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Unit -IV**Chapter-16. Photosynthesis****IMPORTANT POINTS**

Green plants make their own food by photosynthesis. During this process carbon dioxide from the atmosphere is taken in by leaves through stomata and used for making carbohydrates, principally glucose and starch. Photosynthesis takes place only in the green parts of the plants, mainly the leaves. Within the leaves, the mesophyll cells have a large number of chloroplasts that are responsible for CO₂ fixation. Within the chloroplasts, the membranes are sites for the light reaction, while the chemosynthetic pathway occurs in the stroma. photosynthesis has two stages the light reaction and the carbon fixing reactions. in the light reaction the light energy is absorbed by the pigments present in the antenna and funnelled to special chlorophyll a molecules called reaction centre chlorophylls there are two photosystems, PS I and PS II. PS I has a 700 nm absorbing chlorophyll a P700 molecule at its reaction center, while PS II has a P680 reaction centre that absorbs red light at 680 nm After absorbing light, electrons are excited and transferred through PS II and PS I and finally to NAD forming NADH. during this process a proton gradient due to movement through the thylakoid The breakdown of the protons gradient due to movement through the F₀ part of the ATPase enzyme releases enough energy for synthesis of ATP splitting of water molecules is associated with PS II resulting in the release of O₂, protons and transfer of electrons to PS II In the carbon fixation cycle, CO₂ is added by the enzyme, RuBisCO, to a 5 carbon compound RuBP that is converted to 2 molecules of 3- carbon PGA. this is then converted to sugar by the Calvin cycle, and the RuBP is regenerated. During this process ATP and NADPH synthesised in the light reaction are utilised RuBisCO also catalyses a wasteful oxygenation reaction in C₃ plants: Photorespiration Some tropical plants show a special type of photosynthesis called C₄ pathway in these plants the first product of CO₂ fixation that takes place in the mesophyll, is a 4-carbon compound. in the bundle sheath cells the Calvin pathway is carried out for the synthesis of carbohydrates.

1. The name Melvin Calvin is associated with
 - (a) synthesis of ATP during photosynthesis
 - (b) release of water during photosynthesis
 - (c) carbon fixation during photosynthesis
 - (d) capture light energy during photosynthesis
2. Who gave chemical compositions of chlorophyll and carotenoids ?
 - (A) Park and Biggins
 - (B) Meyers and French
 - (C) Willstatter and Stahi
 - (D) Arnon and Benson
3. The non-polar part of chlorophyll is
 - (A) phytol
 - (B) porphyrin
 - (C) pyrrol
 - (D) none above

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4. The approximate dimension of chlorophyll porphyrin ring is.
(A) 1 A° square (B) 5 A° square (C) 10 A° square (D) 15 A° square
5. Photosynthesis is most active in
(A) sunlight (B) yellow (C) red (D) green
6. Intensity of light increase 20 times, rate of photosynthesis will
(A) increase (B) not increase
(C) decrease (D) increase till feed back inhibition.
7. Out of the total light energy that is available for plants is
(A) 50 % (B) 75 % (C) 25 % (D) 1—2%
8. One photon is blue light contains....kcal and of red light....kcal
(A) 70 ; 40 (B) 220 ; 70 (C) 10 ; 90 (D) 90 ; 10
9. The most efficient convertor of sunlight is
(A) Potato (B) Tomato (C) Sugar cane (D) Papaya
10. Cyclic photophosphorylation is confined to
(A) Photosystem I (B) Photosystem II
(C) both a & b (D) none above
11. For synthesis of one gram of hexose, the land plant consumes.
(A) Only 1/3 of the CO₂ of air (B) Only 1/4 of the CO₂ of air
(C) Only 2/3 of the CO₂ of air (D) none of the above
12. For synthesis of one glucose molecule, the number of ATP required are
(A) 9 ATP for C₃ cycle and 20 ATP for C₄ cycle
(B) 18 ATP for C₃ cycle and 30 ATP for C₄ cycle
(C) 22 ATP for C₃ cycle and 35 ATP for C₄ cycle
(D) 24 ATP for C₃ cycle and 36 ATP for C₄ cycle
13. The volume of O₂ liberated in photosynthesis has the following ratio to CO₂.
(A) O₂/CO₂ = 1 (B) O₂/CO₂ = 1/2
(C) O₂/CO₂ = 2/1 (D) O₂/CO₂ = 3/1
14. The inhibiting effect of oxygen in C₃ plants on photosynthesis is
(A) solarization (B) photooxidation
(C) Warbug's effect (D) none above
15. Pick up C₄ plant.
(A) Papaya (B) Potato (C) Maize (D) Pea
16. It is advantageous to use a water plant to demonstrate photosynthesis other than a land plant because.
(A) it photosynthesize rapidly (B) it respire slowly
(C) it does not transpire (D) O₂ bubbles from cut and can be collected over H₂O.
17. For chlorophyll formation most important are
(A) Fe⁺⁺ and Ca⁺⁺ (B) Fe⁺⁺ and Mg⁺⁺ (C) Mg⁺⁺ and Ca⁺⁺ (D) all the above

