RAVI MATHS TUITION CENTRE , WHATSAPP - 8056206308

Time : 60 Mins **13 PHOTOSYNTHESIS IN HIGHER PLANTS 1** **Marks : 240**

1. Which range of wavelength (in nm) is called photosynthetically active radiation (PAR)?
   a) 100-390 b) 390-430 c) 400-700 d) 760-10,000
2. Which one of the following correctly depicts the biochemical reaction for photosynthesis?
   a) $C_6H_{12}O_6 + 6O_2 \xrightarrow{Enzymes} 6CO_2 + 6H_2O$ + energy b) $C_6H_{12}O_6 + 6O_2 + 6H_2O \rightarrow 6CO_2 + 12H_2O$ + energy
   c) $6CO_2 + 6H_2O \xrightarrow[Chlorophyll]{sunlight} C_6H_{12}O6 + 6O_2$ d) $6CO_2 + 12H_2O \xrightarrow[Chlorophyll]{sunlight} C_6H_{12}O_6 + 6O_2 + 6H_2O$
3. Absorption spectrum of chl a shows maximum absorption in_____ and_____ regions of light.
   a) blue and green b) blue and red c) red and green d) red and far red
4. Photosynthetic pigments found in the chloroplasts occur in _____ .
   a) thylakoid membranes b) plastoglobules c) matrix d) chloroplast envelope
5. **Assertion:** The stroma lamellae have both PS I and PS II
   Reason: The grana lamellae lack PSII as well as NADP reductase enzyme.
   a) If both assertion and reason are true and reason is the correct explanation of assertion.
   b) If both assertion and reason are true but reason is not the correct explanation of assertion.
   c) If assertion is true but reason is false. d) If both assertion and reason are false
6. Pigment-containing membranous extensions in some cyanobactena are___
   a) Basal bodies b) pneumatophores c) Chromatophores d) Heterocysts
7. When temperature is increased from minimum to optimum, rate of photosynthesis doubles for every _____rise in temperature.
   a) 1°C b) 10°C c) 20°C d) 30°C
8. Warburg effect refers to
   a) decreased photosynthetic rate at very high O_2 concentration
   b) increased photosynthetic rate at very high O_2 concentration
   c) decreased photosynthetic rate at very low O_2 concentration
   d) increased photosynthetic rate at very low O_2 concentration.
9. How many ATP and NADPH molecules are respectively required to make one molecule of glucose through Calvin cycle?
   a) 3 and 2 b) 9 and 6 c) 18 and 12 d) 12 and 18
10. Which light range is least effective in photosynthesis?
    a) Blue b) Green c) Red d) Violet

11. Read the given statements and select the correct option.
Statement 1: In photosynthesis, during ATP synthesis, protons accumulate in the lumen of thylakoid.
Statement 2: In respiration, during ATP synthesis, protons accumulate in the intermembranal space of mitochondria.
a) Both statements 1 and 2 are correct. b) Statement 1 is correct but statement 2 is incorrect.
c) Statement 1 is incorrect but statement 2 is correct. d) Both statements 1 and 2 are incorrect

12. The first carbon dioxide acceptor in C_4- plants is _____ .
a) phosphoenol-pyruvate b) ribulose 1, 5-diphosphate c) oxalo acetic acid d) phosphoglyceric acid

13. Chlorophyll a appears _____ in colour and chlorophyll b appears _____ in colour in the chromatogram
a) bluish green, yellowish green b) yellowish green, bluish green c) blue, blue d) green, green

14. Which one of the following equations suggests that O_2 released during photosynthesis comes from water?
a) $6CO_2^{18} + 12H_2O \rightarrow 6O_2^{18} + C_6H_{12}O_6 + 6H_2O^{18}$
b) $6CO_2 + 12H_2O^{18} \rightarrow 6O_2 + C_6H_{12}O_6 + 6H_2O^{18}$
c) $6CO_2^{18} + 12H_2O \rightarrow 6O_2^{18} + C_6H_{12}O_6 + 6H_2O$
d) $6CO_2 + 12H_2O^{18} \rightarrow 6O_2^{18} + C_6H_{12}O_6 + 6H_2O$

15. Formation of ATP in photosytthesis and respiration is an oxidation process which utilises the energy from____
a) cytochromes b) ferredoxin c) electrons d) carbon dioxide

16. The most common limiting factor for photosynthesis is
a) CO_2 b) O_2 c) H_2O d) Temperature

17. The reaction that is responsible for the primary fixation of CO_2 is catalysed by:
a) RuBP carboxylase b) PEP carboxylase c) RuBP carboxylase and PEP carboxylase d) PGA synthase.

