correct matching.



- A. y-chlorophyll a, x-chlorophyll b, z-carotenoids
- B. z-chlorophyll a, y-chlorophyll b, x-carotenoids
- C. y-chlorophyll a, z-chlorophyll b, x-carotenoids
- D. x-chlorophyll b, y-carotenoids, z-chlorophyll a

Answer:



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85. Photosynthetically active radiation (PAR) represents the following range of wavelength :

- A. 400-700nm
- B. 500-600nm
- C. 450-950nm
- D. 340-450nm

Answer:



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86. The graphic representation showing rate of photosynthesis at different wavelength of light is called as

- A. action spectrum
- B. Emerson spectrum
- C. absorption spectrum

D. both action and absorption spectrum

Answer:



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87. Absorption spectrum is a graph showing

- A. they ability of pigments to absorb different wave lengths of light
- B. the ability of light to perform photosynthesis
- C. the ability of chlorophyll to make ATP from absorbed light
- D. absorption of CO_2 by plants

Answer:



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88. What is quantum requirement?

- A. Number of quanta required to reduce one CO_2
- B. Number of quanta required to liberate one O_2
- C. Both a and b
- D. Number of quanta required to synthesize one ATP, $NADPH_2$

Answer:

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89. The quantum yield is

A. $\frac{1}{8}=0.125$

B. 0.12

C. Both a and b

D. 0.9

Answer:

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90. While studying bacterial photosynthesis who first time suggested that water must be split into H^+ & OH^- ions in higher plants

- A. Ruben
- B. Robert Hill
- C. Prof.Arnon
- D. Van Niel

Answer:



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91. Who proved that O_2 released during photosynthesis is from H_2O and not from CO_2

- A. Ruben
- B. Robert Hill

C. Prof.Arnon

D. Van Niel

Answer:



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92. Who used isotope of oxygen to prove that oxygen comes from water in photosynthesis by using Chlorella?

A. Arnon

B. Blackmann

C. Reuben and Kamen

D. Radiant energy to heat energy

Answer:



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93. In photosynthesis, O_2 is released from... according to Robert Hill

- A. H_2O
- B. CO_2
- C. Both a and b
- D. Either from H_2O or CO_2

Answer:



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94. In light reaction, plastoquinone facilitates the transfer of electrons from

- A. PS-I to $NADP^+$
- B. PS-I to ATP synthase
- C. PS-II or $Cytb_6f$ complex
- D. $Cytb_6f$ complex to PS-I

Answer:



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

- A. 1 molecule of 6-C compound
- B. 1 molecule of 3-C compound and 1 molecule of 2-C compound
- C. 2 molecule of 3-C compound
- D. 1 molecule of 3-C compound

Answer:



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96. A cell that lacks chloroplast does not

A. evolve carbon dioxide

B. liberate oxygen

C. require water

D. utilize carbohydrates

Answer:



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97. Energy is transferred from the light reaction step to the dark reaction step by.

A. chlorophyll

B. ADP

C. ATP

D. RuBP

Answer:

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98. Which one is wrong in photorespiration.

- A. It occurs in chloroplasts.
- B. It occurs in day time only.
- C. It is characteristic of C_4 plants
- D. It is characteristic of C_3 plants.

Answer:

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99. Non-cyclic photophosphorylation differs from cyclic photophosphorylation in that the form

- A. involves only PS I
- B. include evolution of O_2

C. involves formation of assimilatory power

D. both b and c

Answer:



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100. For fixation of 6 molecules of CO_2 and formation of one molecule of glucose in Calvin cycle, requires.

A. 3 ATP and 2 $NADPH_2$

B. 18 ATP and 12 $NADPH_2$

C. 30 ATP and 18 $NADPH_2$

D. 6 ATP and 6 $NADPH_2$

Answer:



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101. In maize and wheat the first stable products formed in mesophyll and in bundle sheath cells respectively are.

- A. OAA and PEPA
- B. OAA and OAA
- C. OAA and 3PGA
- D. 3PGA and OAA

Answer:



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102. C_4 pathway is also called as dicarboxylation pathway because.

- A. RuBP + CO_2 in bundle sheath cells
- B. PEPA + CO_2 in mesophyll cells
- C. both a and b
- D. It occurs in presence of intensive light

Answer:



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103. The head and tail of chlorophyll are made up of.

- A. prophyrina nd phytin respectively
- B. pyrole and tetrapyrole respectively
- C. prophyrin and phyrol respectively
- D. tetrapyrole and pyrrole respectively

Answer:



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104. The net results of photo-oxidation of water is release of.

- A. electron and proton

B. proton and oxygen

C. proton, electron and oxygen

D. electron and oxygen

Answer:



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105. For fixing one molecule of CO_2 in Calvin cycle, are required.

A. $3ATP + 1NADPH_2$

B. $3ATP + 2NADPH_2$

C. $2ATP + 3NADPH_2$

D. $3ATP + 3NADPH_2$

Answer:



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106. In presence of high concentration of oxygen, RuBP carboxylase converts RuBP to.

- A. Malic acid and PEP
- B. PGA and PEP n
- C. PGA and malic acid
- D. PGA and phosphoglycolate

Answer:



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107. The sequential order in electron transport from PS-II and PS-I of photosynthesis is.

