

GPLUS EDUCATION

Date :
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BIOLOGY

PHOTOSYNTHESIS IN HIGHER PLANTS

Single Correct Answer Type

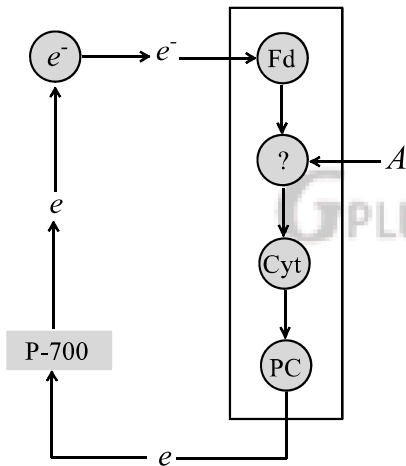
1. As compared to a C₃-plant, how many additional molecules of ATP are needed for net production of one molecule of hexose sugar by C₄-plants?
 - a) 2
 - b) 6
 - c) 0
 - d) 12
2. Proton gradient is broken down due to
 - a) Movement of electrons across the membrane to stroma
 - b) Movement of electrons across the membrane to lumen
 - c) Movement of proton across the membrane to lumen
 - d) Movement of proton across the membrane to stroma
3. Which of the following is a simplified equation of photosynthesis?

a) $CO_2 + 2H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light energy}} C_5H_{10}O_4 + H_2O + O_2 \uparrow$	b) $CO_2 + 2H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light energy}} (CH_2O)_n + O_2 \uparrow$
c) $CO_2 + 2H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light energy}} C_3H_6O_3 + CO_2 + O_2 \uparrow$	d) $CO_2 + 2H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light energy}} (CH_2O)_n + H_2O + O_2 \uparrow$
4. The membrane of thylakoid is called
 - a) Cell membrane
 - b) Fret membrane
 - c) Granum membrane
 - d) Thylakoid membrane
5. The enzyme responsible for primary carboxylation in C₃-plants is
 - a) Hexokinase
 - b) Succinic dehydrogenase
 - c) Pyruvate carboxylase
 - d) RuBP carboxylase oxygenase
6. The law of limiting factors was proposed with particular reference to photosynthesis. Identify the scientist, who proposed this law?
 - a) Calvin
 - b) Weismann
 - c) Emerson
 - d) Blackman
7. The synthesis of one molecule of glucose during Calvin cycle requires
 - a) 12 molecules of ATP and 18 molecules of NADPH₂
 - b) 6 molecules of ATP and 12 molecules of NADPH₂
 - c) 18 molecules of ATP and 12 molecules of NADPH₂
 - d) 12 molecules each of ATP and NADPH₂
8. The enzymatic reactions incorporate CO₂ into the plants leading to the synthesis of sugar in
 - a) Stroma
 - b) Stroma lamella
 - c) Grana
 - d) Both (a) and (b)
9. In CAM-plants, carbon dioxide acceptor is
 - a) RuBP
 - b) PEP
 - c) OAA
 - d) PGA
10. PEP carboxylase
 - I. is involved in at least some CO₂ fixation in both C₃ and C₄-plants
 - II. Catalyses the reaction of fixing CO₂ into pyruvic acid in bundle sheath cells
 - III. is capable of fixing CO₂ more efficiently at lower atmospheric CO₂ concentration than RuBP carboxylase
 Select the correct option
 - a) I and II
 - b) II and III
 - c) I, II and III
 - d) Only III
11. Which factor is not limiting in normal condition for photosynthesis?
 - a) Air
 - b) Carbon dioxide
 - c) Water
 - d) Chlorophyll
12. PS is made up of which of the following?

- a) Reaction centre
 c) Both (a) and (b)
13. In higher plants, the shape of the chloroplast is
 a) Discoid b) Cup-shaped
 c) Girdle-shaped d) Reticulate
14. Identify the correct combination of the following

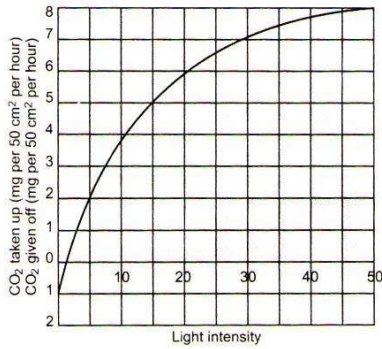
substrate	enzyme	Product
I. Phosphoenolpyruvate	PEP carboxylase	C ₄ acid
II. Malate	Malic enzyme	C ₄ acid
III. RuBP	Ribulose 5-phosphate kinase	C ₃ acid
IV. Pyruvate	Pyruvate dikinase	C ₃ acid

- a) III and IV b) I and II c) II and III d) I and IV
15. Cyclic photophosphorylation produces
 a) NADPH b) ATP c) ATP + NADPH₂ d) ATP + NADPH₂ + O₂
16. Phenomenon which converts light energy into chemical energy is
 a) Respiration b) Photosynthesis c) Transpiration d) None of these
17. In the given chart of photophosphorylation, What does 'A' represent?



- a) PC b) FRS c) PQ d) Cyt -a₃
18. In photosystem, antennae includes all pigments except
 a) Chlorophyll-a b) Chlorophyll-b c) Carotenoids d) Xanthophyll
19. I. Tomato
 II. Black pepper
 III. Mango
 From the above option choose the correct answer in respect of green house crops
 a) I and III b) III and II c) I, II and III d) I and II
20. Plastocyanin contains
 a) Copper b) Iron c) Calcium d) potassium
21. The two pigment system theory of photosynthesis was proposed by
 a) Blackman b) Hill c) Emerson d) Arnon
22. Which one of the following is not true about the light reactions of photosynthesis?
 a) Light energy provides energy for the photolysis of water through excitation of the reaction centre of PS-II

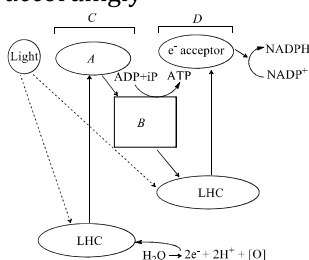
- b) The flow of electrons from water to NADP in non-cyclic electron transport produces one ATP
 c) Reactions of the two photosystems are needed for the reduction of NADP
 d) P₆₈₀ and P₇₀₀ are the reaction centres of PS-I and PS-II respectively
23. By which plant pigment maximum absorption of radiation takes place in the blue and red regions of absorption spectrum?
 a) Chlorophyll-*a* b) Chlorophyll-*b* c) Xanthophyll d) Carotenoid
24. Factors affecting photosynthesis are
 I. number and size of leaves
 II. age and orientation of leaves
 III. amount of chlorophyll
 IV. amount of O₂ and CO₂
 Select the correct option
 a) I, II and IV b) II, IV and V c) IV, V and I d) I, II, III and IV
25. In an experiment, a leaf was partially covered with black paper, and other one was exposed to light. On testing these leaves for starch, in the presence of sunlight, one may conclude that photosynthesis had occurred in
 a) Green part of leaves b) Black paper covered part of leaves
 c) Both (a) and (b) d) None of the above
26. I. It is the characteristic of C₄-plants
 II. It is the characteristic of C₃-plants
 III. It occurs in chloroplast
 IV. It occurs in day time
 V. It occurs in night
 Select the correct options in relation to photorespiration
Correct option Incorrect option
 a) I, IV II, III, IV b) II, III, IV I, V
 c) I, II, III IV, V d) IV, V I, II, III
27. First reaction in photosynthesis is
 a) Photolysis of water b) Excitation of chlorophyll molecule
 c) Formation of APT d) Fixation of CO₂
28. Kranz anatomy is a morphological diversity in the leaves of
 a) C₃-plants b) C₄-plants c) Both (a) and (b) d) CAM-plants
29. Which of the following is concerned with carbon dioxide fixation?
 a) Krebs cycle b) Calvin cycle c) Ornithine cycle d) Glycolysis
30. Hill reaction occurs in
 a) High altitude plants b) Total darkness
 c) Absence of water d) Presence of ferricyanide
31. Rubisco enzyme is absent in
 a) Mesophyll cell b) Bundle sheath cell c) C₃-plants d) C₄-plants
32. During the experiment in laboratory, the thylakoid is somehow punctured so that the interior of the thylakoid is no longer separated from stroma. This damage will have the direction effect on
 a) ATP formation b) Absorption of light
 c) Flow of electrons from PS-I to PS-II d) All of the above
33. The graph below shows the relation between light intensity and the giving off and taking up of carbon dioxide by the leaves of a plant. Why is most carbon dioxide given off when the light intensity is zero units?



- a) Because it is just the start of the experiment
 b) Only respiration is taking place at this intensity of light
 c) Only photosynthesis is taking place at this intensity of light
 d) The rate of photosynthesis is equivalent to the rate of respiration
34. Cyclic photophosphorylation results only in the
 a) Formation of ATP
 b) Formation of NADP⁺ + H⁺ and ATP
 c) Formation of NAD⁺ + H⁺
 d) Formation of ADP + Pi
35. I. H₂S not H₂O is involved in photosynthesis of sulphur bacteria
 II. ATP is produced during light reaction *via* chemiosmosis
 III. Absence of light leads to the stoppage of photosynthesis
 IV. Calvin cycle occurs in grana
 Select the correct option
 a) II, III and IV
 b) I, III and IV
 c) I, II and IV
 d) I, II and III
36. Under normal condition, which one of the following is a major limiting factor?
 a) Light
 b) CO₂
 c) Temperature
 d) Chlorophyll
37. Which one is essential for the respiration as well as photosynthesis?
 a) Rubisco
 b) Plastocyanin
 c) Ubiquinone
 d) Cytochrome
38. Light Harvesting Complex (LHC) is
 a) One molecule of chlorophyll-*a*
 b) Very few molecule of chlorophyll-*a*
 c) Hundreds of pigment molecules bound to proteins
 d) Chlorophyll-*a* + chlorophyll-*c* + protein + DNA
39. Which of the following represents the correct molecular formula of chlorophyll-*b*?
 a) C₅₅H₇₂O₆N₄Mg
 b) C₅₅H₇₂O₅N₄Mg
 c) C₅₅H₇₂O₄N₄Mg
 d) C₅₅H₇₀O₆N₄Mg
40. In C₄-plants, the bundle sheath cells
 a) Have thin walls to facilitate gaseous exchange
 b) Have large intercellular spaces
 c) Are rich in PEP carboxylase
 d) Have a high density of chloroplasts
41. The following (I-IV) are the main steps of chemosynthetic ATP synthesis in the light reaction. Arrange them in correct order
 I. H⁺ concentration gradient established
 II. H⁺ diffuses through ATP synthetase
 III. Carriers use energy from electrons to move H⁺ across the membrane
 IV. Electrons from PS-II pass along electron transport chain
 V. Light excites electrons in PS-II
 VI. Energy of H⁺ flow is used by ATP synthetase to make ATP
 a) I, II, III, IV, V, VI
 b) II, IV, V, III, II, VI
 c) V, IV, III, I, II, VI
 d) V, VI, III, IV, II, I
42. What is the wavelength of radiations in visible spectrum?
 a) 400-700 nm
 b) 400-800 nm
 c) 390-760 nm
 d) 760-390 nm
43. Which of the following is not related to photorespiration?
 a) Lysosome
 b) Chloroplast
 c) Peroxisome
 d) Mitochondria