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18. Translocation of sugar in angiosperms occur in form of
(A) glucose (B) starch (C) lactose (D) sucrose
19. Q_{10} is
(A) respiratory coefficients (B) photosynthetic coefficient
(C) photosynthetic yield (D) temperature coefficient
20. Photorespiration is favoured by
(A) low temperatures (B) low light intensity
(C) high O_2 and low CO_2 (D) low O_2 and high CO_2
21. Quinones are
(A) mobile electron carriers (B) enzymes of oxidative phosphorylation
(C) enzymes of krebs cycle (D) none of the above
22. During dark reaction, for the fixation of carbon, the three carbon atoms of each molecule of 3 – phosphoglyceric acid (PGA) are derived from
(A) RuBP only (B) CO_2 only
(C) RuBP + CO_2 (D) RuBP + CO_2 + PEP.
23. Calvin cycle utilize for fixation of 3 molecules of CO_2
(A) 9 ATP and 6 $NADPH_2$ (B) 8 ATP and 8 $NADPH_2$
(C) 9 ATP and 3 $NADPH_2$ (D) 6 ATP and 6 $NADPH_2$
24. Chloroplast has maximum quantity of...in stroma
(A) dehydrogenase (B) RuBP carboxylase
(C) pyruvic carboxylase (D) hexokinase
25. If thylakoids are removed and kept in culture medium having CO_2 and H_2O and exposed to light ; they cannot form hexose sugars as end product because.
(A) light trapping device absent (B) pigments P-700 and P-680 not linked
(C) CO_2 assimilating enzymes absent (D) CO_2 assimilation cannot occur in light
26. Which of the following plant is efficient converter of solar energy whose net productivity 2-4 kg/m²/yr or even higher.
(A) Wheat (B) rice (C) sugarcane (D) bajra
27. The number of photons required to release one mole of O_2 in photosynthesis called.
(A) quantum yield (B) quantum requirement
(C) red drop (D) Emerson's effect
28. Calvin cycle represents one of the following phenomenon.
(A) oxidative carboxylation (B) dark phosphorylation
(C) dark respiration (D) reductive carboxylation
29. Hill reaction takes place
(A) in the absence of CO_2
(B) in the presence of carbon dioxide
(C) in the absence of a suitable electron acceptor
(D) none above

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30. Match the names of scientists given under Column – I with their important contributions given under Column – II ; choose the answer which gives correct combination of the alphabets :

Column – I(Scientists)**Column – II(Contributions)**

- | | |
|-------------------|---|
| P. Peter Mitchell | (i) Steps of dark reaction of photosynthesis. |
| Q. J.W. Gibbs | (ii) Photosynthetic phosphorylation |
| R. Daniel Arnon | (iii) Concept of free energy |
| S. Melvin Calvin | (iv) Chemiosmotic hypothesis |
| | (v) Mass flow hypothesis |

- (a) P = (iv), Q = (iii), R = (ii), S = (i)
 (b) P = (iii), Q = (iv), R = (i), S = (i)
 (c) P = (iv), Q = (v), R = (iii), S = (ii)
 (d) P = (iv), Q = (iii), R = (i), S = (ii)

31. Match Column – I with given under Column – II ; choose the answer which gives correct combination:

Column – I(Scientists)**Column – II(Contributions)**

- | | |
|--|----------------------|
| P. A pigment which absorbs red and far-red light | (i) Cytochrome |
| Q. Main pigment involved in transfer of electrons in photosynthesis is | (ii) PEP carboxylase |
| R. NADPH ₂ is generated through... | (iii) Photochrome |
| S. Enzyme which fixes CO ₂ in C ₄ plants | (iv) Photosystems |

- (a) P = (i), Q = (ii), R = (iii), S = (iv)
 (b) P = (iii), Q = (i), R = (iv), S = (iii)
 (c) P = (iii), Q = (ii), R = (iii), S = (i)
 (d) P = (i), Q = (ii), R = (iv), S = (iii)

32. The basic feature of typical C₄ plants showing 'Kranz' anatomy is

- (A) the presence of chloroplasts in mesophyll and epidermal cells
 (B) the presence of chloroplasts in bundle sheath cells
 (C) the presence of rudimentary chloroplasts in bundle sheath cells and typical chloroplasts with well-formed grana in mesophyll cells
 (D) the presence of typical chloroplasts with well-formed grana in bundle sheath cells and rudimentary chloroplasts in the mesophyll cells

33. A. Six turns of Calvin-cycle result in the production of one molecule of glucose (C₆H₁₂O₆)

R. Three molecules of ribulose 1, 5 – bisphosphate (Ru BP) react with three molecules of carbon dioxide to produce six carbon intermediates.