- A. FeS, PQ, PC and Cytochrome
- B. FeS, PQ, Cytochrome and PC
- C. PQ, Cytochrome, PC and FeS

D. PC, Cytochrome, FeS, PQ

Answer:



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108. The photosynthesis in marine water is... and on land ...takes place

A. 10%, 90%

B. 20%, 80%

C. 50%, 95%

D. 90%, 10%

Answer:



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109. Which of the following is true for membrane of chloroplast?

A. Outer is more permeable & inner is selectively permeable

B. both are uniform, smooth

C. each membrane have $40 - 60 \text{ \AA}$ thick

D. all of these

Answer:



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110. The vitamin present in chloroplast is

A. osmophillic granules made up of Vit-A

B. osmophillic granules made up of Vit-B

C. osmophillic granules made up of Vit-K

D. osmophillic granules made up of Vit-D

Answer:



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111. The accepted size of chlorophyll molecule is

- A. Head, $15 \times 10A^\circ$ and Tail, $25A^\circ$
- B. Head, $20 \times 20A^\circ$ and Tail, $25A^\circ$
- C. Head, $10 \times 10A^\circ$ and Tail, $15A^\circ$
- D. Head, $15 \times 15A^\circ$ and Tail, $20A^\circ$

Answer:



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112. Read the statements,

A) 7 types of chlorophylls are present in photosynthetic organisms.

B) $C_{55}H_{72}O_5N_4Mg$ act as a reaction centre/essential pigment or trapping centre.

C) Chlorophyll a is characterized by the side group of methyl which is

replace by aldehyde (CHO) in chlorophyll b.

D) Porphyrin head is hydrophilic and phytol tail are lipophilic.

A. A,B,C correct D wrong

B. A,B correct C,D wrong

C. A,B correct C,D wrong

D. A,B,C, D correct

Answer:



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113. Which pigments protects the chlorophyll-a from undergoing photo-oxidation, when exposed to strong light and convert nascent oxygen into molecular oxygen

A. Chlorophyll-c

B. Chlorophyll-a

C. Carotenoids

D. Chlorophyll-b

Answer:

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114. Read the following hints:

List I

- A. Thylakoid Lumen
- B. Grana
- C. Peroxisome
- D. Stroma

List II

- I. Reduction of CO_2
- II. Photorespiration
- III. Photolysis of water
- IV. Food storage
- V. Light reaction

The correct match is

- | | A | B | C | D |
|----|-----|-----|-----|----|
| a) | III | V | II | I |
| b) | V | III | I | II |
| c) | I | II | III | IV |
| d) | V | I | III | II |

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115. Read the following lists:

List I (Pigment)	List II (Present in)
A. Chlorophyll-b	I. Photosynthetic bacteria
B. Chlorophyll -c	II. All photosynthetic energetic organisms
C. Chlorophyll -d	III Rhodophyceae
D. Chlorophyll-a	IV. Phaeophyceae
	V. Chlorophyceae

The correct match is

	A	B	C	D
a)	III	V	II	I
b)	V	III	I	II
c)	V	IV	III	II
d)	V	I	III	II



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116. The quantum of energy in a photon is

A. directly proportional to wavelength

B. inversely proportional to wavelength

C. not proportional to wavelength

D. independent of wavelength

Answer:

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117. Photolysis of water needs the presence of which of the following ions of OEC (Oxygen evolving complex)

A. Mg^{+} + and Mn^{+} +

B. Ca^{+} + , Mn^{+} + and Cl^{-}

C. Mg^{+} + and Cl^{-}

D. Cu^{+} + and Cl

Answer:

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118. In cyclic photophosphorylation, the first electron donor & last electron acceptor is.....

- A. PS-I
- B. plastocyanin
- C. PS-II
- D. cytochrome-f

Answer:

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119. The byproduct of photosynthesis is

- A. CO_2
- B. Oxygen
- C. Energy

D. Sugar

Answer:



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120. What is the number of H^+ ions accumulated in lumen when 6 H_2O molecules undergo photolysis during non cyclic electron transport if H_2O is again formed?

A. 48

B. 24

C. 12

D. 6

Answer:



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121. Assimilatory power is.....&assimilatory power is useful who derive the dark reaction.

A. $NADPH_2 \rightarrow \text{reduce } CO_2$

B. ATP to reduce CO_2

C. $FADH_2 \rightarrow \text{reduce } CO_2$

D. $NADPH_2 + ATP \rightarrow \text{reduce } CO_2$

Answer:



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122. In the experiment of Calvin for tracing out the path of carbon, the algae used were.

A. Chlorella and Chlamydomonas

B. Chlorella and Scenedesmus

C. Chlorococcum and Chlorella

D. Chlorobium and Scenedesmus

Answer:



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123. The primary acceptor of CO_2 in C_3 pathway of photosynthesis is

- A. Phosphoglyceric acid
- B. Ribulose phosphate
- C. Ribulose 1,5 bisphosphate
- D. Glucose

Answer:



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124. How many Calvin cycles are required to produce one molecule of glucose?

- A. 2
- B. 4
- C. 6
- D. 8

Answer:



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125. How many quanta are required to reduce one molecule of CO_2 and to produce one molecule of O_2 in green plant photosynthesis?

- A. 32 quanta
- B. 16 quanta
- C. 8 quanta

D. 48 quanta

Answer:



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126. What is drawback of RuBP carboxylase?

