



BIOLOGY

BOOKS - MBD BIOLOGY (ODIA ENGLISH)

PHOTOSYNTHESIS

Question Bank

1. Photosynthesis is maximum in:

A. Green light

B. Blue followed by red light

C. (b) Red followed-by blue light

D. Blue light

Answer: C



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2. DCMU

A. Inhibits PS-I

B. Inhibits PS-II

C. Destroy chloroplast

D. Inhibits oxidative phosphorylation

Answer: B



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3. Synthesis of food in C_4 pathway occurs in chlorophyll of:

A. Guard cells

B. Bundle sheath

C. Spongy mesophyll

D. Palisade cells

Answer: B



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4. Liberation of O_2 when green cells in water are exposed to sunlight in the presence of suitable acceptor is called

A. Arnon's reaction

B. Emerson's enhance effect

C. Blackman's reaction

D. Hill's reaction

Answer: D



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5. The first acceptor of electrons from an excited chlorophyll molecule of photosystem-II is:

A. Iron-sulphur protein

B. Ferredoxin

C. Quinone

D. Cytochrome

Answer: C



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6. In the leaves of C₄ plants, malic acid formation during CO₂ fixation occurs in the cells of:

A. Bundle sheath

B. Phloem

C. Epidermis

D. Meosphyll

Answer: D



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7. Photorespiration is seen in:

A. Chloroplast, peroxisome, and ribosome

B. Photosynthetic cell

C. Non-photosynthetic cell

D. Both(a) and(b)

Answer: A



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8. In photosynthesis, splitting of water takes place during

A. Cyclic photophosphorylation

B. Oxidative phosphorylation

C. Non-cyclic photophosphorylation

D. Calvin cycle

Answer: C



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9. The light_ dependent and O_2 independent production of ATP is called:

A. Photorespiration

B. Oxidative phosphorylation

C. Photophosphorylation

D. Photo-oxidation

Answer: C



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10. C_4 cycle takes place in:

A. Rice

B. Sugarcane

C. Wheat

D. Cotton

Answer: B



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11. Electrons from excited chlorophyll molecule of photosystem-II are accepted first by :

A. Quinone

B. Ferredoxin

C. Cytochrome-b

D. Cytochrome-f

Answer: A



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12. In the leaves of C₄ plants, malic acid formation during CO₂ fixation occurs in the cells of:

A. Bundle sheath

B. Guard cells

C. Epidermal cells

D. Mesophyll cells

Answer: D



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13. The C_4 plants are photosynthetically more efficient than C_3 plants because :

A. The CO_2 efflux is not prevented

B. They have more chloroplasts

C. The CO_2 compensation point is more

D. CO_2 generated during photorespiration

is

Answer: B



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14. HSK pathway is also called as:

A. C_2 cycle

B. C_3 cycle

C. C_4 cycle

D. None of these

Answer: C



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15. Site of gluconeogenesis is:

A. Mitochondria

B. Golgi bodies

C. glyoxysomes

D. none of these

Answer: C



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16. 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 O_2

Answer: A



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17. 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

Answer: D



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18. The first carbon fixation in C_4 pathway occurs in chloroplasts of :

- A. guard cells
- B. Mesophyll cells
- C. Bundle sheath cells
- D. Epidermal cells

Answer: B



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19. Starting point of Calvin cycle is:

A. Ribusole monophosphate

B. Ribusole biophosphate

C. 3-phosphoglyceric acid

D. Oxalo-acetic acid

Answer: B



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20. Stroma in the chloroplasts of higher plant contains:

A. Light-dependent reaction enzymes

B. Ribosomes

C. Chlorophyll

D. Light-independent reaction enzymes

Answer: D



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21. Primary CO_2 acceptor of CAM plant:

A. OAA

B. PGA

C. PEP and RuBP

D. Citric acid

Answer: C



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22. Kranz anatomy is observed in:

A. C_2 plants

B. c_3 plants

C. c_4 plants

D. CAM plants

Answer: C



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23. The fixation and reduction of CO_2 occur in presence of

A. ATP

B. ATP AND NADPH

C. NADPH chlorophyll and water

D. ATP, NADPH and LIGHT

Answer: B



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24. Cyclic photophosphorylation results in the formation of:

A. ATP and NADPH

B. ATP NADPH and O_2

C. ATP

D. NADPH

Answer: C



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25. Which of the following is wrongly matched

?