18. Which of the following equations holds true for acidification reactions of CAM pathway?
a) $PEP + CO_2 + H_2O \xrightarrow{PEP\ case} OAA + H_3PO_4$
b) $OAA + NADH \xrightarrow{Dehydrogenase} Malic\ acid + NAD^+$
c) $Malic\ acid + NADP^+ \xrightarrow[enzyme]{Malic} Pyruvic\ acid + CO + NADPH$ d) Both (a) and (b)

19. In C_4 plants, Calvin cycle enzymes are present in
a) chloroplasts of mesophyll cells b) chloroplasts of bundle sheath cells c) cytoplasm of guard cells
d) cytoplasm of epidermal cells

20. A very efficient converter of solar energy with net productivity of 2- 4 kg/m^2 or more is the crop of _____ .
a) Wheat b) Sugarcane c) Rice d) Bajra

21. Electron from excited chlorophyll molecule of photosystem II are accepted first by
a) Quinone b) Ferredoxin c) Cytochrome - b d) Cytochrome -f

22. The correct sequence of flow of electrons in the light reaction is
a) PSII, plastoquinone, cytochromes, PSI, ferredoxin b) PSI, plastoquinone, cytochromes, PSII, ferredoxin
c) PSI, ferredoxin, PSII d) PSI, plastoquinone, cytochromes, PSII, ferredoxin.

23. Energy required for AIP synthesis in PSII comes from
a) proton gradient b) electron gradient c) reduction of glucose d) oxidation of glucose

24. C_4 - cycle was discovered by___
a) Hatch and Slack b) Calvin c) Hill d) Arnon

25. **Assertion:** In C4 plants, the bundle sheath cells are rich in an enzyme phosphoenol pyruvate carboxylase (PEPCase).
Reason: In C4 plants, the mesophyll cells are rich in an enzyme Ribulose bisphosphate carboxylase-oxygenase (RuBisCO).
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

26. During monsoon, the rice crop of Eastern states of India shows lesser yield due to limiting factor of_____
a) CO_2 b) light c) temperature d) water

27. Who demonstrated that green plants purify the foul air produced by breathing animals and burning candles?
a) Priestley b) Ingenhousz c) Sachs d) Engelmann

28. Nine-tenth of all photosynthesis of world (85-90%) is carried out by_____ .
a) large trees with rnillions of branches and leaves b) algae of the ocean
c) chlorophyll containing ferns of the forest d) scientists in the laboratories

29. Wavelength of PAR (Photosynthetically active radiation) varies from
a) 40 - 70 nm b) 400 - 700 nm c) 400 - 700 A˚ d) 40 - 70 A˚

30. Dark reactions of photosynthesis occur in____
a) granal thylakoid-membranes b) stromal lamella membranes c) stroma outside photosynthetio lamellae
d) periplastidial space

31. Stomata of CAM plants_____
a) never open b) are always open c) open during the day and close at night
d) open during the night and close during the day

32. Quality of light refers to
a) intensity of light b) frequency of light c) wavelength of light d) duration of light.

33. PEP is primary CO_2 acceptor in:
a) C_4 plants b) C_3 plants c) C_2 plants d) both C_3 and C_4 plants

34. In the leaves of C_4 plants, malic acid formation during CO_2 fixation occurs in the cells of_____
a) bundle sheath b) Phloem c) epidermis d) mesophyll

35. Stomata in grass leaf are_____
a) rectangular b) kidney-shaped c) dumb-bell-shaped d) barrel-shaped

36. The oxygen evolved during photosynthesis comes from water molecules. Which one of the following pairs of elements is involved in this reaction?
a) Manganese and Potassium b) Magnesium and Molybdenum c) Magnesium and Chlorine
d) Manganese and Chlorine

37. How many quanta are required to reduce one molecule of CO_2 and produce one molecule of O_2 in green plant photosynthesis?
a) 1 b) 8 c) 16 d) 32

38. Select the option which correctly depicts the functions of parts X, Y and Z.
a)

X	Y	Z
Dark reaction	Light reaction	Cytoplasmic inheritance

b)

X	Y	Z
Light reaction	Carbohydrate synthesi	Carbohydrate storage

c)

X	Y	Z
Light reaction	Carbohydrate storage	Carbohydrate synthesis

d)

X	Y	Z
Carbohydrate synthesis	Carbohydrate storage	Cytoplasmic inheritance

39. During high light intensity, the chloroplasts align themselves
    a) in vertical position along lateral walls b) along tangential walls c) in centre and get scattered
    d) perpendicular to light.