- (A) A is correct and R is its explanation (B) A is correct but R is not its explanation
 (C) A is correct but R is wrong (D) Both A and R are wrong

34. Maximum photosynthesis occurs in which of these lights ?

- (A) Red (B) Green
 (C) Very high light (D) Continuous bright light

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35. In C_4 plants showing Kranz anatomy which of the following is correct ?
(A) Bundle sheath cells without grana and mesophyll cells with grana
(B) bundle sheath cells with grana mesophyll cells without grana
(C) both are without grana
(D) both are with grana
36. In Blackmann's 'Law of Limiting Factors' the rate of photosynthesis continues to increase with the successive increase in the amounts of
(A) carbon dioxide, light, temperature (B) temperature, light, carbon dioxide
(C) light, temperature, carbon dioxide (D) light, carbon dioxide, temperature
37. Choose the correct statement
(A) Chl a is blue green pigment with formula $C_{55}H_{70}O_6N_4Mg$
(B) Chl a is blue green pigment with formula $C_{55}H_{72}O_5N_4Mg$
(C) Chl b is yellow green pigment with formula $C_{55}H_{70}O_5N_4Mg$
(D) Xanthophyll is pigment with formula $C_{40}H_{60}$
38. Chlorophyll a is absent in which of the following photosynthesising organisms ?
(A) Bacteria (B) Cyanobacteria (C) Red algae (D) Brown algae
39. Photorespiration in C_3 plants starts from.
(A) phosphoglycerate (B) phosphoglycolate (C) glycerate (D) glycine
40. Which one of the following is wrong in relation to photorespiration ? It
(A) occurs in chloroplasts (B) occurs in daytime only
(C) is a characteristic of C_4 plants (D) is a characteristic of C_3 plants
41. In sugarcane plant CO_2 is fixed in malic acid, in which the enzyme that fixes CO_2 is
(A) ribulose biphosphate carboxylase (B) phosphoenol pyruvic acid carboxylase
(C) ribolose phosphate kinase (D) fructose phosphatase
42. Plants are removed from patients room at night because
(A) they produce CO_2 at night in more concentration
(B) they produce CO_2 all the time but release O_2 also in day time
(C) they consume O_2 at night.
(D) they do not photosynthesize at night, therefore fail to deplete CO_2 of the room, hence their presence will increase CO_2
43. Who is that scientist who gave the Law of limiting factors ?
(A) Blackman (B) Hill (C) Liebig (D) Von Mohi
44. Which of the following is correct for chlorophyll of cyanobacteria ?
(A) Chl a = $C_{55}H_{70}O_6N_4Mg$ (B) Chl a = $C_{55}H_{72}O_5N_4Mg$
(C) Chl b = $C_{55}H_{72}O_6N_4Mg$ (D) Xanthophyll = $C_{40}H_{56}$
45. How many electrons are involved for the formation of 1 mole of glucose and $6O_2$ molecules ?
(A) 6 (B) 12 (C) 18 (D) 24

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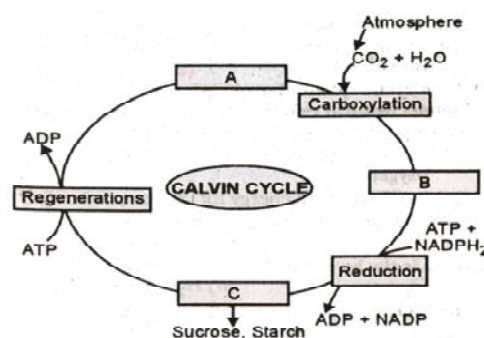
46. A. The atmospheric concentration of CO_2 at which photosynthesis just compensation point.
R. The CO_2 compensation point is reached when the amount of CO_2 uptake is less than that generated through respiration because the level of CO_2 in the atmosphere is more than that required for achieving CO_2 compensation point.
- (A) If A is correct and R is its explanation (B) If A is correct but R is not its explanation
(C) If A is correct but R is wrong (D) If both A and R are correct
47. Choose the correct statement.
- (A) The C_4 plants do not have Rubisco.
(B) Carboxylation of RuBP leads to the formation of PGA and phosphoglycolate.
(C) Decarboxylation of C_4 acids occurs in the mesophyll cells.
(D) In CAM plants Calvin's cycle reactions occur during night.
48. Match the names of scientists given under Column – I with their important contributions given under Column – II ; choose the answer which gives correct combination of the alphabets :
- | Column – I(Scientists) | Column – II(Contributions) |
|-------------------------------|--------------------------------------|
| P. Peter Mitchell | (i) Law of limiting factor |
| Q. Blackmann | (ii) Dark reaction |
| R. Daniel Arnon | (iii) Photosynthetic phosphorylation |
| S. Melvin Calvin | (iv) Chemiosmotic hypothesis |
| t. Mass flow hypothesis | |
- (A) P = (iv) Q = (i) R = (iii) S = (ii)
(B) P = (i) Q = (iv) R = (ii) S = (iii)
(C) P = (ii) Q = (i) R = (iii) S = (iv)
(D) P = (iv) Q = (iii) R = (ii) S = (i)
49. Match the following with correct combination
- | | |
|------------------------|-----------------------|
| P. Carboxylation | (i). Oxygen evolution |
| Q. Phosphorylation | (ii) Photorespiration |
| R. Photolysis of water | (iii) Rubisco |
| S. Phosphoglycolate | (iv) Chemosynthesis |
| T. Nitrosomonas | (v)ATP |
- (A) P = (i) Q = (ii) R = (iii) S = (iv) T = (v)
(B) P = (iii) Q = (v) R = (i) S = (ii) T = (iv)
(C) P = (i) Q = (iii) R = (v) S = (iv) T = (i)
(D) P = (i) Q = (iii) R = (iv) S = (ii) T = (v)
50. During photosynthesis, plants
- (A) absorb O_2 , release CO_2 (B) release O_2 , absorb CO_2
(C) absorb N_2 , release O_2 (D) absorb N_2 and release NH_3