- A. it fix CO_2 when its concentration is normal
- B. it is unable to fix CO_2 concentration is high
- C. When CO_2 concentration is less & O_2 concentration is high it fix O_2 instead of CO_2
- D. No effect on CO_2 fixation when the concentration of O_2 is less or more

Answer:



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127. Plants do not store carbohydrate as glucose but do so as starch because glucose.

- A. is not unstable
- B. attracts herbivores
- C. alters osmotic balance
- D. dissolves

Answer:

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128. The ratio of CO_2 fixed, $NADPH_2$ and ATP consumed, when one glucose molecule is formed through C_3 cycle.

- A. 2: 3: 4
- B. 1: 2: 3
- C. 3: 4: 5

D. 1:1:2

Answer:



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129. In C_3 species, for assimilation of 20 CO_2 molecules required ATP and $NADPH_2$.

A. 30 and 20

B. 60 and 30

C. 60 and 40

D. 12 and 18

Answer:



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130. In C_3 pathway in regeneration phase.

- A. 10 molecules of PGAL forms 6 molecules of RUBP
- B. 2 molecules of PGAL forms 6 molecules of RUBP
- C. 6 molecules of PGAL forms 6 molecules of RUBP
- D. 5 molecules of PGAL forms 6 molecules of RUBP

Answer:



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131. The enzyme RuBP carboxylase comprises of

- A. 10% of total chloroplast protein
- B. 12% of total chloroplast protein
- C. 16% of total chloroplast protein
- D. 30% of total chloroplast protein

Answer:



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132. Photorespiration is

- A. directly proportional to productivity of photosynthesis
- B. inversely proportional to productivity of photosynthesis
- C. non proportional to productivity of photosynthesis
- D. equal proportional to productivity of photosynthesis

Answer:



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133. The cell organelle used in photorespiration which is not semiautonomous.

- A. chloroplast
- B. peroxisome
- C. mitochondria
- D. power house of cell

Answer:

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134. Why is photorespiration called a wasteful process.

- A. O_2 utilized
- B. CO_2 is lost
- C. O_2 is released
- D. CO_2 is fixed by chloroplast

Answer:

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135. Which metal ion is a constituent of chlorophyll?

- A. Iron
- B. Copper
- C. Magnesium
- D. Zinc

Answer:



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136. Which pigment acts directly to convert light energy to chemical energy?

- A. Chlorophyll a
- B. Chlorophyll b
- C. Xanthophyll

D. Carotenoid

Answer:



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137. Which range of wavelength (in nm) is called photosynthetically active radiation (PAR)?

A. 100-390

B. 390-430

C. 400-700

D. 760-100

Answer:



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138. Which light range is most effective in photosynthesis?

- A. Blue
- B. Green
- C. Red
- D. Violet

Answer:



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139. Chemosynthetic bacteria obtain energy from.

- A. Sun
- B. Infra red rays
- C. Organic substances
- D. Inorganic chemicals

Answer:



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140. Energy required for ATP synthesis is PSII comes from

- A. Proton gradient
- B. Electron gradient
- C. Reduction of glucose
- D. Oxidation of glucose

Answer:



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141. During light reaction is photosynthesis the following are formed.

- A. ATP and sugar

B. Hydrogen, O_2 and sugar

C. ATP, hydrogen and O_2

D. ATP, hydrogen and O_2 donor

Answer:



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142. Dark reaction in photosynthesis is called so because

A. It can occur in dark also

B. It does not depend on light energy

C. It cannot occur during day light

D. It occurs more rapidly at night

Answer:



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143. PEP is primary CO_2 acceptor in

- A. C_4 plants
- B. C_3 plants
- C. C_2 plants
- D. Both C_3 and C_4 plants

Answer:



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144. Splitting of water is associated with

- A. Photosystem I
- B. Lumen of thylakoid
- C. Both photosystem I and II
- D. Inner surface of thylakoid membrane

Answer:

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Example

1. Why does RuBisCo carry out preferential carboxylation than oxygenation in plants.

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2. Why is chlorophyll-a called an essential pigment?

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3. Why chl-b, xanthophyll carotens are called as antennae pigment?

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4. Why is photosynthesis considered to be a redox reaction?

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5. What is the net output of light reaction?

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6. Which bacteria follow the O_2 evolving photosynthesis?

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7. How does photosynthesis protect us from harmful radiations.

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8. Who proposed law of limiting factor to explain the various external & internal factors affects the rate of photosynthesis?

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9. How much water is required for photosynthesis?

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10. Which compounds are called as assimilatory power of photosynthesis?

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11. C_4 plants are more efficient than C_3 plants. Discuss.

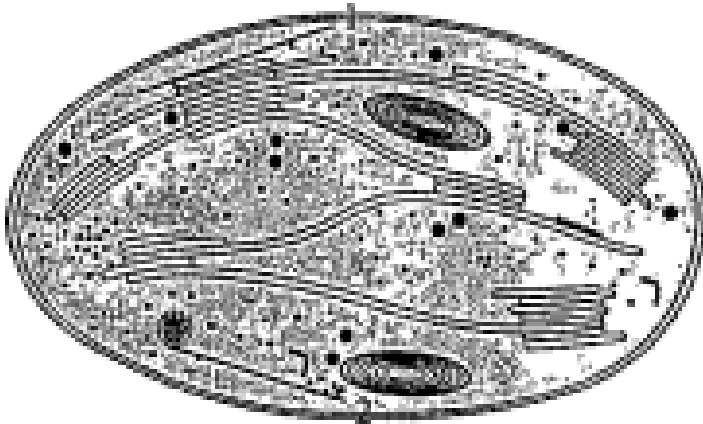
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12. Xerophytic plants survive in high temperature.

