

Test paper: Photosynthesis in Higher Plants

1. In photosystem-I, the first element acceptor is

- a) an iron-sulphur protein b) ferredoxin c) cytochrome d) plastocyanin

2. During photorespiration, the oxygen consuming reaction occurs in

- a) stroma of chloroplasts b) stroma of chloroplasts and mitochondria
c) stroma of chloroplasts and peroxisomes d) grana of chloroplasts and peroxisomes

3. A plant requires magnesium for

- a) protein synthesis b) chlorophyll synthesis c) cell wall development d) holding cells together

4. The first acceptor of electrons from an excited chlorophyll molecule of photosystem II is

- a) iron-sulphur protein b) ferredoxin c) quinone d) cytochrome

5. 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) mesophyll

6. The C₄ plants are photosynthetically more efficient than C₃ plants because

- a) the CO₂ efflux is not prevented b) they have more chloroplasts
c) the CO₂ compensation point is more
d) CO₂ generated during photorespiration is trapped and recycled through PEP carboxylase

7. Manganese is required in

- a) plant cell wall formation b) photolysis of water during photosynthesis
c) chlorophyll synthesis d) nucleic acid synthesis

8. Cyclic photophosphorylation results in the formation of

- a) ATP and NADPH b) ATP, NADPH and O₂ c) ATP d) NADPH

9. Stroma in the chloroplasts of higher plant contains

- a) light-dependent reaction enzymes b) ribosomes
c) chlorophyll d) light-independent reaction enzymes

10. PGA as the first CO₂ fixation product was discovered in photosynthesis of

- a) bryophyte b) gymnosperm c) angiosperm d) alga

11. 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

12. Read the following four statements and select the right option having both correct statements

- (i) Z scheme of light reaction takes place in presence of PS I only
(ii) Only PS I is functional in cyclic photophosphorylation
(iii) Cyclic photophosphorylation results into synthesis of ATP and NADPH₂
(iv) Stroma lamellae lack PSII as well as NADP

- a) (ii) and (iv) b) (i) and (ii) c) (ii) and (iii) d) (iii) and (iv)

13. Kranz anatomy is one of the characteristics of the leaves of

- a) Potato b) Wheat c) Sugarcane d) Mustard

14. CAM helps the plants in

- a) conserving water b) secondary growth c) disease resistance d) reproduction

15. In Kranz anatomy, the bundle sheath cells have

- a) thin walls, many intercellular spaces and no chloroplasts
b) thick walls, no intercellular spaces and many chloroplasts
c) thin walls, no intercellular spaces and several chloroplasts
d) thick walls, many intercellular spaces and few chloroplasts

16. Which one of the following is essential for photolysis of water?

- a) Manganese b) Zinc c) Copper d) Boron

17. A process that makes important difference between C₃ and C₄ plants is

- a) transpiration b) glycolysis c) photosynthesis d) photorespiration

18. Best defined function of manganese in green plants is

- a) photolysis of water b) Calvin cycle c) nitrogen fixation d) water absorption

19. The correct sequence of cell organelles during photorespiration is

- a) chloroplast, Golgi-bodies, mitochondria b) chloroplast, rough endoplasmic reticulum, dictyosomes
c) chloroplast, mitochondria, peroxisome d) chloroplast, vacuole, peroxisome

20. In photosynthesis, the light-independent reactions take place at

- a) photosystem II b) stromal matrix c) thylakoid lumen d) photosystem I

21. Chromatophores take part in

- a) movement b) respiration c) photosynthesis d) growth

22. That the oxygen evolved during photosynthesis came from water was demonstrated by using an isotope of

- a) hydrogen in water b) oxygen in water c) oxygen in carbon dioxide d) carbon in carbon dioxide

23. Which pair is wrong

- a) C₃ – maize b) C₄- Kranz anatomy c) Calvin cycle – PGA d) Hatch and Slack pathway – OAA

24. Photophosphorylation was discovered by

- a) Arnon b) Calvin c) Hill d) Ruben and Kamen

25. The electron lost by P₆₈₀ in the light reaction of photosynthesis is finally gained by

- a) NADP⁺ b) NADPH c) ATP d) none of these

26. Dark reaction of photosynthesis is characterized by

- a) water splitting and production of NADP b) reduction of NADP to NADPH
c) cyclic and noncyclic phosphorylation d) enzyme mediated carbon fixation

27. Which of the following inhibits O₂ release in light phase?

- a) PMA b) zeatin c) DCMU d) none of these

28. Light reactions take place in

- a) stroma b) grana c) cytoplasm d) ER

29. Substrate for photorespiration is

- a) serine b) glycolic acid or glycolate c) IAA d) malic acid

30. Which of the following is not a C₄ plant?

- a) maize b) *Crotolaria* c) Sorghum d) none of these

31. In photosynthesis carbon dioxide is converted to carbohydrates. It is a _____

- a) oxidative b) reductive c) catabolic d) none of these

32. Oxygen evolved during photosynthesis comes from

- a) Carbohydrates b) water c) carbon dioxide d) chlorophyll

33. Green plants kept in light can produce ATP from glucose. This process is referred to as

- a) oxidative phosphorylation b) glycolysis c) TCA cycle d) none of these

34. The first product of CO₂ fixation in C₄ plants is

- a) PGA b) oxaloacetic acid c) malic acid d) PEP

35. Hill reaction was demonstrated

- a) in the absence of water b) in the absence of carbon dioxide c) in the presence of carbon dioxide d) in the absence of a suitable electron acceptor