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51. A plant with low CO_2 compensation point is
(A) *Atriplex patula* (B) *Leucopoa kingii*
(C) *Gossypium hisrsutum* (D) *Tidestromia oblingifolia*
52. Rubisco is an enzyme for
(A) CO_2 fixation in dark reaction (B) photorespiration
(C) regeneration of RuBP (D) photolysis of water
53. Photosynthesis in C_4 plants is relatively less limited by atmospheric CO_2 levels because :
(A) Four carbon acids are the primary initial CO_2 fixation production.
(B) The primary fixation of CO_2 is mediated via PEP carboxalase.
(C) Effective pumping of CO_2 into bundlesheath cells.
(D) Rubisco in C_4 plants has higher affinity for CO_2 .
54. Stomata of CAM plants
(A) are always open
(B) open during the day and close at night.
(C) open during the night and close during the day.
(D) never open
55. The Calvin cycle proceeds in three stages
1. reduction, during which carbohydrate is formed at the expense of the photochemically made ATP and NADPH
2. regeneration, during which the carbon dioxide acceptor ribulose – 1, 5 – biphosphate is formed
3. carboxylation, during which carbon dioxide combines with ribulose – 1, 5 - biophosphate
(A) 3-1-2 (B) 3-2-1 (C) 1-2-3 (D) 2-1-3
56. A. Under conditions of high light intensity and limited CO_2 supply, photorespiration has a useful role in protecting the plants from photo-oxidative damage.
R. If enough CO_2 is not available to utilize light energy for carboxylation to proceed, the excess energy may not cause damage to plants.
(A) If Assertion (A) and reason (R) both are correct and R is explanation to A.
(B) If (A) and (R) both are correct but (R) is not an explanation to A.
(C) If A is true but R is false.
(D) If both A and R are false.
57. A. Photosynthetically C_4 plants are less efficient than C_3 plants.
R. The operation of C_4 pathway requires the involvement of only bundle-sheath cells.
(A) If Assertion (A) and reason (R) both are correct and R is explanation to A.
(B) If (A) and (R) both are correct but (R) is not an explanation to A.
(C) If A is true but R is false.
(D) If both A and R are false.
58. One of the following is electron donor to P_{680} during light reactions of photosynthesis.
(A) NADPH (B) Phytochrome
(C) Chlorophyll (D) Water

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59. The requirement of assimilatory power to fix 6 molecules of CO_2 is
 (A) 6 ATP, 6 NADPH (B) 12 ATP, 18 NADPH
 (C) 18 ATP, 18 NADPH (D) 18 ATP, 12 NADPH
60. Photorespiration and photosynthesis both require
 (A) Organic fuel (B) chlorophyll (C) cytochromes (D) energy
61. The chemical structure of chlorophyll 'a' varies from chlorophyll 'b' due to difference between.
 (A) CH_3 and C_2H_5 (B) CH_3 and $\text{CH}_2 = \text{CH}_2$
 (C) CH_3 and CHO (D) CHO and $\text{CH}_2 = \text{CH}_2$
62. Choose the correct combinations of labelling the carbohydrate molecule involved in the Calvin cycle.
 (A) A – RuBP, B – Triose phosphate C– PGA
 (B) A – PGA, B – RuBP, C Triose phosphate
 (C) A – RuBP, B – Triose phosphate, C – PGAL
 (D) A – RuBP, B – PGAL, C – Triose phosphate
63. Chlorophyll molecules absorb light energy of wavelength
 (A) 300-400 nm (B) 400-500 nm
 (C) 600-800 nm (D) 400-500 nm and 600-700 nm
64. The reduction of ADP to ATP occurs by
 (A) oxidation of water
 (B) high conc. of H^+ ions across the membrane
 (C) oxidation of NADPH
 (D) release of electron from PS-II to PS-I
65. The process of ATP formation from ADP in the presence of light in chloroplast is called
 (A) phosphorylation
 (B) autophosphorylation
 (C) photophosphorylation
 (D) chemophosphorylation
66. 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 2 protons (D) 2 electrons and 2 protons
67. The enzyme pair common to C_3 plants and EMP is
 (A) cytochrome oxidase and enolase
 (B) aldolase and triose phosphate isomerase
 (C) aldolase and enolase
 (D) phosphoglyceromutase and triose phosphate isomerase