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13. Examine the figure

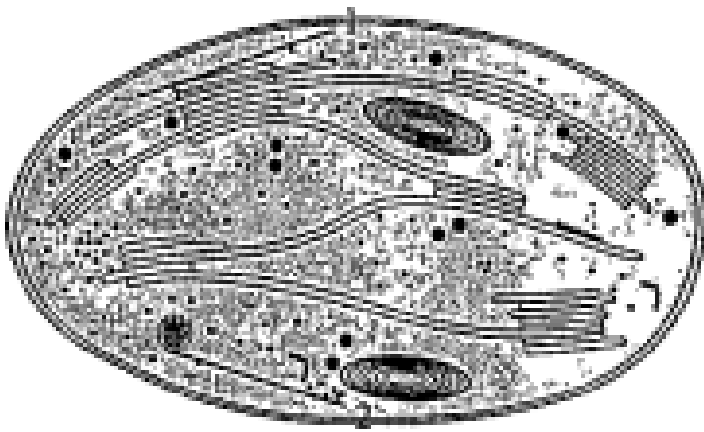
Is this structure present in animal cell or plant cell?



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14. Examine the figure

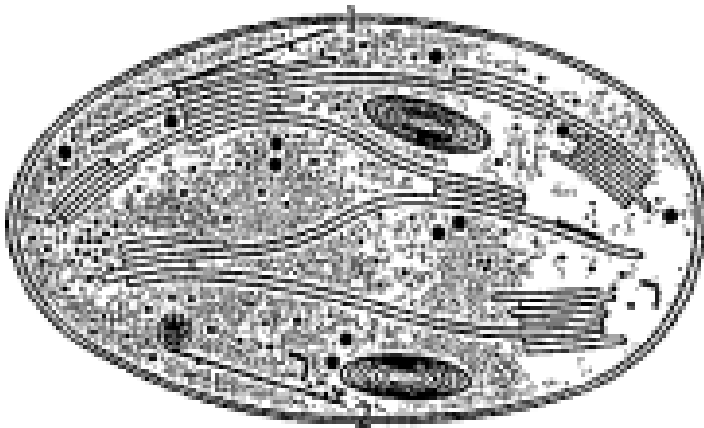
Can these be passed on to the progeny? How?



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15. Examine the figure

Name the metabolic processes taking place in the places marked 1 and 2



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16. $2H_2O \rightarrow 2H^+ + O_2 + 4e^-$ Based on the above equation, answer the following questions:

Where does this reaction take place in plants?

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17. $2H_2O \rightarrow 2H^+ + O_2 + 4e^-$ Based on the above equation, answer the following questions:

What is the significance of this reaction?

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18. How do photosynthesis bacteria that lack chloroplasts conduct photosynthesis?

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19. a. NADP reductase enzyme is located on_____.



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20. Breakdown of proton gradient leads to release of_____.



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21. Can girdling experiments be done in monocots? If yes, How? If no, why not?



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22.

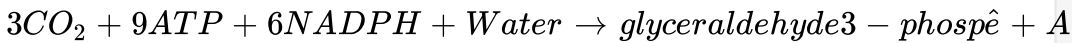


Analyze the above reaction and answer the following questions:

How many molecules of ATP & NADPH are required to fix one molecule of CO_2 ?

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23.



Analyze the above reaction and answer the following questions:

Where in the chloroplast does this process occur?

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24. Does moonlight support photosynthesis?

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25. Some of these terms/chemicals are associated with the C_4 cycle.

Explain

Bundle sheath cells



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26. Some of these terms/chemicals are associated with the C_4 cycle.

Explain

PEP carboxylase



Watch Video Solution

27. Some of these terms/chemicals are associated with the C_4 cycle.

Explain

Hatch Slack pathway



Watch Video Solution

28. Some of these terms/chemicals are associated with the C_4 cycle.

Explain

Calvin cycle



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29. Where is the NADP reductase enzyme found in the chloroplast? State its role.



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30. ATPase enzyme consists of two parts, What are those parts? How are they arranged in the thylakoid membrane? Conformational change occur in which part of the enzyme?



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31. Which products formed during the light reaction of photosynthesis are used to drive the dark reaction?



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32. What is the basis for designating C₃ and C₄ pathways of photosynthesis?



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33. What made Hill to perform his experiment?



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34. Draw well labelled diagram of chloroplast.



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35. How chlorophyll-a is excited? Show it with diagram.



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36. Why energy is essential in different life processes?

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37. How do we get energy?

 [Watch Video Solution](#)

38. Tomatoes, carrots and chillies are red in colour due to the presence of pigments. Name the pigment.

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39. Describe the light dependent steps of photosynthesis. How are they linked to the dark reaction?

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40. What are the steps that are common to C_3 and C_4 photosynthesis?