44. The internal factors that affects photosynthesis of plant depends on the
- Morphological predisposition
 - Genetic predisposition
 - Temperature
 - Environment predisposition
45. How many H⁺ ions are formed from 12 water molecules during non-cyclic photophosphorylation?
- 12
 - 24
 - 36
 - 48
46. In non-cyclic photophosphorylation, there is photolysis of 12 water molecules. How many H⁺ are formed?
- 24 H⁺
 - 36 H⁺
 - 12 H⁺
 - 32 H⁺
47. Maximum photosynthesis occurs in
- Red light
 - Blue light
 - Green light
 - Violet light
48. I. Initial CO₂ acceptor
II. Extent of photorespiration
III. Enzyme catalysing reaction that fixes CO₂
IV. Presence of Calvin cycle
V. Leaf anatomy
Which one does not differ in a C₃ and C₄-plants?
- I and V
 - Only IV
 - II and III
 - Only II
49. Energy transfer in photosynthesis occurs as
- Phycocerythrin→ phycocyanin →carotenoid →chlorophyll-a
 - Chlorophyll-b →carotenoid →phycocerythrin →chlorophyll-a
 - Phycocyanin→phycocerythrin→ carotenoid→ chlorophyll-a
 - Chlorophyll-b→ carotenoid→ phycocyanin→ chlorophyll-a
50. What is true for photosynthesis?
- Carbon dioxide is oxidised and water is reduced
 - Carbon dioxide is reduced and water is oxidised
 - Both carbon dioxide and water are reduced
 - Both carbon dioxide and water are oxidised
51. Which of the following statement is false in case of (C₄-plant)?
- CO₂ acceptor is RuBisCo in mesophyll cell
 - Carboxylation occurs in mesophyll cells
 - Leaves have two cell types
 - Mesophyll cells lack Rubisco
52. Chlorophyll in chloroplasts is located in
- Grana
 - Pyrenoid
 - Stroma
 - Both (a) and (b)
53. Which photosystem is involved in cyclic photophosphorylation?
- PS-II
 - PS-I
 - Xanthophyll and PS-II
 - Xanthophyll and PS-I
54. The mechanism of ATP formation both in chloroplast and mitochondria is explained by
- Relay pump theory of Godlewski
 - Cholodny-Went's model
 - Chemiosmotic theory
 - Munch's mass-flow hypothesis
55. Absorption spectrum of chlorophyll-a and the action spectrum of photosynthesis is identical because chlorophyll-a
- Absorbs the maximum light
 - Absorbs the minimum light
 - Absorbs the red and blue light
 - Is found most abundantly
56. Which would do maximum harm to a tree?
- Loss of half of its branches
 - Loss of all its bark
 - Loss of all its leaves
 - Loss of half of its leaves
57. Pyruvate + ATP \xrightarrow{y} PEP + AMP + H₃PO₄
Identify-y in the given reaction and choose the correct option
- Phosphopyruvate dikinase
 - Phosphopyruvate monokinase

- c) Phosphopyruvate dikinase
 58. A wastage process is
 a) Respiration b) Photosynthesis c) Photorespiration d) Movement
59. How many molecules of glycine is required to release one CO₂ molecule in photorespiration?
 a) One b) Two c) Three d) Four
60. Choose the correct statement.
 a) The C₄-plants do not have RUBISCO
 b) Carboxylation of RuBP leads to the formation of PGA and phosphoglycolate
 c) Carboxylation of phosphoenol pyruvate results in the formation of C₄-plants
 d) Decarboxylation of C₄-acids occur in the mesophyll cells
61. Conditions helpful in photorespiration are
 a) More oxygen and less carbon dioxide b) Less oxygen and more carbon dioxide
 c) More temperature and less oxygen d) More humidity and less temperature
62. Which of the following is/are the raw material for photosynthesis?
 I. H₂O II. CO₂
 III. Light IV. Chlorophyll
 Choose the correct option
 a) II, III and IV b) I and IV c) I, II and III d) I, II, III and IV
63. The special structure present in C₄-plants in
 a) Thin cuticle b) Multi-layered epidermis
 c) Kranz type body d) One-layered epidermis
64. In which of the following form glucose is usually stored in plants?
 a) Lipid b) Carbohydrates c) Protein d) Starch
65. A student sets up an experiment on photosynthesis as follow : He takes soda water in a glass tumbler and add a chlorophyll extracts into the contents and keeps the tumbler exposed sunlight hoping that he has provided necessary ingredient for photosynthesis to proceed (viz, CO₂, H₂O, chlorophyll and light). What do you think what will happen after, say few hours of exposure of light?
 a) Photosynthesis will take place and glucose will produced
 b) Photosynthesis will take place and starch will be produced which will turn the mixture turbid
 c) Photosynthesis will not take place because CO₂ dissolves in soda water escapes into the atmosphere
 d) Photosynthesis will not take place because intact chloroplasts are needed for the process
66. With respect to compensation point, which of the following is true for C₃ and C₄-plants
 a) Compensation points of C₃ and C₄- plants are equal
 b) Compensation points of C₃- plant is higher than C₄-plants
 c) Compensation points of C₄-plant is higher than C₃-d) plants
67. Light energy in photosynthesis is utilized in
 a) H₂O converted into H₂ b) ADP converted into ATP
 c) ATP converted into ADP d) None of the above
68. Identify A, B, C and D in the given diagram of z-scheme of light reaction and choose the correct option accordingly



- a) A- e^- acceptor, B-ETS, C-PS-II, D-PS-I
 c) A-ETS, B- e^- acceptor, C-PS-I, D-PS-II
69. $PEP + CO_2 + H_2O \xrightarrow{x} \text{Oxaloacetic acid} + H_3PO_4$
 Identify X
 a) Ligase b) Oxidoreductase c) PEP carboxylase d) Lyase
70. Stroma lamellae membrane lacks
 I. PS-II
 II. NADP reductase
 III. non-cyclic photophosphorylation
 Select the correct option
 a) I and II b) II and III c) III and I d) I, II and III
71. RUBISCO stands for
 a) Ribulosebisphosphate carboxylase oxygenase
 b) Ribulose phosphate carboxylase oxygenase
 c) Ribulose phosphate carboxylic oxygenase
 d) None of the above
72. In chloroplasts, chlorophyll is present in the
 a) Outer membrane b) Inner membrane c) Thylakoids d) stroma
73. DCMC
 a) Inhibits PS-I
 b) Inhibits PS-II
 c) Destroy chloroplast
 d) Inhibits oxidative phosphorylation
74. Malic acid (4-C) is produced in which plant without Kranz anatomy?
 a) *Bryophyllum* b) *Kalanchoe* c) *Opuntia* d) All of these
75. What is the advantage of light reactions producing ATP and NADPH₂ on stromal side of thylakoid membrane?
 a) Calvin cycle consumes ATP and NADPH₂ from stroma
 b) Light reaction occurs in stroma
 c) Dark reaction occurs in grana need ATP + NADPH₂
 d) CO₂ is produced in stroma
76. Generally, plants adapted to dry tropical conditions have
 a) C₂ pathway b) C₃ pathway c) C₅ pathway d) C₄ pathway
77. Correct sequence of rate of photosynthesis in different light is
 a) Red > Blue > Green b) Blue > Red > Green c) Green > Blue > Red d) Green > Red > Blue
78. During the light reaction, the water splits into
 a) H⁺, O₂ electrons b) H₂, O₂ electrons c) 2H⁺, $\frac{1}{2}$ O₂ 2 electrons d) $\frac{1}{2}$ H₂, $\frac{1}{2}$ O₂ electrons
79. Adenosine diphosphate contains
 a) One high energy bonds b) Two high energy bonds
 c) Three high energy bonds d) Four high energy bonds
80. The thylakoids are aggregated to form stalks of discs called
 a) Stroma b) Grana
 c) Stroma thylakoids d) Intergranal thylakoids
81. Which hypothesis best explains the synthesis of ATP in chloroplast?
 a) Chemosynthetic hypothesis b) Chemiosmotic hypothesis
 c) Potential gradient hypothesis d) Redox gradient hypothesis
82. In dark cycle, one molecule of glucose formation needed
 a) 12 ATP and 12 NADPH b) 14 ATP and 12 NADPH
 c) 16 ATP and 12 NADPH d) 18 ATP and 12 NADPH

83. The main photosynthetic pigments in the plants are
a) Chlorophyll-*a* and chlorophyll-*c* b) Chlorophyll-*a* and chlorophyll-*d*
c) Chlorophyll-*b* and chlorophyll-*a* d) Chlorophyll-*b* and chlorophyll-*c*
84. Radioactive C^{14} is given to carbon dioxide and released to atmosphere. This carbon dioxide is taken by RuBP in a C_3 -plants. First radioactive C^{14} is seen, in which compound?
a) PGAL b) PEP c) RMP d) PGA
85. Example of water soluble plant pigment is
a) Chlorophyll- α b) Chlorophyll-*b* c) Anthocyanin d) xanthophyll
86. PS-I and PS-II were discovered by
a) Robert Emerson b) Blackman c) Robert Mayer d) Arnon
87. Photorespiration is also called
I. Glycolate pathway
II. C_3 -cycle
III. Oxidative photosynthetic carbon cycle
Select the correct option
a) I and II b) II and III c) III and I d) I, II and III
88. 'Hatch and Slack' cycle is found in
a) C_4 -plants b) C_3 -plants c) Both (a) and (b) d) None of these
89. Which of the following statements is true with regard to light reaction of photosynthetic mechanism in plants?
a) Chlorophyll- α occurs with peak absorption at 680 nm in photo system-I and at 700 nm in photo system-II
b) Magnesium and sodium ions are associated with photolysis of water molecules
c) O_2 is evolved during cyclic photophosphorylation
d) Photo system-I and II are both involved in non-cyclic photophosphorylation
90. Photosynthesis convert radiant or solar energy into the
a) Physical energy b) Latent energy c) Chemical energy d) Oxidation energy
91. Photolysis of each water molecule in light reaction will yield
a) 2 electrons and 4 protons b) 4 electrons and 4 protons
c) 4 electrons and 3 protons d) 2 electrons and 2 protons
92. Which of the following is the first compound that accepts carbon dioxide during dark phase of photosynthesis?
a) NADP b) RuBP c) Ferredoxin d) Cytochrome
93. In a CAM-plant, the concentration of organic acid
a) Increases during the day b) Decreases or increases during the day
c) Increases during night d) Decreases during any time
94. If photosynthesising, green algae are provided with CO_2 labelled with an isotope of oxygen (O^{18}), later analysis showed that all of the following compounds produced by the algae contains ^{18}O except
a) PGA b) RuBP c) Glucose d) O_2
95. Phytochrome occurs in two forms. In which form it promotes the germination of seeds of some species?
a) P_{fr} from b) P_r from c) Both (a) and (b) d) None of these
96. Solarisation is
a) Formation of chlorophyll b) Destruction of chlorophyll
c) Utilization of sunlight d) Effects of solar light
97. C_4 -pathway is a regular mode of CO_2 fixation in
I. dicots
II. pteridophytes
III. monocots
Select the correct option