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68. Non-cycle photosphorylation is the main photochemical reaction in green plants because
(A) it produces assimilatory power and oxygen
(B) it initiates photolysis of water of productions of oxygen
(C) it utilizes more energy for oxygen production.
(D) there is no other cycle available.
69. is the by product of photosynthesis.
(A) O_2 (B) H_2O (C) CO_2 (D) $C_6H_{12}O_6$
70. Site of reduction of carbon is
(A) lamellae (B) thylakoid (C) grana (D) stroma
71. In C_4 plants, the primary CO_2 acceptor is
(A) 3 - PGA (B) Oxalo acetic acid (C) RuBP (D) PEP
72. It is estimated that about 85% of the earth's photosynthetic activity is carried out by
(A) trees (B) savannas
(C) phytoplanktons (D) herbaceous plants
73. 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 favourable ?
(A) Amount of oxygen evolved decreases as carbon dioxide in water is absorbed by sodium bicarbonate.
(B) Amount of oxygen evolved increases as the avilability of carbon dioxide increases
(C) Amount of oxygen evolved decreases as the avilability of carbon dioxide increases
(D) Amount of oxygen evolved increases as carbon dioxide in water is absorbed by sodium bicarbonate
74. In C_4 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
75. In chlorophyll structure four pyrole rings are united with Mg by their atoms of
(A) N (B) C (C) H (D) O
76. The fixation and reduction of CO_2 occur in preence of
(A) ATP (B) ATP and NADPH
(C) NADPH, chlorophyll and water (D) ATP, NADPH and light
77. Sugar moves in phloem vessels as _____.
(a) cellulose (b) glucose (c) starch (d) sucrose
78. ____ ions help in photolysis of water.
(a) Mn^{++} (b) Mg^{++} (c) Cl^- (d) both (a) and (c)
79. RUBISCO enzyme is also called as _____.
(a) carboxy tetra mutase (b) carboxy di mutase
(c) carboxy tri mutase (d) carboxy uni mutase

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80. _____ is precursor for abscissic acid (ABA)
(a) Zeatin (b) Lutein (c) Violaxanthin (d) Mevalonic acid
81. In young leaves ratio of carotene to Xanthophyll is _____.
(a) 2 : 1 (b) 3 : 1 (c) 1 : 3 (d) 1 : 2
82. Which of the following pigments contains open pyrrole ring?
(a) Phycobilins (b) Xanthophylls (c) Chlorophylls (d) α -carotene
83. In which of the following light, rate of photosynthesis is maximum?
(a) white (b) discontinuous white (c) red (d) blue
84. Quantum yield of photosynthesis is _____.
(a) 13.5 % (b) 8 % (c) 13% (d) 12.5%
85. During light phase of photosynthesis _____ is oxidized and _____ is reduced.
(a) CO_2 and Water (b) Water and CO_2
(c) Water and NADP (d) NADPH_2 and CO_2
86. During dark phase of photosynthesis _____ is oxidized and _____ is reduced
(a) CO_2 and Water (b) Water and CO_2
(c) Water and NADP (d) NADPH_2 and CO_2
87. The visible product of photosynthesis is _____.
(a) glucose (b) cellulose (c) starch (d) fructose
88. To produce 3 glucose molecules _____ ATP and _____ NADPH_2 molecules are required.
(a) 54, 36 (b) 54, 30 (c) 36, 60 (d) 18, 12
89. Glycolytic reversal is a part of _____.
(a) aerobic respiration (b) anaerobic respiration
(c) light phase of photosynthesis (d) dark phase of photosynthesis
90. RuBp carboxylase acts as RuBp carboxygenase at _____ CO_2 conc. And _____ O_2 conc.
(a) low, low (b) low, high (c) high, high (d) high, low
91. The source of CO_2 during calvin cycle in C_4 plant is
(a) Malic acid (b) OAA (c) PEP (d) RuBP
92. Dicot which follow C_4 pathway is _____.
(a) wheat (b) Amranthus (c) Maize (d) Mango
93. Absorption spectrum of chlorophyll is maximum in _____ light.
(a) red (b) blue (c) yellow (d) blue-violet
94. The oxygen molecule in glucose formed during photosynthesis comes from
(a) Water (b) Organic acids (c) CO_2 (d) atmosphere
95. Dimorphic chloroplast are present in _____.
(a) zea mays (b) sacchrum officinale (c) sorghum bicolor (d) all of these
96. Red pigment in tomato is
(a) β -carotene (b) Anthocyanin (c) Lycopene (d) Lutein