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41. Are the enzymes that catalyse the dark reactions of carbon fixation located inside the thylakoids or outside the thylakoids?

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42. Why are the plants that consume more than the usual 18 ATP to produce 1 molecule of glucose favoured in tropical regions?

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43. What is the advantage of having more than one pigment molecule in a photocentre?

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44. Explain why chlorophyll appears green in reflected light and red in transmitted light. Explain the significance of these phenomena in terms of photosynthesis.



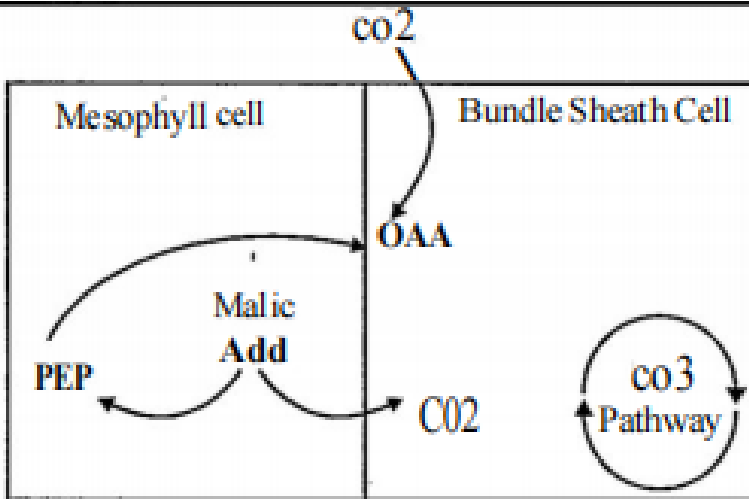
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45. Why is photosynthesis considered to be the most important process in the biosphere?



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46. Correct the pathway and name it



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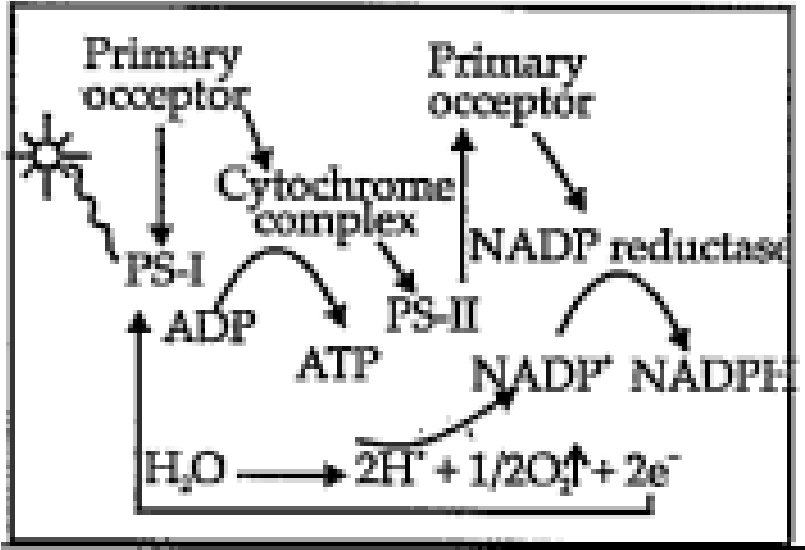
47. Why is photolysis of water accompanied with non-cyclic photphosphorylation?

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48. In C_4 plants, why is C_3 pathway operated to bundle sheath cells only?

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49. Is there something wrong in following schematic presentation? If yes, correct it so that photosynthesis will be operated.



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50. What would have happened if C_4 plants did not have Kranz anatomy?

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51. What would happen if plants did not have accessory pigments?

 [Watch Video Solution](#)

52. Succulents are known to close their stomata during the day. How do they meet their photosynthetic CO_2 requirement?

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53. Chlorophyll 'a' is the primary pigment for light reaction. What are accessory pigments? What is their role in photosynthesis?

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54. Do reaction of photosynthesis called, as 'Dark Reaction' need light? Explain.

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55. How are photosynthesis and respiration related to each other?



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56. If a green plant is kept in dark with proper ventilation, can this plant carry out photosynthesis? Can anything be given as supplement to maintain its growth or survival?



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57. Photosynthetic organisms occur at different depths in the ocean. Do they receive qualitatively and quantitatively the same light? How do they adapt to carry out photosynthesis under these conditions?



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58. In tropical rain-forests, the canopy is thick and shorter plants growing below it, receive filtered light. How are they able to carry out photosynthesis ?



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59. Under what conditions does RuBisCo function as an oxygenase?



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60. Why does the rate of photosynthesis decrease at higher temperatures?



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61. Explain how during light reaction of photosynthesis, ATP synthesis is a chemiosmotic phenomenon.



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62. Find out how Melvin Calvin worked out the complete biosynthetic pathway for synthesis of sugar.



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63. 6 turns of C_3 cycle are required to generate one molecule of glucose!
Give reasons.