- a) I and II b) I and III c) II and II d) I, II and III
98. Carboxylation (C_3 -cycle) is catalysed by
a) Carboxylase b) RuBP carboxylase c) RuBP oxygenase d) Both (b) and (c)
99. The ratio between 2-carbon and 3-carbon intermediates having $-NH_2$ group formed in photosynthetic oxidation cycle is
a) 1 : 1 b) 2 : 1 c) 3 : 2 d) 3 : 4
100. In which one of the following nitrogen is not a constituent?
a) Invertase b) Pepsin c) Idioblast d) Bacteriochlorophyll
101. If a chemical process is affected by more than one factors then its rate will be determined by
a) Two closely related factors
b) Only one factor, which is close to its minimal value
c) Only one factor, which is close to its maximum value
d) Only one factor, which is close to its appropriate value
102. I. Temperature
II. CO_2 concentration
III. Chlorophyll arrangement
IV. Water
Among the given factors, identify the external factors that affects the rate of photosynthesis and correct option accordingly
a) I, II and IV b) I, II and III c) II, III and IV d) I, III and IV
103. Which activity is performed by PS-I in light reaction?
a) Reduction of NADPH b) Reduction of $NADP^+$
c) Oxidation of $NADP^+$ d) Oxidation of NAD
104. C_4 pathway for CO_2 -fixation was proposed by
a) Benson and associates b) Arnon and associates
c) Rouhani et al., d) Hatch et al.,
105. A scientist disrupted the chloroplast and separated the stroma from lamella. For fixing CO_2 he supplied stroma with
I. ATP
II. NADPH
III. Glucose
Select the correct option
a) I and III b) III and II c) I and II d) I, II and III
106. CAM helps the plants in
a) Secondary growth b) Disease resistance c) Reproduction d) Conserving water
107. PEP is present in
a) Mesophyll cell b) Bundle sheath cell c) Meristematic cell d) Both (a) and (b)
108. The absorption spectrum of chlorophyll
a) Shows that some colours of light are absorbed more than the others
b) Approximates the action spectrum of photosynthesis
c) Explains why chlorophyll is a green pigment
d) Has all the above properties
109. PGA as the first carbon dioxide fixation product was discovered in photosynthesis of
a) Bryophyte b) Gymnosperm c) Angiosperm d) Alga
110. In C_3 -plants, the first stable compound formed after carbon dioxide fixation is
a) Phosphoglyceraldehyde
b) Malic acid
c) Oxaloacetic acid
d) 3-phosphoglycerate

111. Which chemical compound/molecule supplies electrons continuously to PS-II?
 a) CO₂ b) O₂ c) H₂O d) NADPH
112. Colour that we see in leaves is due to the presence of
 I. Chlorophyll-*a* II. Chlorophyll-*b*
 III. Xanthophyll IV. Carotenoid
 a) I and II b) I, III and IV c) II, III and IV d) I, II, III and IV
113. Quantasomes occur on the surface of
 a) Cristae b) Plasmalemma c) Nuclear envelope d) Thylakoids
114. First carbon dioxide acceptor in C₄- plants is
 a) PEP b) PGA c) RuBP d) Pyruvic acid
115. In Calvin cycle, if one molecule of RuBP is carboxylated than how many PGA molecule will be formed?
 a) 2 b) 3 c) 4 d) 5
116. The type of carbon dioxide fixation seen in many succulent plant species is
 a) C₄-pathway b) C₂-pathway c) CAM-pathway d) C₃-pathway
117. Water stress causes the stomata to ...A... hence reducing the ...B... availability.
 Here A and B refer to
 a) A-open; B-H₂O b) A-close; B-H₂O c) A-close; B-CO₂ d) A-open; B-CO₂
118. Photosynthesis cannot continue for long if during light reaction, only cyclic photophosphorylation takes place. This is because
 a) Only ATP is formed, NADPH⁺ + H⁺ is not formed b) Photosystem-I stops getting excited at a wavelength of light beyond 680 nm
 c) There is unidirectional cyclic movement of the electrons d) There is no evolution of oxygen
119. Light reaction of photosynthesis occurs inside
 a) Stroma b) Grana
 c) Endoplasmic reticulum d) Cytoplasm
120. Bundle sheath cells are rich in which enzyme
 a) PEP carboxylase b) Malate dehydrogenase
 c) Phosphofructokinase d) RuBisCo
121. In sugarcane plant, ¹⁴CO₂ is fixed in a malic acid, in which the enzyme that fixes carbon dioxide is
 a) Ribulose phosphate kinase b) Fructose phosphatase
 c) Ribulose bisophosphate carboxylase d) Phosphoenol Pyruvic acid carboxylase
122. For yielding one molecule of glucose, the Calvin cycle turns
 a) Two times b) Four times c) Six times d) Eight times
123. The light reaction of photosynthesis end up in the formation of
 a) NaDH₂ b) ATP c) Sugar d) NADPH₂
124. In leaves of C₄-plants, malic acid synthesis during carbon dioxide fixation occurs in
 a) Epidermal cells b) Mesophyll cells c) Bundle sheath cells d) Guard cells
125. Biosynthetic phase of photosynthesis is the formation of
 a) Lipid b) Fat c) Protein d) Sugars
126. What happen to the chloroplast pigment when they absorb light?
 a) They become reduced b) They become excited
 c) They lose potential energy d) Calvin cycle is triggered
127. In C₄-pathway, the first product identified was
 a) 3-PGA b) OAA c) 2-PGA d) 1-3DPGA
128. Law of limiting factors was given by
 a) Leibig b) Blackman c) Calvin d) Arnon
129. PS-I in cyclic photophosphorylation is involved in the formation of ...A... by ...B... movement of electrons
 What does A and B refer here?

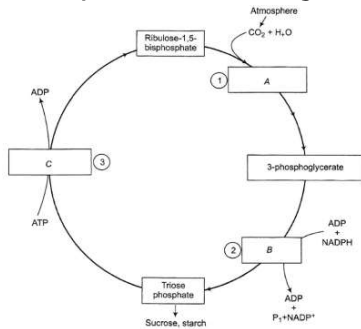
- a) A-ATP; B-down hill redox potential b) A-ADP; B-up hill redox potential
c) A-NADH + H⁺; B-down hill energy d) A-NADPH + H⁺; B-down hill energy
130. The green-coloured pigment present in all autotrophs was named chlorophyll by
a) Pelletier Caventou b) Julius Robert Mayer c) Jean Senebier d) Melvin Calvin
131. Within the chloroplast, there is the membranous system consisting of
I. grana
II. stroma lamellae
III. fluid stroma
Choose the correct option
a) I and II b) II and III c) I and III d) I, II and III
132. Joseph Priestley observed that when mouse alone was placed in a closed bell jar with burning candle, it was suffocated and candle burning extinguished but when mouse was placed with a mint plant in the same bell jar, that mouse stayed alive and candle continued to burn. What he concluded from this experiment?
a) Burning candle remove the air b) Mint plant restore the air
c) Both (a) and (b) d) CO₂ is required for burning of candle
133. Organelles involved in photorespiration is/are
I. chloroplast
II. peroxisomes
III. mitochondria
Choose the correct option
a) I and II b) II and III c) III and I d) I, II and III
134. The first step in dark reaction of photosynthesis is
a) Formation of ATP
b) Ionization of water
c) Attachment of carbon dioxide to a pentose sugar
d) Excitement of electron of chlorophyll by a photon of light
135. Calvin cycle is also called
a) Calvin-Benson cycle b) C₃-cycle
c) Reductive pentose pathway d) All of the above
136. Plants in which the first product of CO₂ fixation is C₃ acid, *i. e.*, the ...A... pathway, and those in which the first product was C₄ acid (OAA), *i. e.*, the ...B... pathway
Complete the given statement by filling appropriate options in the given blanks
a) A-C₂; B-C₃ b) A-C₃; B-C₄ c) A-C₄; B-C₂ d) A-C₂; B-C₃
137. Photosynthesis is an important process for life on earth because
a) It is the primary source of all food on earth
b) It is responsible for the release the of oxygen
c) It is the only natural process responsible for the utilisation of sunlight
d) All of the above
138. The mineral involved in the photolysis of water are
I Manganese II Calcium
III magnesium IV Chloride
a) I and II only b) I, II and IV only c) I, II and II only d) I and IV only
139. Calvin cycle represents
a) Reductive carboxylation b) Substrate level phosphorylation
c) Dark respiration d) Oxidative carboxylation
140. Identify the correct sequence of enzymes given below which participate in the regeneration phase of Calvin cycle.
I. Ribulose-5-phosphate isomerase
II. Ribulose-5-phosphate epimerase

- III. Transketolase
 IV. Triose phosphate isomerase
- a) VI, I, III, II b) III, IV, II, I c) IV, III, I, II d) II, I, IV, III
141. Etiolation in plants is caused when they
- a) Are grown in dark b) Have mineral deficiency
 c) Are grown in intense light d) Are grown in blue light
142. Dichlorophenyl dimethylurea inhibits
- a) PS-I b) PS-II
 c) Chloroplast functioning d) Oxidative phosphorylation
143. Photosynthetic pigments in chloroplast are embedded in the membrane of
- a) Photoglobulin b) Matrix c) Thylakoid d) Mitochondria
144. Pigments can be separated from leaf by
- a) ELISA test b) RIA test
 c) Centrifugation d) Paper chromatography
145. In which of the following, oxygen does not evolve during photosynthesis?
- a) Photosynthetic red algae
 b) Photosynthetic green algae
 c) Photosynthetic blue-green algae
 d) Photosynthesis bacteria
146. Who proved that the organic matter is synthesised from carbon dioxide and water during the photosynthesis?
- a) Liebig b) Priestley c) Ingen Housz d) Von Mayer
147. Which of the following statements is true with regard to the light reaction of photosynthesis?
- a) In PS-II the reaction centre chlorophyll- α has an absorption peak at 700 nm hence, is called P_{700} b) In PS-I the reaction centre chlorophyll- α has an absorption maxima at 680 nm and is called P_{680}
 c) The spitting of water molecule is associated with PS-I d) Photosynthem-I and II are involved in Z scheme
148. In Calvin cycle, the first product identified was
- a) 3-phosphoglyceric acid b) 2-phosphoglyceric acid
 c) 1-phosphoglyceric acid d) 4-phosphoglyceric acid
149. I. Water is oxidised in PS-I not in PS-II
 II. Light is needed for both PS-I and PS-II
 III. Due to photolysis of water, formation of ATP and NADPH occurs
 IV. Production of NADPH and H^+ is associated with PS-II not PS-I
 Identify the true statement and select the correct option
- a) I and II b) II and III c) I and IV d) II and IV
150. PS-I is located on the
- a) Non-appressed part of a grana thylakoids b) Stroma thylakoids
 c) Appressed part of grana thylakoids d) Both (a) and (b)
151. I. Chlorophyll- a
 II. Chlorophyll- b
 III. Anthocyanin
 Select the correct option regarding water soluble pigment
- a) I and II b) Only II c) Only II d) I and II
152. C_4 -plant minimises the photorespiration because C_4 -plants
- a) Use PEPcase to initiate CO_2 fixation b) Do not carry out the Calvin cycle in low CO_2 level
 c) Exclude Calvin cycle d) Show photorespiration
153. In the process of photosynthesis, water molecule breaks during
- a) Red drop b) Photolysis

c) Phosphorylation

d) Carbon assimilation

154. Identify A, B and C in the given figure, and choose the correct option from the set (A-C) given below



- a) A-Reduction, B-Carboxylation, C-Regeneration
- b) A-Reduction, B-Regeneration, C-Carboxylation
- c) A-Carboxylation, B-Reduction, C-Regeneration
- d) A-Carboxylation, B-Regeneration, C-Reduction

155. In grana of chloroplast, the reaction $ADP + P_i = ATP$ during day shows

- a) Oxidative phosphorylation
- b) Photophosphorylation
- c) Substrate level phosphorylation
- d) Dephosphorylation

156. Very strong light has a direct inhibiting effect on photosynthesis, which is known as

- a) Solarization
- b) Etiolation
- c) Chlorosis
- d) Defoliation

157. What is the effect of high CO₂ concentration and higher values of ATP/ADP ratio?

- a) Rate of Calvin cycle increased
- b) Rate of Krebs cycle decreased
- c) Rate of glycolate cycle decreased
- d) All of the above

158. pH of thylakoid lumen during photosynthesis is

- a) Basic
- b) Neutral
- c) Acidic
- d) Depends on H⁺ concentration

159. Head portion of the chlorophyll is called ...A... . Tail portion of the chlorophyll is called ...B... . Fill in the with respect to A, B and tick the appropriate option