40. Assume a thylakoid which is somehow punctured so that the interior of the thylakoid is no longer separated from the stroma. This damage will have the most direct effect on which of the following processes?
    a) Splitting of water b) Absorption of light energy by chlorophyll
    c) Flow of electrons from photosystem II to photosystem I d) Synthesis of ATP

41. The correct sequence of cell organelles during photorespiration is_____
    a) Chloroplast-Golgibodies-mitochondria b) Chloroplast-Rough Encloplasmic reticulum. Dictyosomes
    c) Chloroplast-peroxisome-mitochondria d) Chloroplast-vacuole-peroxisome

42. CO_2 is accepted by RUBP in C_4 plants in
    a) Mesophyll cells b) Bundle sheath cell c) Stomatal gaurd cells d) Epidermal cells

43. Stomatal movement is not affected by____
    a) O_2 concentration b) Light c) Temperature d) CO_2 concentration

44. During Hatch and Slack pathway, PEP combines with CO_2 in the presence of enzyme PEP Case, to form OAA. This process of initial fixation of CO_2 occurs in
    a) mesophyll cells b) bundle sheath cells c) both (a) and (b) d) none of these.

45. Chlorophyll-a molecule at its carbon atorn 3 of the pyrrole ring-II has one of the following_____
    a) aldehyde group b) methyl group c) carboxyl group d) magnesium

46. Anoxygenic photosynthesis is characteristic of____
    a) Rhodospirillum b) Spirogyra c) Chlamydomonas d) Ulva

47. The first acceptor of electrons from an excited chlorophyll molecule of photosystem II is___
    a) iron-sulphur protein b) ferredoxin c) quinone d) cytochrome

48. Tropical plants have a_____ temperature optimum than the plants adapted to temperate climates.
    a) lower b) equal c) higher d) none of these

49. Select the incorrect statement as far as kranz anatomy is concerned.
    a) Undifferentiated mesophyll occurs in concentric layers around vascular bundles.
    b) Centrifugal chloroplasts are present in bundle sheath cells.
    c) Large sized bundle sheath cells are arranged in a wreath-like manner in one to several layers
    d) Chloroplasts of bundle sheath cells possess well developed grana lamellae

50. Which pair is wrong
    a) C_3 plant - maize b) Calvin cycle - PGA c) Hatch-Stack cycle - OAA d) C_4 -plant Kranz Anatomy

51. The process which makes major difference between C3 and C4 plants is
    a) Respiration b) Glycolysis c) Calvin cycle d) Photorespiration

52. Chlorophyll-a occurs in____

a) all photosynthetic autotrophs b) in all higher plants c) all oxygen liberating autotrophs
d) all plants except fungi

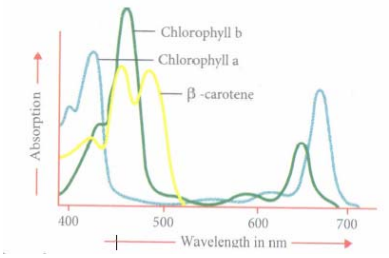
53. Reaction centre of PSI is_____and reaction centre of PS II is _____.
a) P680, P_{700} b) P_{700}, P_{680} c) P_{800}, P_{600} d) P_{700}, P_{900}

54. Who used prism, green alga Cladophora and aerobic bacteria and plotted the first action spectrum for photosynthesis?
a) Sachs b) Arnon c) Arnold d) Engelmann

55. Which of the following is not an external factor influencing photosynthesis?
a) CO_2 concentration b) O_2 concentration c) Availability of water d) Chlorophyll concentration

56. The main difference between chlorophyll 'a' and 'b' is :
a) Chlorophyll 'a' is all a linear chain compound and 'b' is branched chain
b) Chlorophyll 'a' has no Mg^+ ion in center of molecule
c) In chlorophyll 'a' there is -CH_3 group whereas in 'b' it i -CHO group d) All of the above

57. Given graph represents the absorption spectra of three photosynthetic pigments, chi a, chi b and ~-carotene.



Select the correct statement regarding this.
a)
The curve showing the amount of absorption of different wavelengths of light by a photosynthetic pigment is called as absorption spectrum.
b) Chi a and chi b absorb maximum light in blue and red wavelengths of light.
c) Rate of photosynthesis is maximum in blue and red wavelengths of light. d) All of these

58. A tadpole like configuration is found in
a) Chlorophyll b) Carotenoids c) Phycobilins d) Anthocyanin

59. Consider the following statements regarding starch and sucrose synthesis during day time and select the correct ones.
(i) Triose phosphate is confined to chloroplast and is utilised for the synthesis of starch only.
(ii) Triose phosphate is translocated to cytosol from chloroplast.
(iii) Triose phosphate is utilised for the synthesis of both starch and sucrose.
(iv) Triose phosphate is translocated from cytosol to chloroplas
a) (i) and (iii) b) (ii) and (iii) c) (ii) and (iv) d) (iii) and (iv)

60. Yellowish colour of autumn foliage is due to the presence of a type of xanthophyll pigment called as
a) lutein b) lycopene c) fucoxanthin d) zeaxanthin