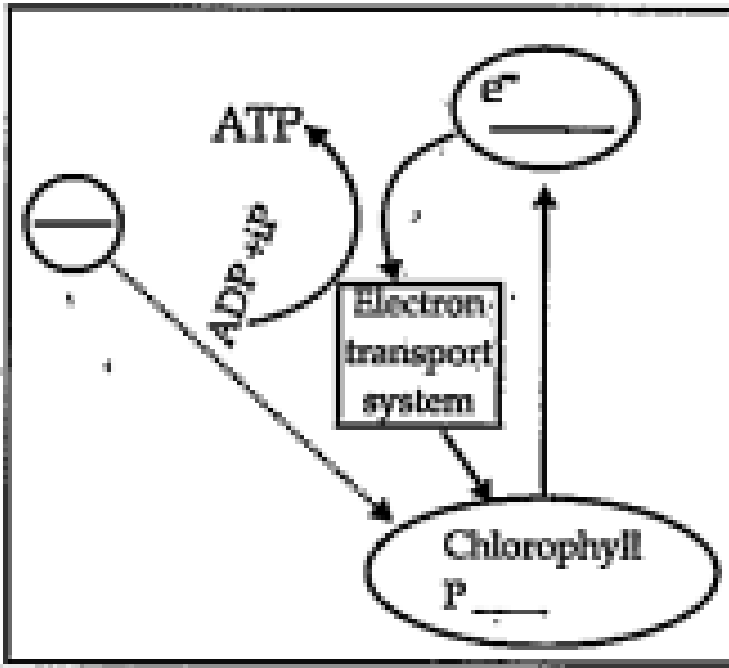
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64. In what kind of plants do you come across 'Kranz' anatomy? To which conditions are those plants better adapted? How are these plants better adapted than other plants, which lack this anatomy?



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65. Complete the flow chart of cyclic photophosphorylation of the photosystem-I.



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66. A process is occurring throughout the day, in 'X' organism. Cells are participating in this process. During this process ATP, CO₂ and water are evolved. It is not a light dependent.

Name the process.



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67. A process is occurring throughout the day, in 'X' organism. Cells are participating in this process. During this process ATP, CO₂ and water are evolved. It is not a light dependent.

Is it a catabolic or an anabolic process?



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68. A process is occurring throughout the day, in 'X' organism. Cells are participating in this process. During this process ATP, CO₂ and water are evolved. It is not a light dependent.

What could be the raw material of this process?



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69. Tomatoes, carrots and chillies are red in colour due to the presence of pigments. Name the pigment.



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70. Why do we believe chloroplast and mitochondria to be semi-autonomous organelle?



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71. What is the first product of C₄ cycle?



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72. Which enzyme is there in bundle sheath cells and mesophyll cells?



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73. A cyclic process is occurring in C₃ plant, which is light dependent, and needs O₂. This process doesn't produce energy rather it consumes

energy.

Can you name the given process?



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74. A cyclic process is occurring in C₃ plant, which is light dependent, and needs O₂. This process doesn't produce energy rather it consumes energy.

Is it essential for survival?



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75. A cyclic process is occurring in C₃ plant, which is light dependent, and needs O₂. This process doesn't produce energy rather it consumes energy.

What are the end products of this process?



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76. A cyclic process is occurring in C3 plant, which is light dependent, and needs O₂. This process doesn't produce energy rather it consumes energy.

Where does it occur?

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77. Suppose Euphorbia and Maize are grown in the tropical area.

Which one of them do you think will be able to survive under such conditions?

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78. Suppose Euphorbia and Maize are grown in the tropical area.

Which one of them is more efficient in terms of photosynthetic activity?

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79. Suppose Euphorbia and Maize are grown in the tropical area.

What difference do you think are there in their leaf anatomy?

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80. How can you identify whether the plant is C_3 or C_4 ? Explain/Justify.

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81. Distinguish between Photorespiration and Respiration.

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82. Distinguish between

action spectrum and absorption spectrum.

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83. Calvin cycle consists of three phases, what are they? Explain the significance of each of them.



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84. Differentiate between cyclic and non-cyclic photophosphorylation.



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85. Draw a flow chart of non-cyclic photophosphorylation.



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86. Describe Calvin cycle.



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87. Compare C_4 and CAM plants.

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88. Which type of plants show the C_4 pathway. Give examples.

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89. Is it correct to say that photosynthesis occurs only in leaves of a plant? Besides leaves, what are the other parts that may out be capable of carrying photosynthesis? Justify.

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90. The entire process of photosynthesis consists of a number of reactions. Where in the cell do each of these take place?

Synthesis of ATP & NADPH.....





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91. The entire process of photosynthesis consists of a number of reactions. Where in the cell do each of these take place?

Photolysis of water.....



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92. The entire process of photosynthesis consists of a number of reactions. Where in the cell do each of these take place?

Fixation of CO_2



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93. The entire process of photosynthesis consists of a number of reactions. Where in the cell do each of these take place?

Synthesis of sugar molecule.....



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94. The entire process of photosynthesis consists of a number of reactions. Where in the cell do each of these take place?

Synthesis of starch.....

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95. Which property of the pigment is responsible for its ability to initiate the process of photosynthesis? Why is the rate of photosynthesis higher in the red and blue regions of the spectrum of light?

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96. What can we conclude from the statement that the action and absorption spectrum of photosynthesis overlap? At which wavelength do they show peaks?