- a) A-phytol, B-porphyrin
- b) A-porphyrin, B-phytol
- c) A-pyrrole ring, B-phytol
- d) A-porphyrin, B-pyrrole ring

160. Members of family-Crassulaceae perform

- a) C₃-photosynthesis
- b) CAM-photosynthesis
- c) C₄-photosynthesis
- d) All of these

161. ...A... plants have the higher temperature optimum than ...B... the plants adapted climate

Here A and B refer to

- a) A-Desert; B-Tropical
- b) A-Temperature; B-Tropical
- c) A-Tropical; B-Temperature
- d) A-Desert; B-Temperature

162. Which is not correct for ancient plants?

- a) They have photosynthetic pigment
- b) They are primitive algae
- c) They use H₂S as hydrogen source
- d) They release oxygen as byproduct

163. Which of the following cell organelles is associated with photorespiration?

- a) Mitochondria
- b) Peroxisome
- c) Chloroplast
- d) All of these

164. The protons are transported across the thylakoid membrane into the lumen because

- a) Electrons are transferred to hydrogen carrier is which is present on inner membrane
- b) Electrons are transferred to electron carrier
- c) Electrons are transferred to intermembrane space
- d) Electrons are transferred to hydrogen carrier, which is present outer side of membrane

165. The light phase of photosynthesis is called

- a) Hill reaction
 c) Pigment action
 b) Photo action
 d) Chlorophyllous process

166. Which of the following statements are correct?

- I. Light reaction occurs in stroma
 II. Light reaction occurs in grana
 III. Dark reaction occurs in stroma
 IV. Dark reaction occurs in grana

Choose the correct option

- a) I and II
 b) II and IV
 c) III and IV
 d) II and III

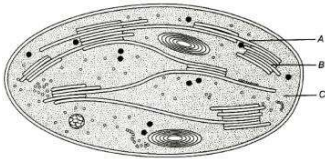
167. In photosynthesis, what does occur in PS-II?

- a) It takes longer wavelength of light and e^- from H_2O
 b) It takes shorter wavelength of light and e^- from H_2O
 c) It takes longer wavelength of light and e^- from NADP
 d) It takes shorter wavelength of light and e^- from NADP

168. Cyclic-photophosphorylation results in the formation of

- a) NADPH
 b) ATP and NADPH
 c) ATP, NADPH and oxygen
 d) ATP

169. Identify A, B and C in given figure



- a) A-Stroma wall, B-Grana, C-Stroma
 b) A-Stroma lamella, B-Grana, C-Stroma
 c) A-Stroma lamella, B-Stroma, C-Grana
 d) A-Starch grain, B-Stroma, C-Grana

170. In photosystem II, the reaction centre chlorophyll-a absorbs ...A... nm wave length of red light causing electron to become excited and jump into an orbit farther from the atomic nucleus. These electrons are picked up by an ...B..., which passes them to an electron transport system consisting of ...C...

Pick the right choice for A, B and C

- a) A-680 nm, B-electron donor, C-cytochromes
 b) A-780 nm, B-electron acceptor, C-cytochromes
 c) A-680 nm, B-electron acceptor, C-cytochromes
 d) A-780 nm, B-electron donor, C-cytochromes

171. Which of the following statements with regard to photosynthesis is/are correct?

- I. In C_4 -plants, the primary CO_2 acceptor is PEP.
 II. In the photosynthetic process, PS-II absorbs energy at or just below 680 nm.
 III. The pigment that is present in the Pigment System-I is P_{683} .

- a) II and III only
 b) I only
 c) III only
 d) I and II only

172. Which one is correct for C_4 -plants?

Mesophyll **Bundle Sheath**

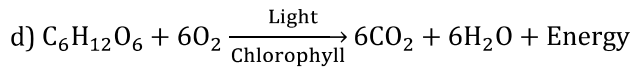
- a) PEPcase C_4 -cycle RuBisCo C_3 -cycle
 b) PEPcase Calvin cycle RuBisCo C_4 -cycle
 c) RuBisCo C_4 -cycle PEPcase C_3 -cycle
 d) RuBisCo C_2 -cycle PEPcase C_3 -cyce

173. Synthesis of food in C_4 -pathway occurs in chlorophyll of

- a) Guard cells
 b) Bundle sheath cells
 c) Spongy mesophyll cells
 d) Palisade cells

174. Which one is the correct reaction of photosynthesis?

- a) $6CO_2 + 6H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light}} 6O_2 + C_6H_{12}O_6$
 b) $6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light}} C_6H_{12}O_6 + 6O_2 + 6H_2O$
 c) $C_6H_{12}O_6 + 6O_2 + 6H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light}} 6CO_2 + 12H_2O + \text{Energy}$



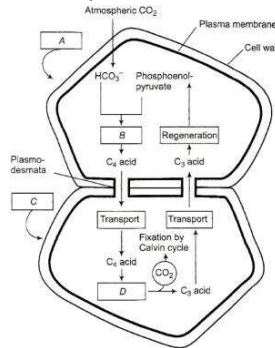
175. I. Lysosome II. Chloroplast
III. Peroxisome IV. Mitochondria

Which of the following organelles is/are not related to photorespiration?

Choose the correct option

- a) Only I b) I, IV and II c) I, III and IV d) Only IV

176. Identify A, B, C and D in the given figure and choose the correct option accordingly



- a) A-Mesophyll cell, B-Fixation, C-Bundle sheath cell, D-Decarboxylation
b) A- Mesophyll cell, B-Decarboxylation, C-Bundle sheath cell, D-Fixation
c) A-Chloroplast, B-Decarboxylation, C-Bundle sheath cell, D-Fixation
d) A-Chloroplast, B-Fixation, C-Bundle sheath cell, D-Fixation

177. In photosynthesis, action and absorption spectrum were related by

- a) Von Helmholtz b) Englemann c) Emerson d) Lavoisier

178. Which of the following is the formula of chlorophyll-a?

- a) $C_{55}H_{70}O_2N_4Mg$ b) $C_{55}H_{72}O_5N_4Mg$ c) $C_{55}H_{70}O_5N_4Mg$ d) $C_{55}H_{72}O_2N_4Mg$

179. Oxygen which is liberated during photosynthesis, comes from

- a) Carbon cells b) Spongy cells c) Palisade cells d) Bundle sheath cells

180. Photosynthetic organisms remove of carbon/year if assumed that the photosynthetic organisms use 0.1% of incident visible light

- a) 0.1015 tonn b) 0.2015 tonn c) 0.1123 tonn d) 0.03 tonn

181. Light reaction or photochemical phase includes

- I. light absorption
II. water splitting
III. oxygen release
IV. ATP and NADP formation

Select the correct option

- a) I, II and IV b) I, II and III c) I, III and IV d) I, II, III and IV

182. Identify A, B and C shown in a table representing the Calvin cycle

In	Out
A CO_2	One glucose
B ATP	ADP
C NADPH	NADP

Choose the correct option

- a) A-5 CO_2 , B-18, C-12 b) A-6 CO_2 , B-12, C-18 c) A-4 CO_2 , B-12, C-18 d) A-6 CO_2 , B-18, C-12

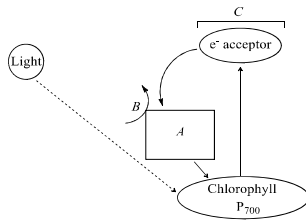
183. Rate of photosynthesis is low in herbs, shrubs as compared to sun plants because

- a) Herb, shrubs receive mere red light
b) Herb, shrubs receive mere blue light
c) Herb, shrubs receive mere more green light
d) Herb, shrubs receive more white light

184. PEPcase has an advantage over RuBisCo. The advantage is
 a) RuBisCo combines with O₂ but PEPcase do not
 b) RuBisCo combines with NO₂ but PEPcase do not
 c) RuBisCo conserve energy but PEPcase do not
 d) PEPcase is present in both mesophyll cells and bundle sheath cells but RuBisCo is not
185. Activator of ribulose biphosphate carboxylase oxygenase is
 a) Mg²⁺ b) Zn²⁺ c) Ca²⁺ d) SO₄²⁻
186. Photolysis of water during photosynthesis occurs with the help of
 a) PS-II b) PS-I c) Ferredoxin d) Cytochrome
187. $\text{RuBP} + \text{O}_2 \xrightarrow{x} \text{PGA} + \text{Phosphoglycolate}$.
 Identify x in the given equation and choose the correct option
 a) RuBP carboxylase b) RuBP oxygenase c) RuBisCo d) PEP-carboxylase
188. Which one of the following is wrong in relation to photorespiration?
 a) It is a characteristic of C₄-plants
 b) It is a characteristics of C₃-plants
 c) It is occurs in chloroplasts
 d) It occurs in day-time only
189. Flow of electrons in non-cyclic photo phosphorylation is
 a) Unidirectional (from PS-I to PS-II) b) Amphidirectional
 c) Bidirectional d) Unidirectional (from PS-II to PS-I)
190. Priestley discovered oxygen in
 a) 1770 b) 1774 c) 1778 d) 1782
191. Which of the following is wrongly matched?
 a) Sorghum – Kranz anatomy b) PEP carboxylase – Mesophyll cells
 c) Blackman – Law of limiting factors d) Photosystem-II – P₇₀₀
192. Transport of C₄ acid from mesophyll cells to the bundle sheath cell takes place through
 a) Cell membrane b) Cell wall c) Plasmodesmata d) Osmosis
193. Maximum amount of photosynthesis occurs in
 a) Light compensation point b) O₂ compensation point
 c) Saturation point d) Desaturation point
194. Sunken stomata are usually found in
 a) C₃ plants b) CAM plants c) Insectivorous plants d) Phanerogams
195. I. In C₃-plant, Calvin pathway takes place in mesophyll cell
 II. In C₄-plant, Calvin pathway takes place in the mesophyll cell
 Which of the following statements true?
 Choose the correct option
 a) Statement I is incorrect, II is correct b) Statement II is incorrect, I is correct
 c) Both incorrect d) Both correct
196. C₃-plant show optimum photosynthesis at
 a) High O₂ b) High CO₂
 c) Low O₂ d) High temperature = 45°C
197. During C₄-cycle, the acid formed are
 I. Picric acid II. OAA
 III. Malic acid IV. Aspartic acid
 Select the correct option
 a) I, II, III and IV b) II, III and IV c) I, IV and II d) I, III and IV
198. Consider the following statements regarding photosynthesis.
 I. ATP formation during photosynthesis is termed as photophosphorylation.
 II. Kranz anatomy pertains to leaf.

