

Dr. Rafiq Zakaria Campus  
Maulana Azad College of Arts, Science and Commerce.

**Department of Botany**

(Question Bank)

Class: B.Sc. II. Semester: IV

Paper Name: **Plant Physiology**. Paper Number: **XII**

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**UNIT 1.**

1. Describe the process of active and passive absorption of water.
2. Discuss briefly cohesion theory of ascent of sap.
3. Define transpiration and add a note on types of transpiration.
4. Discuss briefly the mechanism of opening and closing of stomata.
5. What is an essential element? Describe the role of calcium and magnesium in plant life.
6. What are micronutrients? Describe the role of any three micronutrients in plant life.
7. Give an account of the mass flow hypothesis of the transport of organic solutes.

**UNIT 2.**

1. Describe briefly the molecular mechanism of enzyme action.
2. Describe briefly nomenclature and classification of enzymes.
3. What are enzymes? Describe in brief the properties of enzymes.
4. What are Auxins? Explain their role and practical applications.
5. What are Gibberelins? Explain their role and practical applications.

**UNIT 3.**

1. Describe in detail Calvin Cycle.
2. Distinguish between C<sub>3</sub> and C<sub>4</sub> Pathways.
3. Describe red drop and Emerson's enhancement effect.
4. What is photophosphorylation? Describe Z scheme of electron transfer.
5. Describe in detail Kreb's
6. Describe in detail EMP pathway.

**Short Notes:**

- a. Diffusion.
- b. Osmosis
- c. Plasmolysis
- d. Imbibition
- e. Ascent of sap (Transpiration pull theory)
- f. Types of transpiration
- g. Protoplasmic streaming theory
- h. Source and sink
- i. ATP
- j. Cytokinins
- k. ABA
- l. Ethylene
- m. Ultrastructure of chloroplast
- n. Hill's reaction
- o. Red drop
- p. Photosystem I & II
- q. CAM
- r. Fermentation.

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**1. Transpiration is least in**

- (a) good soil moisture
- (b) high wind velocity
- (c) dry environment
- (d) high atmospheric humidity.

**Answer: d**

**2. Stomata open and close due to**

- (a) circadian rhythm
- (b) genetic clock
- (c) pressure of gases inside the leaves
- (d) turgor pressure of guard cells.

**Answer: d**

**3. Phytochrome is involved in**

- (a) phototropism
- (b) photorespiration
- (c) photoperiodism
- (d) geotropism.

**Answer: c**

**4. Gibberellins promote**

- (a) seed germination

- (b) seed dormancy
- (c) leaf fall
- (d) root elongation

**Answer: a**

**5. Cut or excised leaves remain green for long if induced to root or dipped in**

- (a) gibberellins
- (b) cytokinins
- (c) auxins
- (d) ethylene.

**Answer: b**

**6. Hormone primarily connected with cell division is**

- (a) IAA
- (b) NAA
- (c) cytokinin/zeatin
- (d) gibberellic acid

**Answer: c**

**7. Carbon dioxide joins the photosynthetic pathway in**

- (a) PS I
- (b) PS II
- (c) light reaction
- (d) dark reaction.

**Answer: d**

**8. NADP<sup>+</sup> is reduced to NADPH in**

- (a) PS I
- (b) PS II
- (c) Calvin cycle
- (d) noncyclic photophosphorylation.

**Answer: d**

**9. Minerals absorbed by root move to the leaf through**

- (a) xylem
- (b) phloem
- (c) sieve tubes
- (d) none of the above.

**Answer: a**

**10. Phosphorous and nitrogen ions generally get depleted in soil because they usually occur as**

- (a) neutral ions
- (b) negatively charged ions
- (c) positively charged ions
- (d) both positively and negatively charged but disproportionate mixture.

**Answer: b**

**11. Which one is an essential mineral, not constituent of any enzyme but stimulates the activity of many enzymes**

- (a) Zn
- (b) Mn
- (c) K
- (d) Mg. **Answer: c**

**12. Which one increases in the absence of light?**

- (a) uptake of minerals
- (b) uptake of water
- (c) elongation of internodes
- (d) ascent of sap.

**Answer: c**

**13. Leaf fall can be prevented with the help of**

- (a) abscisic acid
- (b) auxins
- (c) florigen
- (d) cytokinins.

**Answer: d**

**14. Which of the following hormones can replace vernalisation?**

- (a) auxin
- (b) cytokinin
- (c) gibberellins
- (d) ethylene.

**Answer: c**

**15. In C<sub>4</sub> plants, Calvin cycle operates in**

- (a) stroma of bundle sheath chloroplasts
- (b) grana of bundle sheath chloroplasts
- (c) grana of mesophyll chloroplasts
- (d) stroma of mesophyll chloroplasts.

**Answer: a**

**16. Greatest producers of organic matter are**

- (a) crop plants
- (b) forests
- (c) plants of the land area
- (d) phytoplankton of oceans.