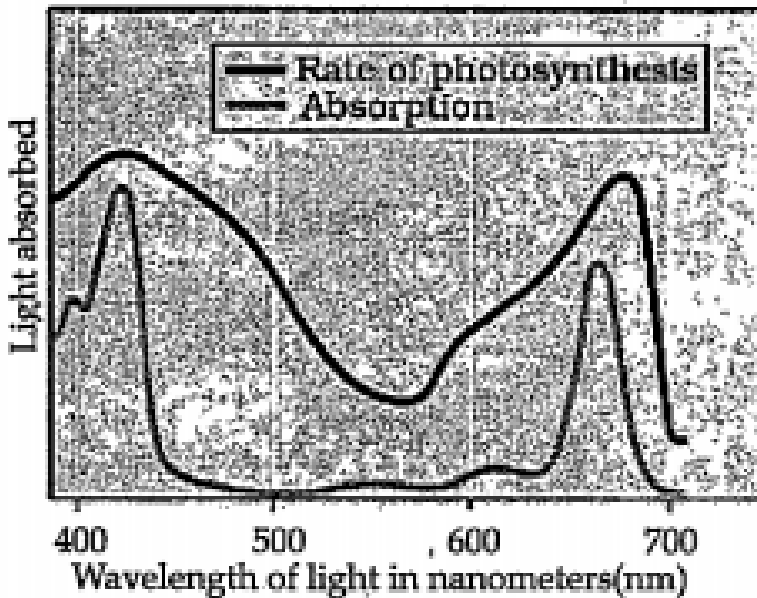
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97. Under what conditions are C4 plants superior to C3?

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98. In the figure given below, the black line (upper) indicates action spectrum for photosynthesis and the lighter line (lower) indicates the absorption spectrum of chlorophyll a, answer the following:

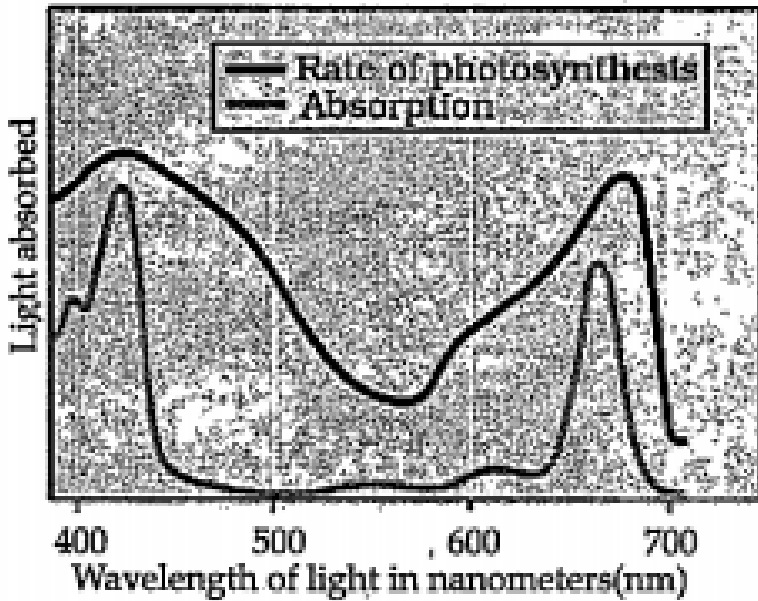
How can we derive an absorption spectrum for any substance?



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99. In the figure given below, the black line (upper) indicates action spectrum for photosynthesis and the lighter line (lower) indicates the absorption spectrum of chlorophyll a, answer the followings:

If chlorophyll-a is responsible for light reaction of photosynthesis, why do the action spectrum and absorption spectrum not overlap?

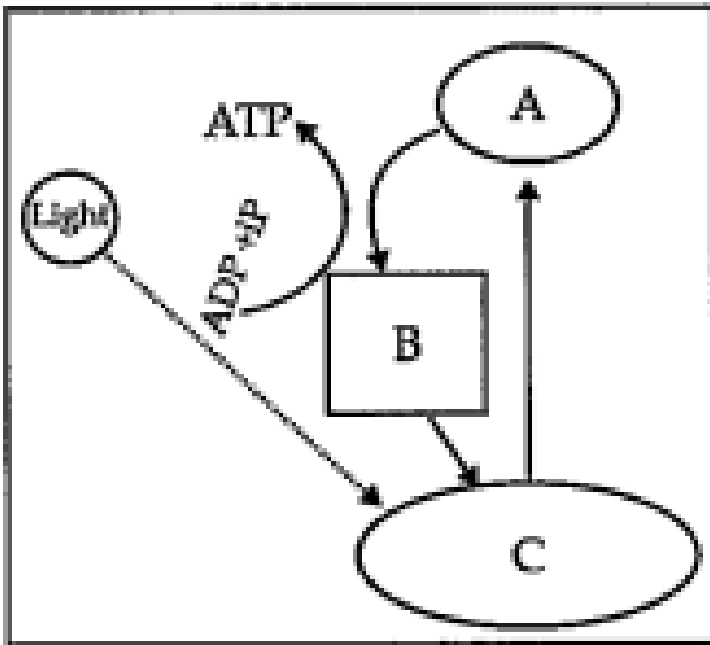


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100. What are the important events and end products of the light reaction?

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101. In the diagram shown below label A, B, C. What type of phosphorylation is possible in this?



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102. Why is the RuBisCo enzyme more appropriately called RuBP Carboxylaseoxygenase and what important role does it play in photosynthesis?

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103. What special anatomical features are displayed by leaves of C_4 plants? How do they provide advantage over the structure of C_3 plants?