- III. Reduction of NADP^+ to NADPH occurs during Calvin cycle.
 IV. In a chlorophyll molecule, magnesium is present in phytol tail.
- a) I and II correct
 b) III and IV are correct
 c) I and III are correct
 d) I and IV correct
199. Presence of bundle sheath is a characteristic of
- a) Xerophytic plants
 b) Members of grass family
 c) C_4 -plants
 d) C_3 -plants
200. Oxygenic photosynthesis occurs in
- a) *Chromatium*
 b) *Oscillatoria*
 c) *Rhodospirillum*
 d) *Chlorobium*
201. I. They have special leaf anatomy
 II. They tolerate high temperature
 III. Lack photorespiration
 IV. Greater productivity of biomass
 These are the probable characters of
- a) C_2 -plant
 b) C_3 -plant
 c) C_4 -plant
 d) Any plant
202. In which region, most of the photosynthesis takes place?
- a) Red and green region
 b) Violet and indigo region
 c) Blue and red region
 d) Blue and black region
203. In an experiment demonstrating the evolution of oxygen in *Hydrilla*, sodium bicarbonate is added to water in the experimental set-up. What would happen if all other conditions are favorable?
- a) Amount of oxygen evolved decreases as carbon dioxide in water is absorbed by sodium bicarbonate
 b) Amount of oxygen evolved increases as the availability of carbon dioxide increases
 c) Amount of oxygen evolved decreases as the availability of carbon dioxide increases
 d) Amount of oxygen evolved increases as carbon dioxide in water is absorbed by sodium bicarbonate
204. Who proposed that O_2 comes from water instead from CO_2 during photosynthesis?
- a) Von Neil
 b) Engelmann
 c) Blackman
 d) Warburg
205. Which equation is correct to prove that O_2 comes from water during photosynthesis?
- a) $6\text{CO}_2^{18} + 12\text{H}_2\text{O} \rightarrow 6\text{O}_2^{18} + \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O}$
 b) $6\text{CO}_2 + 12\text{H}_2\text{O}^{18} \rightarrow 6\text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O}^{18}$
 c) $6\text{CO}_2^{18} + 12\text{H}_2\text{O} \rightarrow 6\text{CO}_2^{18} + \text{C}_6\text{H}_{12}\text{O}_6$
 d) $6\text{CO}_2 + 12\text{H}_2\text{O}^{18} \rightarrow 6\text{O}_2^{18} + \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O}$
206. The components of PS-I are located on the
- a) Stroma
 b) Stroma thylakoid
 c) Granum thylakoid
 d) Outer surface of stromal and granal thylakoid
207. Cyclic photophosphorylation occurs in
- a) Stroma lamellae
 b) Appressed part of grana lamellae
 c) Stroma cell wall
 d) Grana cell wall
208. Identify from the following, a characteristic pigment, which contains copper containing protein
- a) Plastoquinone
 b) Ferredoxin
 c) Cytochrome
 d) Plastocyanin
209. I. The electrons that carriers photophosphorylation are located in the thylakoid membrane
 II. During photophosphorylation, the chloroplast stroma becomes more acidic than the interior of thylakoid membrane
 III. Protons diffuses through the protein channels which are ATP synthetase molecules
 IV. ATP is formed from $\text{ADP} + \text{P}_i$ on the stroma side of the thylakoid in the chloroplast
 V. During photophosphorylation, water ionises to form H^+ , yielding electrons to PS-II
 Which of the following statement are false?
- a) I and II
 b) III and IV
 c) IV and V
 d) Only II
210. Which of the following elements is an activator for both Ribulosebisphosphate carboxylase oxygenase and phosphoenol pyruvate carboxylase in photosynthetic carbon fixation?

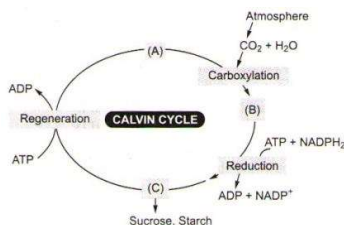
- a) Mg^{2+} b) Zn^{2+} c) Ca^{2+} d) SO_4^{2-}
211. Who experimentally proved that source of oxygen during photosynthesis is water?
a) Van Niel b) Robin Hill c) Arnon d) Emerson
212. Warburg effect is the
a) Inhibition of C_4 -cycle by O_2 b) Inhibition of C_2 -cycle by O_2
c) Inhibition of C_3 -cycle by O_2 d) Inhibition of C_3 -cycle by CO_2
213. Oxaloacetic acid changes to the malic acid by the action of
a) Oxaloacetic dehydrogenase b) Malic dehydrogenase
c) PEP dehydrogenase d) RMP dehydrogenase
214. Consider the following statements.
I. The portion of the spectrum between 300-500 nm is also referred to as Photosynthetically Active Radiation (PAR).
II. Magnesium, calcium and chloride ions play prominent roles in the photolysis of water.
III. In cyclic photophosphorylation, oxygen is not released (as there is no photolysis of water) and NADPH is also not produced.
a) I is true; but II and III are false b) I and II are false; but III is true
c) II is true; but I and III are false d) I and II are true; but III is false
215. When two photosystem (I and II) work in a series, the phosphorylation is called
a) Cyclic b) Non-cyclic c) Bicyclic d) Both (a) and (b)
216. The ATPase enzyme consists of
I. F_0 II. F_1 III. F_2
Select the correct option
a) I and III b) I and II c) Only I d) II and III
217. Chemiosmosis requires
I. a membrane
II. a proton pump
III. a proton gradient
Select the correct option
a) II and III b) I and III c) I and II d) I, II and III
218. Biosynthetic phase of photosynthesis is dependent on
I. NADPH II. NADH
III. ATP IV. $NAD^+ + H^+$
a) I and III b) IV and I c) I and VI d) IV and II
219. Kranz anatomy is the characteristics of
a) C_5 -plants b) C_3 -plants c) C_2 -plants d) C_4 -plants
220. In which type of reactions related to plant photosynthesis peroxisomes are involved?
a) Glycolate cycle b) Calvin cycle
c) Bacterial photosynthesis d) Glyoxylate cycle
221. Photosynthesis is a
a) Catabolic process b) Anabolic process c) Amphibolic process d) Catalytic process
222. Beyond of saturation point, the photosynthesis begins to decline because of
I. Photo inhibition
II. Photo-oxidation
III. Photo-reduction
Select the/correct option which matches with statement
a) I and III b) III and II c) I, II, and III d) I and II
223. A chemical substance when irradiated with UV rays, absorb radiations and emits visible light is called
a) Luminescent b) Fluorochrome c) Bioluminescence d) Metachrome
224. Identify A, B and C in the given figure of cyclic phosphorylation and choose the correct option accordingly



- a) A-ETS, B-ADP + Pi → ATP, C-PS-II
 b) A-ETS, B-ADP + Pi → ATP, C-PS-I
 c) A-NADH₂, B-ADP + Pi → ATP, C-PS-I
 d) A-NADH₂, B-ADP + Pi → ATP, C-PS-II
225. Chlorophyll-*a* and *b* differ in having
- a) Chlorophyll-*a* has a methyl group and chlorophyll-*b* has aldehyde group in position X
 b) Chlorophyll-*a* has an aldehyde group and chlorophyll-*b* has a methyl group in position X
 c) Chlorophyll-*a* has a carboxyl group and Chlorophyll-*b* has an aldehyde group in position X
 d) Chlorophyll-*a* has an ethyl group and Chlorophyll-*b* has an aldehyde group in position X
226. Of the total incident solar radiation the proportion of PAR is
- a) About 60%
 b) Less than 50%
 c) More than 80%
 d) About 70%
227. Who discovered that light is essential for releasing oxygen in plants?
- a) Stephen Hales
 b) Lavoisier
 c) Jan Ingenhousz
 d) Von Helmont
228. How many Calvin cycles are required to produce 5 molecules of glucose?
- a) 60
 b) 15
 c) 30
 d) 90
229. During light reaction of photosynthesis
- a) ADP is phosphorylated and NADPH oxidised
 b) ADP is phosphorylated and NADP reduced
 c) ADP is phosphorylated and NADPH reduced
 d) ATP is phosphorylated and NADPH reduced
230. The ATP production in photosynthesis is called
- a) Phototropism
 b) Phosphorylation
 c) Photooxidation
 d) Photophosphorylation
231. Who described the first action spectrum of photosynthesis?
- a) Sachs
 b) Engelmann
 c) Arnold
 d) Von Helmont
232. Who provided the evidence for the production of glucose when plant grows?
- a) Julius von Sachs
 b) Stephen Hales
 c) Lavoisier
 d) Von Helmont
233. Which of the following is used during discovery of Calvin cycle?
- a) *Spirogyra*
 b) *Volvox*
 c) *Chlamydomonas*
 d) *Chlorella*
234. The movement of electrons in ETC in light reaction is?
- a) Up hill in terms of redox reaction
 b) Down hill in terms of redox reaction
 c) Either (a) or (b)
 d) Both (a) and (b)
235. The wavelength of light absorbed by P_r from of phytochrome is
- a) 640 nm
 b) 680 nm
 c) 720 nm
 d) 620 nm
236. In C₄- plants, the carbon dioxide fixation occurs in
- a) Guard cells
 b) Spongy cells
 c) Palisade cells
 d) Bundle sheath cells
237. What is the name given to the flattened membranous sacs which are embedded in the matrix of the chloroplast?
- a) Thylakoids
 b) Granum
 c) Stroma
 d) Mesophyll cells
238. C₄-plants are more efficient in photosynthesis than C₃ plants due to
- a) Higher leaf area
 b) Presence of larger number of chloroplasts in the leaf cells
 c) Presence of thin cuticle
 d) Lower rate of photorespiration
239. Which of the following is maximum in chloroplast?

- a) RuBP carboxylase b) Hexokinase c) Phosphatase d) Nuclease
240. Photolysis of water releases
 I. electron
 II. proton
 III. oxygen
 Select the correct option
 a) I and II b) II and III c) I and III d) I, II and III
241. Which of the following characteristics out of I, II, III, IV are exhibited by C₄-plant?
 I. Kranz anatomy
 II. Oxaloacetic acid
 III. Large bundle sheath cells
 IV. Found only in desert area
 a) I, II and III b) I, II and IV c) II, III and IV d) III, I and IV
242. In C₄-plants, the bundle sheath cells
 a) Have cells density of chloroplast b) Are rich in PEPcase
 c) Have large number of Rubisco d) Are large sized having transferase
243. The Z scheme of electron transport is
 a) Cyclic photophosphorylation b) Non-cyclic photophosphorylation
 c) Both (a) and (b) d) Where only photosystem pigment-I is involved
244. Photophosphorylation in chloroplast is most similar to the
 a) Mitochondrial substrate level phosphorylation
 b) Mitochondrial oxidative phosphorylation
 c) Mitochondrial hydrolysis of H₂O
 d) All of the above
245. I. Chlorophyll-*a*
 II. Chlorophyll-*b*
 III. Xanthophyll
 IV. Carotenoid
 Separate the given pigments into the accessory and main pigments involved during photosynthesis
Main pigment Accessory Pigment
 a) I II, III, IV b) II, III and IV I
 c) II and III I and IV d) I and IV II and III
246. In photosynthesis, energy from light reaction to dark reaction is transferred in the form of
 a) ADP b) ATP c) RuBP d) chlorophyll
247. RuBisCo performs oxygenase activity at
 a) Low CO₂ concentration b) High CO₂ concentration
 c) High H₂O concentration d) Low H₂O concentration
248. Primary acceptor of CO₂ in C₄-cycle is
 a) PGA b) PEP c) RuBP d) OAA
249. In bundle, sheath cells are the large cells around the
 a) Vascular bundles of C₄-plants b) Vascular bundles C₃-plants
 c) Vascular bundles of C₂-plants d) All of the above
250. Which of the following is the first compound that accepts carbon dioxide during dark phase of photosynthesis?
 a) NADP b) RuBP c) Ferredoxin d) Cytochrome
251. Number of carboxylation occurs in Calvin cycle is
 a) Zero b) One c) Two d) Three
252. Plants adapted to low light intensity have
 a) Larger photosynthetic unit size than the sun plants

- b) Higher rate of carbon dioxide fixation than the sun plants
 c) More extended root system
 d) Leaves modified to spines
253. If green plants are incubated with O^{18} labelled water, which molecule (photosynthesis product) will become radioactive from the given options
 a) O_2 b) H_2O c) CO_2 d) ATP
254. The first action spectrum of photosynthesis was described by Engelman was related to
 a) Algae b) Mint plant c) Bacteria d) Bryophytes
255. To form one molecule of glyceraldehydes phosphate in Calvin cycle
 a) 9 ATP and 36 NADPH are required b) 6 ATP and 6 NADPH are required
 c) 3 ATP and 3 NADPH are required d) 9 ATP and 6 NADPH are required
256. Products of light reaction are ATP and O_2 , of these, B... diffuses out of the chloroplast, while ATP and NADPH are used to derive the process leading to the synthesis of food more accurately, ...C..., What does the blanks A-C refers here?
 a) A-NADP; B- O_2 ; C-lipid b) A-NADPH₂; B- O_2 ; C-amino
 c) A-NAD⁺; B- O_2 ; C-sugars d) A-NADPH + H⁺; B- O_2 ; C-sugars
257. Light compensation point is the point where
 a) Gaseous exchange occurs in photosynthesis
 b) Gaseous exchange do not occur in photosynthesis
 c) Gaseous exchange reduce in photosynthesis
 d) Light intensity become appropriate for photosynthesis
258. During the dark reaction, the acceptor of CO_2 is
 a) NADPH₂ b) RuBP c) H_2O d) CO_2
259. During photorespiration, the oxygen consuming reaction(s) occur in
 a) Stroma of chloroplasts and mitochondria
 b) Stroma of chloroplasts and peroxisomes
 c) Grana of chloroplasts and peroxisomes
 d) Stroma of chloroplasts
260. Which one of the following concerns Photophosphorylation?
 a) $ADP + \text{Inorganic } PO_4 \rightarrow ATP$ b) $AMP + \text{Inorganic } PO_4 \xrightarrow{\text{Light energy}} ATP$
 c) $ADP + AMP \xrightarrow{\text{Light energy}} ATP$ d) $ADP + \text{Inorganic } PO_4 \xrightarrow{\text{Light energy}} ATP$
261. In an experiment, chloroplasts were made acidic by soaking them in acidic solution. What will happen if this chloroplast is transferred to a solution having basic pH?
 a) ATP formation takes place b) No ATP formation takes place
 c) NAD formation takes place d) Sugar formation takes place
262. Choose the correct combination of labeling the carboxydrate molecule involved in the Calvin cycle.