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97. Solarisation refers to _____.
(a) formation of sugar with help of water and energy (b) destruction of chlorophyll
(c) synthesis of chl. (d) both b and c
98. Dark reaction requires light reaction for
(a) carboxylation of RUBP (b) regeneration of RuBP
(c) reduction of PGA (d) formation of hexose sugar
99. Emerson effect proves
(a) concept of two photosystem in plant (b) photophosphorylation
(c) photorespiration (d) there are light and dark reaction in photosynthesis
100. Name a plant which do not perform photosynthesis is
(a) Algae (b) Bryophyllum (c) cuscutta (d) Pitcher plant
101. Light reaction of photosynthesis results in formation of _____.
(a) O^2 (b) $NADPH + H^+$ (c) ATP (d) All of these
102. $C_{55}H_{70}O_6N_4Mg$ is
(A) An accessory pigment in photosynthesis (B) Present in PS-II
(C) Present in all green plants (D) All of these
103. The ionized chl.a⁺
(A) Receives low energy electron (B) Receives high energy electron
(C) Expels low energy electron (D) Expels high energy electron
104. In Calvin cycle,
(A) fructose 1,6 diphosphate undergoes dephosphorylation.
(B) ATP is formed during dephosphoylation of fructose
(C) 1,3 diPGA undergo phosphorylation
(D) none of these
105. What will happen to the rate of photosynthesis if sodium bicarbonate is added in the water having hydrilla plant in a beaker
(A) It will remain normal (B) It will be decreased
(C) It will be stopped (D) It will be accelerated
106. Which of the following gas would disappear from the atmosphere if all the photosynthetic activities were to stop?
(A) Nitrogen (B) Carbondioxide
(C) Hydrogen (D) Oxygen
107. Photo-oxidation of chlorophyll and cell contents as a result of high light intensity is known as
(A) Solarization (B) Photolysis
(C) Photoperiodism (D) Photorespiration
108. Temperature is very high but a plant is showing photosynthesis with normal rate, probably it would be
(A) C_3 plant (B) Mango plant (C) Pea plant (D) Sugarcane plant

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109. For the process of photosynthesis all except one of the following items are essential. Point out the exception
- (A) CO_2 , optimum temperature (B) Glucose and oxygen
(C) Water and minerals (D) Light and chlorophyll
110. The prerequisites of Calvins cycle are
- (A) H_2O , CO_2 , ATP (B) ATP, H_2O , NADPH_2
(C) CO_2 , ATP, NADPH_2 (D) NADPH_2 , H_2O , CO_2
111. In the calvin cycle, the assimilatory power is used during
- (A) Formation of PGA
(B) Conversion of PGA to PGAL
(C) Formation of fructose 1-6 diphosphate from PGAL
(D) Formation of glucose from fructose – di- phosphate
112. Which is sensitive to longer wavelength of light?
- (A) Photolysis (B) PSI (C) PS II (D) Photophosphorylation
113. In chrophyll structure Phytol tail is present at
- (A) 3rd carbon of IInd ring (B) 2nd carbon of IIIrd ring
(C) 7th carbon of IVth ring (D) 3rd carbon of IVth ring
114. Reduction of co-enzyme NADP depends on
- (A) Reduction of CO_2 (B) Evolution of O_2
(C) Photolysis of water (D) Formation of ATP
115. Loculus is the internal space of
- (A) Grana (B) Stroma (C) Thylakoid (D) Quantasome
116. Calvins cycle involves
- (A) Oxidative phosphorylation (B) Oxidative carboxylation
(C) Reductive carboxylation (D) Reductive phophorylation
117. In C_4 plants, carboxylation is twice, it can be represented as
- (A) Pyruvic acid + CO_2 and malic acid + CO_2
(B) RuBP + CO_2 and pyruvic acid + CO_2
(C) PEPA + CO_2 and RuBP + CO_2
(D) PEPA + CO_2 and malic acid + CO_2
118. In non-cyclic photophosphorylation, all the participants acts as electron donor and acceptor except
- (A) Chl-a of PS I (B) Chl-a of PS II (C) NADP (D) Both (A) and (B)
119. Ribbon shaped chloroplast is present in
- (A) Zygnema (B) Spirogyra
(C) Chlorobium (D) Chromatium
120. Which of the following protist is a photoautotroph
- (A) Thiobacillus (B) Ferrobacillus
(C) Diatoms (D) Chlorobium