**Answer and Explanation: d**

**17. The principal pathway of water translocation in angiosperms is**

- (a) sieve cells
- (b) sieve tube elements
- (c) xylem vessel system
- (d) xylem and phloem.

**Answer: c**

**18. Abscissic acid controls**

- (a) cell division
- (b) leaf fall and dormancy
- (c) shoot elongation
- (d) cell elongation and wall formation.

**Answer: b**

**19. Highest auxin concentration occurs**

- (a) in growing tips
- (b) in leaves
- (c) at base of plant organs
- (d) in xylem and phloem.

**Answer: a**

**20. Kranz anatomy is typical of**

- (a) C<sub>4</sub> plants
- (b) C<sub>3</sub> plants
- (c) C<sub>2</sub> plants
- (d) CAM plants

**Answer: a**

**21. The first carbon dioxide acceptor in C<sub>4</sub>-plants is**

- (a) phosphoenol-pyruvate
- (b) ribulose 1, 5-diphosphate
- (c) oxalo-acetic acid
- (d) phosphoglyceric acid.

**Answer: a**

**22. In soil, the water available for root absorption is**

- (a) gravitational water
- (b) capillary water
- (c) hygroscopic water
- (d) combined water.

**Answer: b**

**23. The most widely accepted theory for ascent of sap in trees is**

- (a) capillarity
- (b) role of atmospheric pressure
- (c) pulsating action of living cell
- (d) transpiration pull and cohesion theory of Dixon and Jolly.

**Answer: d**

**24. A chemical believed to be involved in flowering is**

- (a) gibberellin
- (b) kinetin
- (c) florigen
- (d) IBA.

**Answer: c**

**25. The hormone responsible for apical dominance is**

- (a) IAA
- (b) GA
- (c) ABA
- (d) Florigen.

**Answer: a**

**26. Abscisic acid causes**

- (a) stomatal closure
- (c) leaf expansion
- (b) stem elongation
- (d) root elongation.

**Answer: a**

**27. Photosynthetic pigments found in the chloroplasts occur in**

- (a) thylakoid membranes
- (b) plastoglobules
- (c) matrix
- (d) chloroplast envelope.

**Answer: a**

**28. Dark reactions of photosynthesis occur in**

- (a) granal thylakoid membranes
- (b) stromal lamella membranes
- (c) stroma outside photosynthetic lamellae
- (d) periplastidial space.

**Answer: c**

**29. Ferredoxin is a constituent of**

- (a) PS I
- (b) PS II
- (c) Hill reaction
- (d) P<sub>680</sub>.

**Answer: a**

**30. Water movement between cells is due to**

- (a) T.P.
- (b) W.P.
- (c) D.P.D.
- (d) incipient plasmolysis.

**Answer: c**

**31. Which of the following is used to determine the rate of transpiration in plants?**

- (a) poromeer/hygrometer
- (b) potometers
- (c) auxanometer
- (d) tensiometer/barometer.

**Answer: b**

**32. Conversion of starch to organic acids is required for**

- (a) stomatal opening
- (b) stomata! closing
- (c) stomatal formation
- (d) stomatal activity.

**Answer: a**

**33. At constant temperature, the rate of transpiration will be higher at**

- (a) sea level
- (b) 1 km below sea level
- (c) 1 km above sea level
- (d) 1.5 km above sea level.

**Answer: d**

**34. In guard cells when sugar is converted into starch, the stomatal pore**

- (a) closes completely
- (b) opens partially
- (c) opens fully
- (d) remains unchanged.

**Answer: a**

**35. Which is employed for artificial ripening of banana fruits?**

- (a) auxin
- (b) coumarin
- (c) ethylene
- (d) cytokinin.

**Answer: c**

**35. Apical dominance is caused by**

- (a) abscisic acid in lateral bud
- (b) cytokinin in leaf tip
- (c) gibberellin in lateral buds
- (d) auxin in shoot tip.

**Answer: d**

**36. Dwarfness can be controlled by treating the plant with**

- (a) cytokinin
- (b) gibberellic acid
- (c) auxin
- (d) antigibberellin.

**Answer: b**

**37. The enzyme that catalyses carbon dioxide fixation in C<sub>4</sub> plants is**

- (a) RuBP carboxylase
- (b) PEP carboxylase
- (c) Carbonic anhydrase
- (d) Carboxydismutase.

**Answer: b**

**38. Photosystem II occurs in**

- (a) stroma
- (b) cytochrome
- (c) grana
- (d) mitochondrial surface.

**Answer: c**

**39. Chlorophyll a occurs in**

- (a) all photosynthetic autotrophs
- (b) in all higher plants
- (c) help retain chlorophyll
- (d) inhibit protoplasmic streaming.

**Answer: a**

**40. Which is produced during water stress that brings stomatal closure?**

- (a) ethylene
- (b) abscisic acid
- (c) ferulic acid
- (d) coumarin.