- a) A-RuBP, B-Triose phosphate, C-PGA b) A-PGA, B-RuBP, C-Triose phosphate
 c) A-PGA, B-Triose phosphate, C-RuBP d) A-RuBP, B-PGA, C-Triose phosphate
263. If the light becomes unavailable during photosynthesis then
 a) Immediately biosynthetic process stops
 b) Biosynthetic phase does not stops
 c) Biosynthetic phase stopes forever

- d) Biosynthetic phase continues for some time and then stops
264. I. In photosynthesis, the proton accumulation is towards the inside of membrane of thylakoid
II. In respiration, proton accumulation occurs in the inter membrane space of the mitochondria
Select the correct option
- a) Statement I is incorrect II is correct
b) Statement II is incorrect I is correct
c) Both Statement I and Statement II incorrect
d) Both Statement I and Statement II are correct
265. Chloroplasts without grana are known to occur in
- a) Bundle-sheath cells of C₃-plants
b) Mesophyll cells of C₄-plants
c) Bundle-sheath cells of C₄-plants
d) Mesophyll cells of all plants
266. PGA, the first carbon dioxide fixation product was firstly discovered in
- a) Bryophytes b) Pteridophytes c) Angiosperms d) Alga
267. Liberation of oxygen when green cells in water are exposed to sunlight in presence of suitable acceptor is called
- a) Arnon's reaction b) Emerson's enhance effect
c) Blackman's reaction d) Hill's reaction
268. Fixation of one molecule of CO₂ requires how much (in C₄-plants). ATP and NADPH respectively
- a) 5/2 b) 2/5 c) 2/3 d) 3/2
269. In half leaf experiment, a part of a leaf is enclosed in a test tube containing KOH soaked cotton, while the other half is exposed to air and then setup is placed in light for sometime. It was latter found that part of leaf which was exposed to air tested positive for starch. This indicates that
- a) Light is essential for photosynthesis
b) Oxygen is liberated in photosynthesis
c) Water is essential for photosynthesis because in KOH soaked leaf, starch synthesis do not occurs as water reacts with KOH and it become unavailable for photosynthesis
d) Carbon dioxide is essential for photosynthesis because in KOH soaked leaf, starch synthesis do not occurs as CO₂ is absorbed by, so CO₂ is not available for photosynthesis
270. Is a CAM plant.
- a) Maize b) Pineapple c) Onion d) Pea
271. Every CO₂ molecule entering the Calvin cycle needs
- a) 2 molecule of NADPH and 3 molecule of ATP for its fixation
b) 2 molecule of NADPH and 2 molecule of ATP for its fixation
c) Variable amount of ATP
d) Only NADPH
272. Proton gradient is very important across the membrane because
- a) Building up of proton gradient release energy
b) Building up of proton gradient increase the pH towards lumen side of thylakoid membrane
c) Breakdown of proton gradient release CO₂
d) Breakdown of proton gradient release energy
273. The first acceptor of electrons from an excited chlorophyll molecule of Photo system-II is
- a) Cytochrome b) Iron-sulphur protein
c) Ferredoxin d) Quinine
274. Substance which is essential for the respiration as well as photosynthesis is
- a) Cytochrome b) RuBisCo c) Plastocyanin d) Ubiquinone
275. Which of the following is a 4-carbon compound?

- a) Oxaloacetic acid
c) Ribulose biphosphate
- b) Phosphoglyceric acid
d) Phosphoenol pyruvate
276. A graph that plots the rate at which CO₂ is converted to glucose *versus* the wavelength of light illuminating a leaf is called
a) An absorption spectrum
c) Pigment kinetics
- b) An adsorption spectrum
d) An action spectrum
277. Water stress makes plant leaves ...A... thus, ...B... the surface area of leaves and their metabolic activity as well
Here A and B refer to
a) A-wilt, B-increases
c) A-fall, B-decreases
- b) A-wilt, B-decreases
d) A-fall, B-increases
278. Which plant performs photosynthesis even after the closing of stomata?
a) C₂
c) C₄
- b) C₃
d) C₅
279. During photorespiration, the conversion of phosphoglycolate to glycolate takes place in this cell organelle.
a) Mitochondria
c) Peroxisome
- b) Glyoxysome
d) Chloroplast
280. The chemical formula of starch is
a) (C₆H₁₀O₅)_n
c) C₁₂H₂₂O₁₁
- b) (C₆H₁₂O₆)_n
d) CH₃COOH
281. Emerson effect explain the phenomenon of
a) Transpiration
c) Photosynthesis
- b) Absorption of water by roots
d) Respiration
282. Which fractions of the visible spectrum of solar radiations are primarily absorbed by carotenoids of the higher plants?
a) Red and violet
c) Blue and green
- b) Violet and blue
d) Green and red
283. Photosynthesis in C₄-plants is relatively less limited by atmospheric carbon dioxide levels because
a) Four carbon acids are the initial carbon dioxide acceptors
c) Effective pumping of CO₂ into bundle sheath cells
- b) The primary fixation of carbon dioxide is mediated via PEP carboxylase
d) Rubisco in C₄- plants has higher affinity for CO₂
284. CAM-plant among the following is
a) Maize
c) Sugarcane
- b) *Kalanchoe*
d) Wheat
285. Identify the 5-C compound from the given option
a) RuBP
c) 3PGA
- b) OAA
d) NADPH₂
286. The functions of chloroplast of membrane system is
a) Trapping of light energy
c) Synthesis of NADPH
- b) Synthesis of ATP
d) All of these
287. Photophosphorylation differs from oxidative phosphorylation in requiring input of energy in the form of
a) Light
c) AMP
- b) Heat
d) NAD
288. Cyclic phosphorylation occurs at which wavelength
a) Wavelength beyond 800 nm
c) Wavelength below 680 nm
- b) Wavelength beyond 680 nm
d) Wavelength below 500 nm
289. If there is mutation in cytochrome system then this will
a) Inhibit the movement of electrons from PS-II to PS-I
c) Inhibit the photolysis of water
- b) Inhibit the movement of electrons from PS-I to PS-II
d) Promote ATP formation
290. Photosynthesis is correctly explained by the equation
a) 6CO₂ + 12H₂O → C₆H₁₂O₆ + 6O₂ + 6H₂O
c) 6CO₂ + 6H₂O → C₆H₁₂O₆ + 6O₂
- b) 6CO₂ + 6H₂O → C₆H₁₂O₆ + 6O₂ + 6H₂O
d) 2CO₂ + 12H₂O → C₆H₁₂O₆ + 2CO₂
291. Which of the following elements are essential for the photolysis of water?
a) Ca and Cl
c) Zn and I
- b) Mn and Cl
d) Cu and Fe
292. The electrons in the reaction centre of PS-I are

- a) Excited simultaneous with PS-II
c) Excited simultaneously with P₇₀₀
293. In plants, glycolate metabolism takes place in
a) Low concentration of carbon dioxide
c) Low concentration of oxygen
294. Chloroplast align themselves in the mesophyll cell in such away that their flat surface are
a) Antiparallel to the cell wall
c) Parallel to the cell wall
295. How many molecules of RuBP are required to produce 20 molecules of serine in photorespiration?
a) 20 b) 40 c) 60 d) 80
296. With reference to three Calvin cycles, which of the given options is correct for the following question?
I. How many gross PGAL molecules are produces?
II. Total, how many ATP molecules are required for synthesis of PGAL molecules?
III. Total, how many NADPH₂ molecules are required for the synthesis of obtained PGAL molecules?
a) I-3PGAL, II-3 ATP, III-3 NADPH₂
c) I-18 PGAL, II-18 ATP, III-18 NADPH₂
297. Which of the following statements regarding C₄-plants is false?
a) The primary CO₂ acceptor is a 5-carbon molecule
b) The initial carboxylation reaction occurs in Mesophyll
c) The leaves that fix CO₂ have two cell types
d) The Mesophyll cells lack Rubisco enzyme
298. CAM pathway is observed in
a) Pineapple b) Maize c) Sunflower d) Sugarcane
299. Scientist believed that since the first product was ...A... acid, the primary acceptor would be ...B... carbon compound; they spent many years trying to identify a 2-carbon compound before they discovered ...C... carbon compound (RuBP).
Complete the given statement with the correct combination of options
a) A-C₃; B-2, C-5 b) A-C₃; B-5, C-2 c) A-C₄; B-5, C-2 d) A-C₄; B-2, A-5
300. I. Photosystem-I is a photosynthetic pigment system located on the appressed part of grana and thylakoids
II. Photosystem-II is a photosynthesis pigment located on the non-appressed part of stroma only
Identify wheather the given statements are correct or incorrect and choose the correct accordingly
a) Statement I is correct, while II is incorrect
c) Both statements are correct
301. Biosynthetic phase is called as dark reaction because
a) It depends on the light reaction
c) It does not depends on NADPH
302. What percentage of solar radiation that hits the earth's atmosphere ever reaches the surface?
a) 92% b) 2% c) 42% d) 22%
303. CO₂ released in bundle sheath is used in the
a) C₄-cycle
c) Respiration
304. Photophosphorylation is the
a) Formation of ADP in the presence of light
b) Formation of ATP in the presence of chemicals
c) Formation of ATP in the presence of light
d) Formation of ATP in the presence of reducing agents
305. During photosynthesis,
a) Oxygen evolved comes from carbon dioxide
b) ATP is formed