36. First transitory chemical formed by reaction between CO₂ and RuBP is

- a) PGAL/GAP b) 2 carboxy, 3-teto, 1-5 biphosphoribotol c) PGA d) dihydroxy acetone phosphate

37. Which of the following acts as an acceptor of CO₂ in C₃ plants?

- a) Glycerate phosphate b) Glucose diphosphate c) Sedoheptulose d) Ribulose biphosphate

38. Which of the following characteristics out of A, B and C are exhibited by C₄ plants?

A – Kranz anatomy B – The first product of photosynthesis is oxaloacetic acid C – Both Pep carboxylase and ribulose bisphosphate carboxylase act as carboxylating enzymes. The correct answer is

- 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

39. In C₄ plants synthesis of sugars/final CO₂ fixation occurs in

- a) epidermis cells b) spongy cells c) undifferentiated mesophyll cells d) bundle sheath cells

40. Dichlorophenyl dimethyl urea (DCMU)

- a) inhibits O₂ evolution and non-cyclic photophosphorylation
- b) promotes O₂ evolution and non-cyclic photophosphorylation
- c) none of these
- d) both (a) and (b)

41. Which of the following is a C₄ plant?

- a) Potato
- b) Mustard
- c) Maize
- d) Wheat

42. The carboxylating enzyme present in the bundle sheath cells of maize leaves is

- a) PEP –carboxylase
- b) RuBP carboxylase
- c) carbonic anhydrase
- d) hexokinase

43. Which one of the following is not paired correctly?

- a) Krebs – tricarboxylic acid cycle
- b) Koshland – induced fit theory
- c) Mitchell – not-cyclic photophosphorylation
- d) Singer and Nicholson – fluid mosaic model

44. Which part of leaf is meant for photosynthesis and gaseous exchange?

- a) Bundle sheath with chloroplasts
- b) Bundle sheath extensions
- c) Palisade parenchyma
- d) Spongy parenchyma

45. The seat of dark reaction of photosynthesis is

- a) grana
- b) thylakoids
- c) stroma
- d) intergranary fibres

46. Photosynthetic unit is called as

- a) sphaerosome
- b) lysosome
- c) quantasome
- d) dictyosome

47. In the light reaction of photosynthesis, NADPH₂, and ATP

- a) non-cyclic photophosphorylation
- b) cyclic photophosphorylation
- c) both cyclic and non cyclic photophosphorylation
- d) Calvin cycle

48. In C₄ plants, CO₂ is accepted by

- a) pyruvate to form oxaloacetate
- b) pyruvate to form malate
- c) phosphoenol pyruvate to form oxaloacetate
- d) oxaloacetate to form malate

49. For each molecule of glucose formed in plants during photosynthesis, the number of molecules of ATP and NADPH₂ required respectively are

- a) 18 and 12
- b) 24 and 16
- c) 12 and 18
- d) 12 and 24

50. RuBisCo is an enzyme for

- a) CO₂ fixation in dark reaction
- b) photorespiration
- c) regeneration of RuBP
- d) photolysis of water

51. The receptor molecule in plants that responds to changes in light is

- a) phytochrome
- b) cytochrome
- c) ferredoxin
- d) vernalin

52. Non cyclic photophosphorylation during photosynthesis produces

- a) NADPH
- b) NADP
- c) NADH
- d) NAD

53. Number of the chlorophyll arranged per reaction centre in the light harvesting complex are

- a) 100 b) 200 c) 300 d) 400

54. _____ is a CAM plant?

- a) maize b) pineapple c) onion d) pea

55. Common immediate source of energy is

- a) AMP b) ADP c) ATP d) GTP

56. Cryptochrome is

- a) yellow light absorbing pigment b) pigment of cryptogams
c) red light absorbing pigment d) blue light absorbing pigment

57. In which plant Calvin experimented by radioactive isotopy to discover the stable product of C₃ cycle?

- a) *Chlorella* b) *Cycas* c) Carrot d) Tobacco

58. Enzymes of photorespiration is/are present in

- a) mitochondria b) chloroplast c) peroxisomes d) mitochondria, chloroplast and peroxisomes

59. Photorespiration is seen in

- a) chloroplast, peroxisomes and ribosome b) photosynthetic cell c) nonphotosynthetic cell d) both (a) and (b)

60. Which one carries out photosynthesis without evolution of O₂?

- a) Green plant b) Members of rhodophyceae c) phototrophic bacteria d) BGA