A. Sorghum - Kranz anatomy

B. PEP carboxylase - mesophyll cells

C. PSII - P700

D. Photorespiration - C_3 plants

Answer:



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26. The loss of water in C_4 plants compared to C_3 plants for the same amount of CO_2 fixed is:

A. Half

B. One third

C. One-fourth

D. Double

Answer: B



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27. The substrate for photorespiration is:

A. Pyruvic acid

B. Acetylcoenzyme-A

C. Glycolate

D. Glucose

Answer: C



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28. The rate of photosynthesis is higher in:

A. Very high light

B. Continuous light

C. Red light

D. Green light

Answer: C



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29. Chloroplast dimorphism is a characteristic feature of:

A. Plants with Calvin cycle

B. C_4 plants

C. ALL plants

D. Only In algae

Answer: B



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30. For every CO_2 molecule entering the calvin cycle the number of ATP and NADPH required is:

A. $2ATP+2NADPH$

B. $2\text{ATP}+3\text{NADPH}$

C. $3\text{ATP}+2\text{NADPH}$

D. $3\text{ATP}+3\text{NADPH}$

Answer: C



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31. Kranz anatomy is one of the characteristics of the leaves of:

A. Potato

B. wheat

C. Sugarcane

D. Mustard

Answer: C



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32. One molecule of glucose in Calvin cycle is formed from:

A. $6CO_2 + 12ATP$

B. $6CO_2 + 30ATP + 12NADPH$

C. $6CO_2 + 18ATP + 12NADPH$

D. $6CO_2 + 18ATP + 30NADPH$

Answer: C



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33. CAM helps the plants in:

A. Conserving water

B. Secondary growth

C. Disease resistance

D. Reproduction

Answer: A



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34. CAM pathway is observed in:

A. Pineapple

B. Maize

C. Sunflower

D. Sugarcane

Answer: A



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35. Which of the following is correct for cyclic photophosphorylation?

A. Only PS-I is involved

B. PS-I and PS-II are involved

C. Release of electron from P_{680}

D. Evolution of O_2

Answer: A



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36. Photosynthetically active radiation (PAR) represents which of the following range of wavelength ?

A. 500-600nm

B. 450-950nm

C. 340-450 nm

D. 400-700nm

Answer: D



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37. Which elements are essential for the photophosphorylation ?

A. Mg and P

B. Zn and I

C. K and Cl

D. Mn and Cl

Answer: D



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38. A process that makes an important difference between C_3 and C_4 plants is,

A. Transpiration

B. Glycolysis

C. Photosynthesis

D. Photorespiration

Answer: D



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39. Best defined function of manganese in green plants is,

A. Photolysis of water

B. Clavin cycle

C. Nitrogen fixation

D. Water absorption

Answer: A



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40. Photorespiration shows formation of:

A. Sugar but not ATP

B. ATP but not sugar

C. Both ATP and sugar

D. Neither ATP nor sugar

Answer: D



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41. Photo-oxidation of water results in the formation of:

A. H^+ , O and ATP

B. H^+ , O_2 , e^- and ATP

C. H^+ , O_2 and e^-

D. none of these

Answer: C



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42. Stomata open at night in:

A. Hydrophytes

B. succulents

C. Mesophytes

D. Halophytes

Answer: B



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43. In C_3 plants first CO_2 acceptor enzyme is:

A. OAA

B. RuBP

C. RuBP carboxylase

D. 3-PGA

Answer: A



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44. The curve showing the rate of photosynthesis at different wavelengths of light is:

A. Absorption spectrum

B. Action spectrum

C. Photo-action

D. Photorespiration

Answer: B



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45. Which is not a step in dark reaction?

A. Carboxylation

B. Reduction

C. Oxidation

D. Regeneration

Answer: C



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46. In case of C_4 pathway primary acceptor CO_2 is

A. RuBP

B. PGA

C. RuDP

D. PEP

Answer: D



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47. The site of light reaction is:

A. Stroma

B. Granum

C. Stroma lamella

D. Unit membrane

Answer: B



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48. Which of the following is an essential part of photosynthesis?

A. Photolysis of water

B. Plasmolysis

C. Glycolysis

D. Photorespiration

Answer: A



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49. In C_4 plants CO_2 is accepted by:

A. Pyruvate to form oxaloacetate

B. Pyruvate to form malate

C. Phosphoenol pyruvate to form
oxaloacetate

D. Oxaloacetate to form malate

Answer: C



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50. The source of oxygen liberated during photosynthesis is:

A. CO_2

B. H_2O

C. O_2

D. Photosynthate

Answer: B



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51. For each molecule of glucose formed in plants during photosynthesis, the number of molecules of ATP and NADPH_2 required are respectively:

A. 18 and 12

B. 12 and 18

C. 24 and 36

D. 12 and 24

Answer: A



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52. Rubisco is an enzyme for:

A. CO fixation in dark reaction

B. Photorespiration

C. Regeneration of RUBP

D. Photolysis water

Answer: A



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53. Non-cyclic photophosphorylation during photosynthesis produces:

A. NADPH

B. NADP

C. NADH

D. NAD

Answer: A



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54. The central atom in the porphyrin like ring of chlorophyll is:

A. Iron

B. Manganese

C. Magnesium

D. Molybdenum

Answer: C



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55. In C_3 plants, the first stable product of photosynthesis during the dark reaction is:

- A. Mallic acid
- B. Oxaloacetic acid
- C. 3-phosphoglyceric acid
- D. Phosphoglyceraldehyde

Answer: C



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56. Number of chlorophyll molecules arranged per reaction centre in the light harvesting complex is:

A. 100-200

B. 200-300

C. 300-400

D. 400-500

Answer: B



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57. The first stable product of HSK pathway is:

A. PEP

B. PGA

C. Malate

D. CO_2

Answer: C



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58. The cell organelle participating in photorespiration is:

A. Lysosome

B. Golgi complex

C. Peroxisome

D. Glyoxysome

Answer: C



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59. Which pigment system is inactivated in red-drop?

A. PS-I

B. PS-II

C. PS-I and PS-II

D. None of these

Answer: B



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60. Which pair is wrong ?

A. C_3 -Maize

B. C_4 -kranz anatomy

C. Calvin cycle-PGA

D. HSK pathway-Oxaloacetic acid

Answer: A



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61. C_4 plants differ from C_3 plants with respect to:

- A. First product
- B. Substrate which accepts CO_2
- C. Number of ATP molecules consumed
- D. All of the above

Answer: D



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62. Synthesis of food in C_4 pathway occurs in chlorophyll of:

A. Palisade tissue

B. Spongy tissue

C. Guard cells

D. Hypodermis

Answer: A



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63. Who demonstrated for the first time that in photosynthesis , oxygen evolves from water?

A. Ruben and kamen

B. Calvin

C. R.Hill

D. Govindji

Answer: C



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64. Calvin cycle is:

A. Dependent upon light

B. independent of light

C. Supported by light

D. Hindered by light

Answer: C



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65. Photosynthesis is a process by which

A. ATP is generated

B. NADH IS reduced to NAD

C. oxidative phosphorylation occurs

D. CO_2 is reduced

Answer: D



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66. Photorespiration is favoured by:

- A. Low light intensity
- B. Low temperature
- C. High O_2 and low CO_2
- D. Low O_2 and high CO_2

Answer: C



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67. Which of the following phenomena is observed in both cyclic and non-cyclic photophosphorylation ?

- A. Formation of ATP
- B. Involvement of PS-I and PS-II
- C. Formation of NADPH₂
- D. Release of O₂

Answer: A



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68. Photorespiration is characteristic of:

A. C_4 Plants

B. C_3 Plants

C. CAM plants

D. All of these

Answer: B



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69. Number of Calvin cycles required to generate a molecule of hexose is:

A. 2

B. 4

C. 6

D. 8

Answer: C



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70. The electrons excited from pigment system

IT, pass directly to:

A. Carotenoids

B. Ferredoxin

C. Plastocyanin

D. Plastoquinone

Answer: D



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71. The assimilatory power of photosynthesis is:

A. ATP

B. NADH

C. ATP and NADH

D. ATP, NADH and CO_2

Answer: C



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72. The rate of photosynthesis is maximum in

A. Green light

B. Blue light

C. Red light

D. Far-red light

Answer: C



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73. Chlorophyll absorbs:

A. Red light only

B. Blue light only

C. Green light only

D. Blue as well as red light

Answer: D



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74. Pigment system connected with oxidation of water is:

A. PS-I

B. PS-II

C. Phycobilisomes

D. Carotenoids

Answer: B



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75. Non-cyclic photophosphorylation differs from cyclic photophosphorylation in:

A. The latter has only PSI

B. Evolution of O_2

C. Reduction of NADP

D. Both(b) and(C)

Answer: D



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76. Hill reaction occurs in

A. High altitude plants

B. Total darkness

C. Absence of water

D. Presence of ferricyanide

Answer: D



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77. Decrease in photosynthetic rate With increased availability of oxygen is called:

A. Richmond lang effect

B. Warburg effect

C. Emerson enhancement effect

D. Blackman's law of limiting factor

Answer: B



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78. Photosynthetic Active Radiation (PAR) has the following range of wavelengths:

A. 300-400nm

B. 400-700nm

C. 500-600nm

D. 450-950nm

Answer: B



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79. During light reaction, radiant energy is converted to chemical energy and stored as

A. Carbohydrate

B. ATP

C. Protein

D. Ferredoxin

Answer: B



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80. In which plant Calvin experimented -by- radioactive isotopy to discover the~stable product of C_3 cycle ?