- c) ATP is not formed
d) Water is required as medium but it does not take part in photosynthesis
306. Cytochrome oxidase is a/an
a) Exoenzyme b) Endoenzyme c) Proenzyme d) Coenzyme
307. Electrons are transferred by splitting of H_2O through ETC during light reaction and reduces
a) NAD to $NADH + H^+$ b) $NADPH$ to H^+
c) $NADP^+$ to $NADPH + H^+$ d) NAD to $NADPH + H^+$
308. Cytochrome oxidase contain
a) Fe b) Mg c) Zn d) Cu
309. Basic features of Kranz anatomy of C_4 -plant is presence of
a) Chloroplast in bundle sheath cells b) Chloroplast in Mesophyll and epidermal cells
c) Typical granal chloroplasts in bundle sheath cells and rudimentary chloroplasts in mesophyll cells d) Rudimentary chloroplasts in bundle sheath cells and typical granal chloroplasts in mesophyll cells
310. The first product of CO_2 fixation in C_4 pathway is
a) Acetic acid b) RuBP c) PGA d) Inorganic acid
311. Photochemical reactions in the chloroplasts are directly involved in
a) Fixation of carbon dioxide
b) Synthesis of glucose and starch
c) Formation of phosphoglyceric acid
d) Photolysis of water and phosphorylation of ATP to ATP
312. Which crop utilizes solar energy most efficiently?
a) Potato b) Sugarcane c) Wheat d) Rice
313. I. CO_2 is assimilated into sugars
II. RUBP is regenerated
III. ATP and NADPH are formed
Select the correct option in context to Calvin cycle
a) I and II b) II and III c) I and III d) I, II and III
314. Majority of energy carrier molecules are oxidised or reduced in the
a) Nucleus b) Mitochondria and chloroplast
c) Nucleus d) Golgi body
315. The water splitting complex is associated with
a) PS-I b) PS-II c) Carotenoid d) Xanthophyll
316. Photosystem I (PS-I) and Photosystem-II (PS-II) are named
a) In the sequence they work in light reaction b) According to their molecular weight
c) In the sequence of their discovery d) In the sequence of their constituents
317. Asymmetric labeling of glucose phosphate formed in photosynthesis is called
a) Warburg's effect b) Pasteur's effect c) Gibb's effect d) Dicken's effect
318. Protons produced by the splitting of water in light reaction of photosynthesis accumulates within the reaction of photosynthesis accumulates within the
a) Lumen of thylakoids b) Intermembrane of chloroplast
c) Stroma of chloroplast d) Outside the lumen of thylakoids
319. The molecule present in the reaction centre of photosystem is
a) Chlorophyll-*a* b) Chlorophyll-*b* c) Chlorophyll-*c* d) Chlorophyll-*d*
320. Photorespiration is the light dependent reaction in which utilisation of
a) Oxygen and release of H_2O takes place b) Oxygen and release of H^+ takes place
c) Oxygen and release of CO_2 takes place d) Oxygen and release of ATP takes place
321. Which photosynthetic pigment is called universal photosynthesis pigments?
a) Chlorophyll-*a* b) Chlorophyll-*b* c) Chlorophyll-*c* d) Chlorophyll-*d*
322. I. PS-I has more chlorophyll-*a* than chlorophyll-*b*

II. PS-II has more chlorophyll-*b* than chlorophyll-*a*

Choose the correct option

- a) I statement is wrong, II is right
 b) II statement is wrong, I is right
 c) Bot statements are wrong
 d) Both statements are right
323. Photosynthesis is a
 a) Physico-chemical process
 b) Physical process
 c) Chemical process
 d) Constructive process
324. The C₄-plants are photosynthetically more efficient than C₃-plants because
 a) The carbon dioxide compensation point is more
 b) Carbon dioxide generated during photorespiration is trapped and recycled through PEP carboxylase
 c) The carbon dioxide efflux is not prevented
 d) They have more chloroplasts
325. We are created by chloroplast. This statement suggest the idea
 a) All the life form possesses chloroplast
 b) All the life form depend on photosynthesis
 c) All the life form is plant
 d) Plants are the first organism on earth
326. Which of the following characteristics out of A, B and C are exhibited by C₄-plants?
 V. Kranz anatomy
 VI. The product of photosynthesis is oxaloacetic acid
 VII. Both PEP carboxylase and ribulose-bisphosphate carboxylase act as carboxylating enzymes.
 a) Only A and B, but not C
 b) Only B and C, but not A
 c) Only A and C, but not B
 d) All A, B and C
327. Hexose monophosphate pathway takes place in
 a) Endoplasmic reticulum
 b) Cristae
 c) Cytoplasm
 d) Mitochondrial matrix
328. The energy required to hydrolyse water during photosynthesis comes from
 a) Reduced chlorophyll
 b) Proton gradient
 c) Oxidised chlorophyll
 d) ATP
329. Chloroplast dimorphism is a characteristic feature of
 a) Plants with Calvin cycle
 b) C₄-plants
 c) All plants
 d) Only in algae
330. The trapping centre of light energy in photosystem-I is
 a) P₆₆₀
 b) P₇₀₀
 c) P₆₈₀
 d) P₆₃₀
331. ATP and NADPH produced in light reaction by the movement of electrons in ETC are used immediatly for
 a) Oxidation of carbohydrate
 b) Synthesis of sugar
 c) Reduction of carbon dioxide
 d) Both (b) and (c)
332. Electrons which gets excited in PS-I must replaced. These replacement ultimately come from
 a) ATP
 b) H₂O
 c) PS-II
 d) NAD
333. Select the correct pathway for electron transport during photosynthesis
 a) CO₂ → RUBP → Glucose- ATP
 b) H₂O → PS-I → PS-II → NADPH → H⁺
 c) H₂O → PS-II → PS-I → NADPH → H⁺
 d) H₂O → PS-II → PS-I → ATP
334. Photorespiration in C₃-plants starts from
 a) Phosphoglycerate
 b) Phosphoglycolate
 c) Glycerate
 d) Glycine
335. Photosynthesis is
 I. Endergonic process
 II. Exergonic process
 III. Chemical process

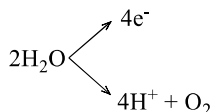
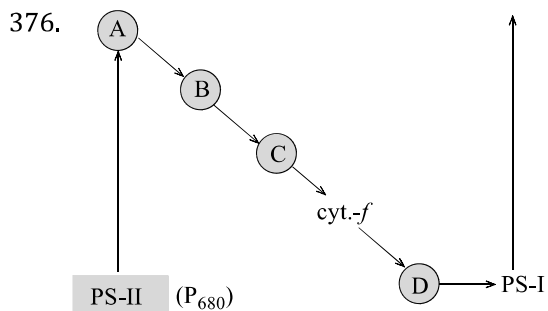
IV. Physical process

Select the correct option

- a) II, III and IV b) I, III and IV c) I, II and IV d) I, II and III
336. Compensation point refers to
a) Little photosynthesis b) Beginning of photosynthesis
c) Rate of photosynthesis equals to the rate of respiration d) None of the above
337. In Z-scheme of light reaction the, participating pigment system are
I. PS-I II. PS-II III. PS-III
IV. Carotenoid and xanthophyll
Choose the correct option
a) I and II b) I, II and III c) I, III and IV d) II and III and IV
338. Function/s of accessory pigments is/are
I. They enable wider range of wavelength of incoming light for photosynthesis
II. They absorb light and transfer the energy to chlorophyll-*a*
III. They protect reaction centre from photo-oxidation
Select the correct option
a) I and II b) II and III c) Only I d) I, II and III
339. In CAM-plants, carbon dioxide required for photosynthesis enters the plant body during
a) Day time through the lenticels
b) Night through the stomata, which are kept open
c) Day time when the stomata are open
d) Night when the hydathodes are open
340. Water is
a) Produced in dark reaction b) A reactant in light reaction
c) Both (a) and (b) d) Involve nowhere in photosynthesis
341. In C_3 plant, when O_2 concentration is more, the O_2 binds to Rubisco and RuBP gets changed to
a) 2 molecules of PGA
b) 2 molecules of phosphoglycerate
c) 2 molecules of phosphoglycolate
d) One molecule each of phosphoglycerate and phosphoglycolate
342. Within the chloroplast, the chlorophyll pigments are organized in the form of
a) PS-I b) PS-II c) PS-III d) Both (a) and (b)
343. Conversion of pyruvate into PEP takes place in
a) Mesophyll cell cytoplasm b) Mesophyll cell chloroplast
c) Bundle sheath cell chloroplast d) Bundle sheath cell cytoplasm
344. What is the function performed by plant pigments?
a) Absorb CO_2 b) Absorb O_2 c) Absorb H_2O d) Absorb light
345. A reduction in the quantity of oxygen evolution during photosynthesis may be observed at
a) Light having wavelength more than 680 nm
b) Light having wavelength less than 680 nm
c) Light having wavelength 560 nm
d) Light having wavelength less than 360 nm
346. Organelles associated with photorespiration are
a) Chloroplast, mitochondria, peroxisome
b) Chloroplast, mitochondria, lysosome
c) Mitochondria, peroxisome, centrosome
d) Nucleus, centrosome, peroxisome
347. Stroma in the chloroplasts of higher plants contain

- a) Light-independent reaction enzymes b) Light-dependent reaction enzymes
c) Ribosomes d) Chlorophyll
348. The concentration of CO₂ in atmosphere is between
a) 0.03-0.04% b) 300-400 ppm c) 400-600 ppm d) Either (a) or (b)
349. Red light favours the ...A... accumulation. Blue light favours the ...B... accumulation
Here A and B refer to
a) A-Starch; B-lipid b) A-lipid; B-starch
c) A-carbohydrate; B-cholesterol d) A-carbohydrate; B-protein
350. Maximum number of chloroplast are found in
a) Root b) Stem c) Leaves d) Short tip
351. The net requirement of assimilatory power for the formation of 6 hexose molecules in maize plant is
a) 72 ATP, 48 NADPH
b) 90 ATP, 60 NADPH
c) 108 ATP, 72 NADPH
d) 180 ATP, 72 NADPH
352. In C₃ plants, the first stable product of photosynthesis during dark reaction is
a) PGAL b) RuBP c) PGA d) OAA
353. The form of pigment which promotes germination is
a) P₇₆₀ b) P₇₃₀ c) P₆₅₀ d) All of these
354. Who proved that oxygen evolved in photosynthesis comes from water?
a) Calvin b) Mayer
c) Blackman d) Ruben, Hassid and Kamen
355. Compensation point refers to
a) Rate of photosynthesis = Rate of respiration
b) Rate of photosynthesis = Rate of H₂O splitting
c) Rate of photosynthesis = PGA formation
d) Rate of photosynthesis = RuBP formation
356. Living organisms have the capability of extracting energy from
a) Reducible substances b) Oxidising substances
c) ADP d) AMP
357. What happens to C₄ acid in the bundle sheath cells?
a) Aspartic acid is deaminated b) Malic acid decarboxylated
c) Either (a) or (b) d) Both (a) and (b)
358. Porphyrin is made up of how many pyrrole ring?
a) One b) Two c) Three d) Four
359. In photorespiration, which is light induced cyclic oxidation of photosynthetic intermediates with the help of oxygen, the substrate is
a) Glycolate b) Glucose c) Pyruvic acid d) Acetyl Co-A
360. Non-cyclic phosphorylation occurs in
I. stroma lamellae
II. grana lamellae
III. chloroplast membrane
Select the correct option
a) Only I b) II and III c) I and III d) Only II
361. Sugarcane show high efficiency of carbon dioxide fixation because of
a) Calvin cycle b) Hatch and Slack cycle c) TCA cycle d) Greater sunlight
362. Carboxylation (C₃-cycle) is the fixation of CO₂ into
a) Amino acid b) Cholesterol ring c) Proteins d) Organic intermediate
363. Malic acid or aspartic acid and oxaloacetic acid both are found in