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104. Which of the following enzymes fix CO_2 in C_4 pathway?

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105. Why is RuBisCo enzyme the most abundant enzyme in the world?

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106. Why does not photorespiration take place in C_4 plants?

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107. How can you identify whether the plant is C_3 or C_4 ? Explain/Justify.

 [Watch Video Solution](#)

108. How can you identify whether the plant is C_3 and C_4 . Explain.

 [Watch Video Solution](#)

109. In C_4 plants, bundle sheath cells carrying out Calvin's cycle are very few in number. Then also C_4 plants are highly productive. Explain.

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110. Why does RuBisCo carry out preferential carboxylation than oxygenation in plants.

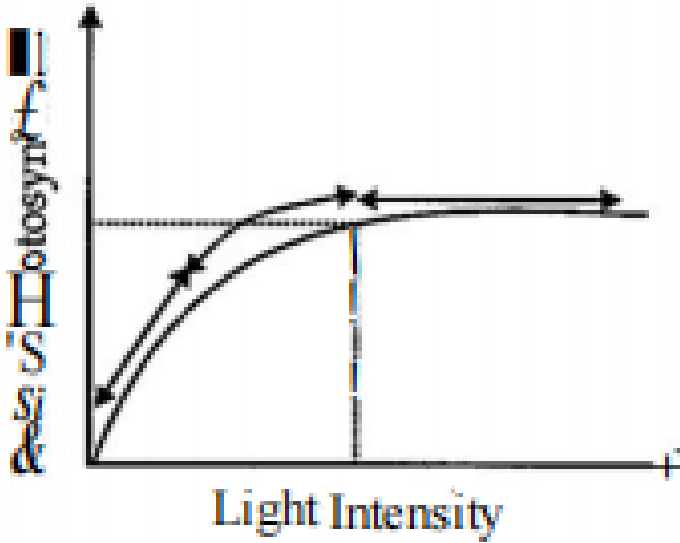
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111. Suppose there were plants that had a high concentration of Chlorophyll-b, but lacked chlorophyll-a, would it carry out photosynthesis? Then why do plants have chlorophyll-b and other accessory pigments?

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112. Figure shows the effect of light on the rate of photosynthesis. Based on the graph, answer the following questions:

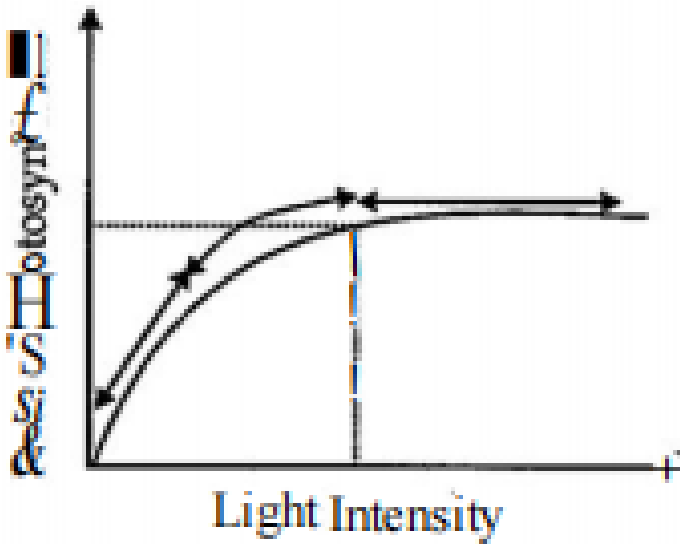
At which points (A, B or C) in the curve is light a limiting factor?



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113. Figure shows the effect of light on the rate of photosynthesis. Based on the graph, answer the following questions:

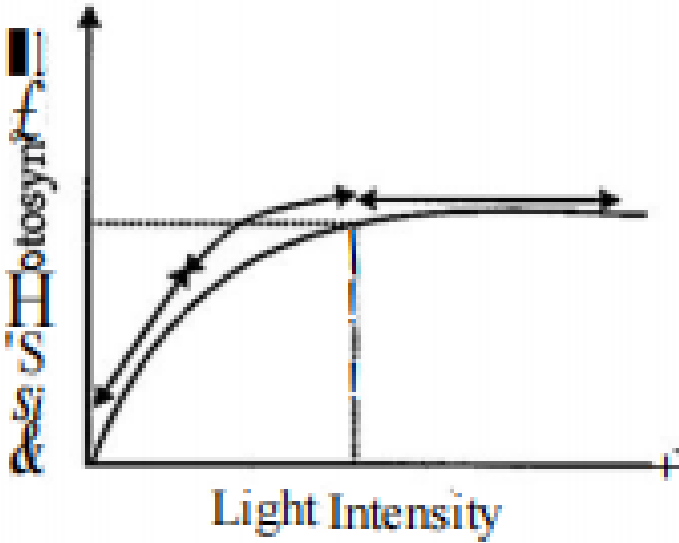
What could be the limiting factors in region A?



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114. Figure shows the effect of light on the rate of photosynthesis. Based on the graph, answer the following questions:

What do C and D represent on the curve?



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115. Differentiate between C_3 and C_4 plants.

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116. Differentiate between cyclic and non-cyclic photophosphorylation.

[Watch Video Solution](#)

117. Differentiate between C_3 and C_4 plants.



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