A. Spirogyra

B. Spinach

C. Chlorella

D. Radish

Answer: C



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81. In photosystem I, the first electron acceptor

is:

A. An iron-sulphur protein

B. Plastoquinone

C. Cytochrome

D. Plastocyanin

Answer: A



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82. Chloroplasts without grana are known to occur:

A. Bundle sheath cells of C_3 plants

B. Mesophyll cells of C_4 plants

C. Bundle sheath cells of C_4 plants

D. Mesophyll cells of all plants

Answer: C



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83. The synthesis of one molecule of glucose during calvin cycle requires:

- A. 12 molecules of ATP and 18 molecules of NADPH_2
- B. 6 molecules of ATP and 12 molecules of NADPH_2
- C. 18 molecules of ATP and 12 molecules of NADPH_2
- D. 12 molecules each of ATP and NADPH_2

Answer: C



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84. The ultimate source of electron in light reaction is _____



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85. Decrease in quantum yield of photosynthesis in red spectrum from that of normal spectrum.



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86. ATP and NADH, are called _____ power of photosynthesis



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87. _____ and _____ are two raw materials of photosynthesis.



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88. The primary source of energy for all living organisms is _____



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89. C_4 plants show _____ anatomy.



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90. Fluorescence and phosphorescence are the type of common material phenomenon

called_____



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91. _____ number of water molecules oxidised to form one molecule of oxygen in,light reaction.



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92. The amount of oxygen evolved by a quantum of light is called_____



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93. Pigment system _____ is involved in evolution of oxygen.



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94. The ultimate source of electron in light reaction is _____



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95. The pigment system active in wavelengths lower than 680 nm is_____



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96. The bubbles evolved during experiment with Hydrilla in a Wilmott's bubbler is_____



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97. The reactant reduced during photosynthesis _____



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98. _____ number of ATP are produced during cyclic photophosphorylation



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99. In _____ cells of the leaves of C_4 plants Calvin cycle occurs.



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100. _____ is the acceptor of CO_2 in C_4 plants.



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101. In photorespiration ____ number of ATP molecules are produced.



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102. Decreasing effect of O_2 concentration on the rate of photosynthesis is called _____ effect.



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103. Blackman's law of limiting factor is the modification of _____ law of minimum.



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104. Photosynthesis is a process by which green plants trap_____ energy and convert it into _____ energy of carbohydrates



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105. RuBP carboxylase, in the presence of high concentration of_____ acts as oxygenase.



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106. The other term for _____ reaction is called calvin cycle.



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107. All the photosynthetic pigments are located in _____ membrane of chloroplasts.



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108. In photosynthesis _____ acts as the hydrogen carrier.



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109. The respiration of early periods of photosynthesis during illumination is called _____



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110. Specific absorption of light by a molecule over a series of wavelength is called _____



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111. Calvin cycle is:



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112. The key compound linking glycolysis with kerbs cycle is _____.



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113. Light-dependent formation of high energy phosphates.



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114. Uptake of O_2 and release of CO_2 in presence of light.



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115. Decrease in quantum yield of photosynthesis in red spectrum from that of normal spectrum.



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116. The morphological structural unit that possesses a photosynthetic unit.



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117. The curve representing the light absorbed at different wavelengths.



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118. The curve showing the rate of photosynthesis at different wavelengths of light is:



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119. Number of O_2 molecules released per quantum of light absorbed.



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120. Increase in photosynthetic activity on successive application of beams of different wavelengths of light.



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121. Coloured porphyrin compounds containing iron exclusively for electron transport.



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122. Production of O_2 by illuminating isolated chloroplasts in the presence of ferricyanide is called Emerson effect.



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123. Number of ATP molecules released per quantum of light is called quantum yield.



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124. Greenlight is most effective for photosynthesis.



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125. NADPH is released in cyclic photophosphorylation.



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126. C₄ cycle is also called Calvin cycle



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127. CAM plants show Kranz anatomy.



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128. Photorespiration is also known as Embden Meyerhop pathway.



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129. Write short notes on Emmerson effect



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130. Write short note on significance of C_4 pathway



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131. Write short note on Photorespiration



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132. Write short note on Limiting factors



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133. Write short note on Hill reaction



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134. Write short note on
photophosphorylation



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135. Write short note on photosynthetic pigments



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136. Distinguish between PS-I and PS-II



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137. Distinguish between Cyclic and non-cyclic photophosphorylation



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138. Distinguish between Light and dark reaction



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139. Distinguish between C_3 and C_4 plants



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140. Distinguish between
Photophosphorylation and oxidative
phosphorylation



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141. Distinguish between Photosynthesis and
chemosynthesis.



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142. Briefly describe the mechanism of photosynthesis in plants with reference to light reaction only:



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143. Give an account of dark reaction in photosynthesis.



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144. How do you conclude that the process of photosynthesis involves light and dark reaction?



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145. Discuss the mechanism and significance of hatch and slack pathway of photosynthesis.



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