- a) Mesophyll cell
c) Bundle sheath cell wall
- b) Bundle sheath cell
d) Mesophyll cell wall
364. Photorespiration could easily be detected in
a) C₃-plants b) C₄-plants c) Both (a) and (b) d) None of these
365. Maximum CO₂ fixation is done by
a) Green plants b) Phytoplanktons c) Zooplanktons d) Bacteria
366. Grana is ill developed or absent in the chloroplast in the
a) Stem of *Hydrilla* b) Leaf of sunflower
c) Bundle sheath of sugarcane leaf d) Mesophyll of grasses
367. Aldolase enzyme is present in
a) Mitochondria b) Chloroplast
c) Lysosomes d) Endoplasmic reticulum
368. Photosynthetic enhancement with flashing light was first observed by
a) Benson and Calvin b) Hill and Calvin
c) Hatch and Slack d) Emerson and Arnold
369. In C₃ cycle for the fixation of every CO₂ molecules, the reduction and regeneration steps required
a) 3 ATP and 2 NADPH₂ b) 2 ATP and 2 NADPH₂ c) 2 ATP and 3 NADPH₂ d) 3 ATP and 3 NADPH₂
370. Synthesis of one molecule of glucose requires
a) 6CO₂, 18 ATP and 12 NADPH b) 6CO₂, 12 ATP and 18 NADPH
c) 6CO₂, 30 ATP and 12 NADPH d) 6CO₂, 38 ATP and 12 NADPH
371. Main biosynthetic pathway for CO₂ fixation in C₄-plant is
a) C₄ pathway b) C₃ pathway c) C₂ pathway d) Both (a) and (b)
372. I. In biosynthetic phase (C₃-cycle), enzymes are present in the matrix of Golgi body
II. C₃ and C₄-cycle are two parts of biosynthetic phase of photosynthesis in C₃-plants
Identify whether the given statement are correct or incorrect and choose the option accordingly
a) Both I and II are correct b) Both I and II are incorrect
c) I is correct, II is incorrect d) II is correct, I is incorrect
373. Wavelength of visible light/PAR is
a) 200-400 nm b) 700-900 nm c) 400-700 nm d) 100-200 nm
374. In Hatch and Slack pathway,
a) Chloroplasts are of same type
b) Kranz anatomy occurs where mesophyll have small chloroplasts whereas bundle sheath have granal chloroplasts
c) Kranz anatomy occurs where mesophyll have small chloroplasts whereas bundle sheath have larger agranal chloroplasts
d) Kranz anatomy where mesophyll cells are diffused
375. Photorespiration takes place only in
a) Lysosomes of plant cell b) Green parts of the plant
c) Mitochondria of plant cell d) None of the above



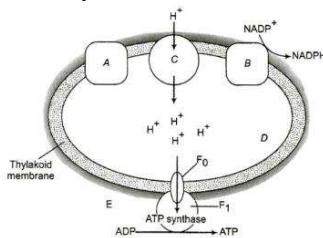
In the above schematic diagram, which is plastocyanin?

- a) C b) D c) A d) B
377. Photochemical reactions in the chloroplast are directly involved in
 a) Photolysis of water and formation of ATP b) Formation of PGA
 c) Synthesis of starch and lipid d) Fixation of PEP
378. During non-cycle photophosphorylation, in which of the following $4e^-$ produced through photolysis will enter?
 a) PS-II b) PC c) PQ d) PS-I
379. Most abundant protein of biological world is
 a) Rubisco b) Ligase c) Permease d) RuBP
380. Core of chlorophyll is formed by
 a) Iron b) Manganese c) Methyl group d) Magnesium
381. Ammonia release from
 a) Photorespiration b) Dark respiration c) CAM d) All of these
382. Accessory pigments absorb light and transfer it to
 a) Chlorophyll-*b* b) Chlorophyll-*a* c) Xanthophyll d) Carotenoids
383. Formation of ATP in mitochondria is called
 a) Mitochondria b) Hydrolysis
 c) Oxidative phosphorylation d) Photophosphorylation
384. Raphides are crystals of
 a) Calcium carbonate b) Calcium oxalate
 c) Magnesium carbonate d) Magnesium oxalate
385. Nucleus/core of the chlorophyll contains
 a) Fe b) Mn c) Mg d) CH_3
386. $(\text{C}_5\text{H}_{10}\text{O}_5)_n$ is the formula of
 a) Protein b) Fat c) Lipid d) Carbohydrate
387. C_4 - plants differ from C_3 -plants in respect to
 a) Number of CO_2 molecules used
 b) Substrate, which accept the CO_2 molecules
 c) The final product
 d) Number of ATP formed
388. ATP synthesis is linked to
 a) Development of pressure gradient across membrane
 b) Development of osmotic gradient across membrane
 c) Development of proton gradient across membrane
 d) Development of electron gradient across membrane

389. Which of the following is formed during photorespiration?
 a) Sugar b) Phosphoglycolate c) NADPH d) ATP
390. Photosynthesis is maximum in
 a) Green light b) Blue followed by red light
 c) Red followed by blue light d) Blue light
391. Large number of chloroplast are present in which of the following cells?
 a) Parenchymatous cell b) Mesophyll cell c) Peroxisomal cell d) Cell wall
392. What is common between chloroplasts, chromoplasts and leucoplasts?
 a) Presence of pigments
 b) Possession of thylakoids and grana
 c) Storage of starch, proteins and lipids
 d) Ability to multiply by a fission-like process
393. Which of the following is true for photosynthesis?
 a) Reduction of CO₂ and water b) Oxidation of CO₂ and water
 c) Reduction of CO₂ and oxidation of water d) Oxidation of CO₂ and reduction of water
394. RuBisCo is found in
 a) Cytoplasm b) Nucleus c) Mitochondria d) Chloroplast
395. In C₄-plants the bundle sheath cells
 a) Have thin walls to facilitate gaseous exchange
 b) Have large intercellular spaces
 c) Are rich in PEP carboxylase
 d) Have a high density of chloroplasts
396. Find out the reason that creates an important difference between C₃ and C₄-plant
 a) Photorespiration b) Calvin cycle c) Glycolysis d) Pressure of cuticle
397. ATPase has
 a) Channel that allows H⁺ diffusion b) Has channel that allows electron diffusion
 c) Channel that allows diffusion O₂ molecule diffusion d) Channel that allows CO₂ molecule
398. In dark reaction, regeneration of RuBP needs
 a) 2 molecule of ATP b) 1 molecule of ATP c) 3 molecule of ATP d) 4 molecule of ATP
399. Rubisco has the active site that binds to
 a) CO₂ b) O₂ c) Either (a) or (b) d) NO₂
400. $\text{RuBP} + \text{CO}_2 \xrightarrow{\text{Rubisco}} x$. In the given Identify x in the given
 a) 2×2 PGA b) 2×3 PGA c) 2×4 PGA d) 2×1 PGA
401. I. Cyclic photophosphorylation needs PS-I and PS-II
 II. Cyclic photophosphorylation produced NADPH + H⁺ and ATP
 III. Cyclic photophosphorylation involves H₂O
 IV. Electrons are recycled in cyclic photophosphorylation
 Identify the correct and incorrect statement and select the option accordingly
 a) I, II and III are incorrect, IV in correct b) I, II and IV are incorrect, III is correct
 c) I, II and III are incorrect, II in correct d) IV, III and II are incorrect, I in correct
402. Which statement about photosynthesis is false?
 a) The electron carriers involved in photophosphorylation are located on the thylakoid membranes
 b) Photosynthesis is a redox process, in which water is oxidized and carbon dioxide is reduced
 c) The enzymes required for carbon fixation are located only in the grana of chloroplasts
 d) In green plants, both PS-I and PS-II are required for the formation of NADPH + H⁺
403. The C₄-plants are different from the C₃-plants with reference to the
 a) Types of pigments involved in photosynthesis b) The number of NADPH that are consumed in

- c) Types of end product of photosynthesis
404. Identify the incorrect statement with respect to Calvin cycle.
- a) The carboxylation of RuBP is catalysed by Rubisco
- c) 18 molecules of ATP molecules of ATP are synthesized during carbon fixation
405. NADP reductase enzyme is present on the
- a) Lumen side of membrane
- c) Stroma side of membrane
406. Cyclic photophosphorylation links to
- a) PS-II
- b) PS-I
- c) Dark reaction
- d) Both (a) and (b)
407. In photorespiration, what is the role of peroxisome?
- a) Helps in oxidation of glycolate
- b) Helps in oxygenation of glycolate
- c) Helps in synthesis of PGA
- d) Helps in reduction of glyoxylate
408. Calvin cycle can be described under three stages. These stages are
- I. carboxylation
- II. ligation
- III. reduction
- IV. regeneration
- Select the correct option
- a) II, III and IV
- b) I, III and IV
- c) I, II and IV
- d) I, II and III
409. In which of the following wavelengths, photosystem-I is inactive?
- a) 780 nm
- b) 680 nm
- c) 690 nm
- d) 550 nm
410. Bacterial photosynthesis involves
- a) Both PS-I and PS-II
- b) Either PS-I or PS-II
- c) PS-I only
- d) PS-II only
411. The first carbon dioxide acceptor in C_4 cycle is
- a) RuBP
- b) PEP
- c) PGA
- d) OAA
412. In photo system-I, the first electron acceptor is
- a) Ferredoxin
- b) Cytochrome
- c) Plastocyanin
- d) An iron-sulphur protein
413. Fixation of six molecules of CO_2 needs
- a) 5 turns of Calvin cycle
- b) 6 turns of Calvin cycle
- c) 3 turns of Calvin cycle
- d) 2 turns of Calvin cycle
414. Energy is ...A... to pump protons across a membrane, to create a gradient or high concentration of protons within the thylakoid ...B... ATPase has a channel that allows diffusion of protons back across the membrane. This releases enough energy to activate ...C... enzyme that catalyses the formation of ATP. Complete the given NCERT statement by filling appropriate option in the given blanks
- a) A-released, B-lumen, C-ligase
- b) A-used, B-lumen, C-ligase
- c) A-used, B-lumen, C-ATPase
- d) A-released, B-lumen, C-ATPase
415. Photosynthesis and respiration are similar because
- I. in eukaryotes, both processes occur in specialised organelles
- II. ATP synthesis in both is explained by chemiosmotic theory
- III. both use ETC
- Select the correct option
- a) I and II
- b) II and III
- c) I and III
- d) I, II and III
416. Which one does not occur in cyclic photophosphorylation?
- a) Oxygen is not given off
- b) Water is not consumed
- c) Only photosystem-I is involved
- d) $NADPH_2$ formation

417. Quantum yield of photosynthesis is
 a) 33 % b) 9 % c) 12 % d) 8 %
418. A plant with low carbon dioxide compensation point is
 a) *Atriplex patula* b) *Leucopoa kingii*
 c) *Gossypium hirsutum* d) *Tidestromia oblongifolia*
419. Select the wrongly matched pair with regard to C₄ cycle.
 a) Primary CO₂ fixation-PGA product
 b) Site of initial-Mesophyll cells carboxylation
 c) Primary CO₂ acceptor-PEP
 d) C₄ plant-Maize
420. ATP synthesised by cells in
 I. chloroplast II. Mitochondria
 III. Golgi body
 Select the correct option
 a) I and III b) I and II c) II and III d) I, II and III
421. In which cells of leaf, pyruvate is converted to PEP in C₄ pathway?
 a) Epidermal cells b) Mesophyll cells
 c) Bundle sheath cells d) Guard cells
422. Identify A, B, C, D and E from the given figure and choose the correct option accordingly



- a) A-PS-I, B-PS-II, C-cytochrome-*b* and *c*, D-Lumen stroma, E-Stroma
 b) A-PS-I, B-PS-II, C-cytochrome-*b* and *c*, D- Stroma, E- Lumen
 c) A-PS-II, B-PS-I, C-cytochrome-*b* and *c*, D-Stroma, E- Lumen
 d) A-PS-II, B-PS-I, C-cytochrome-*b* and *c*, D- Lumen, E-Stroma
423. 3-PGA is first stable product in
 a) Carbon-reduction cycle b) Photorespiration
 c) Light reaction d) All of these