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121. Photosynthesis takes place
(A) Only in green light (B) Only in sunlight
(C) In visible light obtained from any source (D) Only in high intensity of light
122. Chlorophyll-a differs from chlorophyll-b in having—
(A) Methyl group instead of aldehyde group
(B) Aldehyde group instead of methyl group
(C) Methyl group instead of ethyl group
(D) Only phytol tail instead of head
123. In non-cyclic photophosphorylation
(A) ATP is generated
(B) Both PSI and PSII are involved
(C) Electron flow is unidirectional
(D) All the above
124. In con-cyclic photophosphorylation, the electron emitted by P_{680} is replaced by electron from
(A) NADP (B) Water (C) Ferridoxin (D) Chlorophyll-a
125. 85-90% (9/10) of all photosynthesis in the world is carried out by
(A) Shrubs (B) Algae of the oceans
(C) Herbs (D) Scientists in the laboratory
126. Primary and secondary processes of Photosynthesis takes place in _____ and _____ respectively.
(A) Stroma and grana (B) Stroma and lamellae
(C) Thylakoid and quantasome (D) Grana and stroma
127. Which one occurs during both cyclic and non-cyclic photophosphorylation
(A) Formation of ATP (B) Release of O_2
(C) Formation of $NADPH_2$ (D) Involvement of both PSI and PSII
128. The photochemical process in photosynthesis which needs both PSI and PSII also involves
(A) Photolysis of water (B) Z-scheme of electron transfer
(C) Synthesis of assimilatory power (D) All of these
129. For synthesis of one molecule of glucose, the requirement of ATP and $NADPH_2$ is respectively
(A) 15 and 10 (B) 12 and 8
(C) 30 and 15 (D) 18 and 12
130. Which of the following element is needed for chlorophyll biosynthesis?
(A) Copper (B) Magnesium
(C) Calcium (D) Chlorine
131. The two enzymes responsible for primary carboxylation in C_3 and C_4 pathway, respectively are
(A) RuBP carboxylase and RuBP oxygenase
(B) PEP carboxylase and RuBP carboxylase
(C) RuBP carboxylase and PEP carboxylase
(D) PEP carboxylase and pyruvate carboxylase

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132. _____ are placed one above the other to form stack of coins
 (A) oxysomes (B) F_1 particles (C) cristae (D) thylakoids
133. Unidirectional flow of e^- in non-cyclic photophosphorylation is
 (A) PSII $\xrightarrow{e^-}$ PS-I $\xrightarrow{e^-}$ NADP $\xrightarrow{e^-}$ water
 (B) Water $\xrightarrow{e^-}$ PS-II $\xrightarrow{e^-}$ PS-I $\xrightarrow{e^-}$ NADP
 (C) PSI $\xrightarrow{e^-}$ NADP $\xrightarrow{e^-}$ water $\xrightarrow{e^-}$ PS II
 (D) Water $\xrightarrow{e^-}$ PSI $\xrightarrow{e^-}$ PSII $\xrightarrow{e^-}$ NADP
134. The head and tail of chlorophyll are made up of
 (A) Pyrrole and tetrapyrrole (B) Porphyrine and phyrin
 (C) Pophyrine and phytol (D) Tetrapyrrole and magnesium
135. The numbrer of photons needed for the evolution of one molecule of oxygen is
 (A) 8 (B) 2 (C) 12 (D) 18
136. Action spectrum is
 (A) A graph showing amount of light absorbed
 (B) A graph showing rate of photosynthesis
 (C) A graph showing absorption of light
 (D) A graph showing amount of CO_2 released
137. $C_{40}H_{56}O_2$ is molecular formula of
 (A) Xanthophyll (B) Carotenes
 (C) Chlorophylls (D) Phycobillins
138. Quantasome contains
 (A) 150-200 chlorophyll molecules (B) 200 chlorophyll molecules
 (C) 230-250 chlorophyll molecules (D) 300-350 chlorophyll molecules
139. Erythrose monophosphate (4C) is formed during
 (A) CAM pathway (B) C_4 pathway
 (C) Conversion of fructose to glucose (D) Regeneration of RuBP
140. Donor and acceptor of electrons is the same chlorophyll molecule in
 (A) Cyclic phtophosphorylation (B) Photorespiration
 (C) Substrate level phosphorylation (D) Non-cyclic photophosphorylation
141. If a photosynthsing plant releases O^{18} , it is concluded that the plant has been supplied with
 (A) Water containing O^{18} (B) Oxygen in the form of ozone
 (C) Sugar containing O^{18} (D) Carbon dioxide containing O^{18}
142. Which of the following connet the primary and secondary processes of photosynthesis?
 (A) $NADPH_2$ (B) ATP and $NADPH_2$
 (C) ATP (D) Ferridoxins

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143. C_4 plants can perform photosynthesis
 (A) Even in low light intensity
 (B) Even in low CO_2 concentration
 (C) Both (A) and (B)
 (D) Only in high intensity of light and high CO_2
144. In Hill's experiment, Hill used _____ as oxygen acceptor,
 (A) Hydrogen (B) FAD (C) NADP (D) Haemoglobin
145. Fret channel is a another name for
 (A) Stroma lamellae (B) Intergranal lamellae
 (C) Grana lamellae (D) Space present in stroma lamellae
146. Bundle sheath chloroplast of C_4 plants are
 (A) Large and agranal (B) Large and granal
 (C) Small and granal (D) Small and agranal
147. In C_3 pathway, out of 12 molecules of 3-PGAL, how many are used for regeneration of RuBP?
 (A) 12 (B) 8 (C) 10 (D) 6
148. A plant is kept in 300 ppm CO_2 concentration. What will happen to it
 (a) Plant will die soon
 (b) Plant will grow but will not die
 (c) Plant will show normal photosynthesis
 (d) Respiration will be greatly decreased
149. All plastids have essentially same structure because
 (a) They have to perform same function
 (b) They are localized in aerial parts of plants
 (c) All plastids store starch, lipid and proteins
 (d) One type of plastid can be differentiated into another type of plastid depending on cell requirements

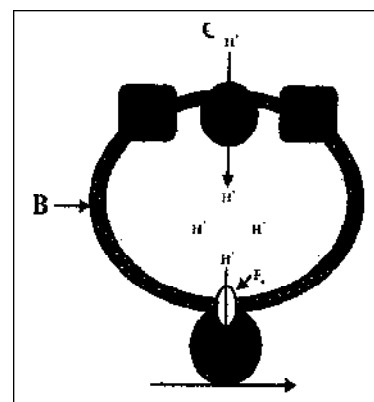
150 Give the correct name of indicated part A and B (CHART)

- (A) A- cytochrome-a & a_3 B -Thylakoid
 (B) A- Thylakoid B-cytochrome-a & a_3
 (C) A- cytochrome-b& f B-Thylakoid
 (D) A- cytopalsm B-Thylakoid

151 which process is indicated by the given chart?

Pls see fig. (QUE:150)

- (A) Synthesis of ATP by chemiosmosis
 (B) Synthesis of food by chemiosmosis
 (C) hydrolysis of water by chemiosmosis
 (D) transfer of electron by chemiosmosis



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ANSWER KEY

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|----|---|----|---|----|---|-----|---|-----|---|-----|---|-----|---|
| 1 | C | 26 | C | 51 | A | 76 | B | 101 | D | 126 | D | 150 | C |
| 2 | C | 27 | B | 52 | B | 77 | D | 102 | D | 127 | A | 151 | A |
| 3 | A | 28 | D | 53 | B | 78 | D | 103 | A | 128 | D | | |
| 4 | D | 29 | D | 54 | C | 79 | B | 104 | A | 129 | D | | |
| 5 | A | 30 | A | 55 | A | 80 | C | 105 | D | 130 | B | | |
| 6 | D | 31 | B | 56 | D | 81 | D | 106 | D | 131 | C | | |
| 7 | A | 32 | C | 57 | D | 82 | A | 107 | A | 132 | D | | |
| 8 | D | 33 | C | 58 | D | 83 | B | 108 | D | 133 | B | | |
| 9 | C | 34 | A | 59 | D | 84 | D | 109 | B | 134 | C | | |
| 10 | A | 35 | A | 60 | C | 85 | C | 110 | C | 135 | A | | |
| 11 | B | 36 | A | 61 | C | 86 | D | 111 | B | 136 | B | | |
| 12 | B | 37 | B | 62 | D | 87 | C | 112 | B | 137 | A | | |
| 13 | A | 38 | A | 63 | A | 88 | A | 113 | C | 138 | C | | |
| 14 | C | 39 | B | 64 | B | 89 | D | 114 | C | 139 | D | | |
| 15 | C | 40 | C | 65 | C | 90 | B | 115 | C | 140 | A | | |
| 16 | D | 41 | B | 66 | D | 91 | A | 116 | C | 141 | A | | |
| 17 | B | 42 | B | 67 | B | 92 | B | 117 | C | 142 | B | | |
| 18 | D | 43 | A | 68 | A | 93 | B | 118 | C | 143 | B | | |
| 19 | D | 44 | B | 69 | A | 94 | C | 119 | B | 144 | D | | |
| 20 | C | 45 | B | 70 | D | 95 | D | 120 | C | 145 | D | | |
| 21 | A | 46 | C | 71 | D | 96 | C | 121 | C | 146 | A | | |
| 22 | C | 47 | C | 72 | C | 97 | B | 122 | A | 147 | C | | |
| 23 | A | 48 | A | 73 | D | 98 | C | 123 | D | 148 | C | | |
| 24 | B | 49 | B | 74 | D | 99 | A | 124 | B | 149 | D | | |
| 25 | C | 50 | B | 75 | A | 100 | D | 125 | B | | | | |