**Answer: b**

**41. The hormone produced during adverse environmental conditions is**

- (a) benzyl aminopurine
- (b) bichlorophenoxy acetic acid
- (c) ethylene
- (d) abscisic acid.

**Answer: d**

**42. The regulator which retards ageing/senescence of plant parts is**

- (a) cytokinin
- (b) auxin
- (c) gibberellin
- (d) abscisic acid.

**Answer: a**

**43. Removal of apical bud results in**

- (a) formation of new apical bud
- (b) elongation of main stem
- (c) death of plant
- (d) formation of lateral branching.

**Answer: d**

**44. Translocation of carbohydrate nutrients usually occurs in the form of**

- (a) glucose
- (b) maltose
- (c) starch
- (d) sucrose.

**Answer: d**

**45. Which one is a C<sub>4</sub>-plant?**

- (a) papaya
- (b) pea
- (c) potato
- (d) maize/corn

**Answer: d**

**46. The carbon dioxide acceptor in Calvin cycle/ C<sub>3</sub>-plants is**

- (a) phospho-enol pyruvate (PEP)
- (b) ribulose 1, 5-diphosphate (RuBP)
- (c) phosphoglyceric acid (PGA)
- (d) ribulose monophosphate (RMP).

**Answer: b**

47. Maximum solar energy is trapped by

- (a) planting trees
- (b) cultivating crops
- (c) growing algae in tanks
- (d) growing grasses.

Answer: c

48. During light reaction of photosynthesis, which of the following phenomenon is observed during cyclic phosphorylation as well as non-cyclic phosphorylation?

- (a) release of O<sub>2</sub>
- (b) formation of ATP
- (c) formation of NADPH
- (d) involvement of PS I and PS II pigment systems.

Answer: b

49. Which of the following pigments acts as a reaction- centre during photosynthesis?

- (a) carotene
- (b) phytochrome
- (c) P<sub>700</sub>
- (d) cytochrome.

Answer: c

50. If the growing plant is decapitated, then

- (a) its growth stops
- (b) leaves become yellow and fall down
- (c) axillary buds are inactivated
- (d) axillary buds are activated.

Answer: d

51. The movement of auxin is largely

- (a) centripetal
- (b) basipetal
- (c) acropetal
- (d) both 'a' and 'c'.

Answer: b

52. The movement of water, from one cell of cortex to adjacent one in roots, is due to

- (a) accumulation of inorganic salts in the cells
- (b) accumulation of organic compounds in the cells
- (c) water potential gradient
- (d) chemical potential gradient.

Answer: c

53. The CO<sub>2</sub> fixation during C<sub>4</sub> pathway occurs in the chloroplast of

- (a) guard cells
- (b) bundle sheath cells
- (c) mesophyll cells
- (d) spongy parenchyma.

Answer: c

54. Which of the following element plays an important role in biological nitrogen fixation?

- (a) copper
- (b) molybdenum
- (c) zinc
- (d) manganese.

Answer: b

55. Which one of the following elements is almost nonessential for plants?

- (a) Zn
- (b) Na
- (c) Ca
- (d) Mo.

Answer: b

56. When water enters in roots due to diffusion, is termed as

- (a) osmosis
- (b) passive absorption
- (c) endocytosis
- (d) active absorption.

Answer: b

57. What will be the number of Calvin cycles to generate one molecule of hexose?

- (a) 8
- (b) 9
- (c) 4
- (d) 6.

Answer: d

58. 'The law of limiting factors' was proposed by

- (a) Leibig
- (b) Hatch and Slack
- (c) Blackman
- (d) Arnon.

Answer: c

59. The correct sequence of electron acceptor in ATP synthesis is

- (a) Cyt. b, c, a<sub>3</sub>, a
- (b) Cyt. c, b, a, a<sub>3</sub>
- (c) Cyt. o, a, b, c
- (d) Cyt. b, c, a, a<sub>3</sub>.

Answer: d

60. Bidirectional translocation of solutes takes place in

- (a) parenchyma
- (b) cambium
- (c) xylem
- (d) phloem.

Answer: d

61. Gibberellic acid induces flower

- (a) in short day plants under long day conditions
- (b) in day-neutral plants under dark conditions
- (c) in some gymnospermic plants only
- (d) in long day plants under short day conditions.

Answer: d

62. With an increase in the turgidity of a cell, the wall pressure will be

- (a) fluctuate
- (b) remain unchanged
- (c) increase
- (d) decrease.

Answer: c

63. Which of the following is not caused by deficiency of mineral nutrition?

- (a) etiolation
- (b) shortening of internode
- (c) necrosis
- (d) chlorosis.

Answer: a

64. When a cell is fully turgid, which of the following will be zero?

- (a) turgor pressure
- (b) water potential
- (c) wall pressure
- (d) osmotic pressure.

Answer: b

65. NADPH<sub>2</sub> is generated through

- (a) photosystem II
- (b) anaerobic respiration
- (c) glycolysis
- (d) photosystem I.

Answer: d

66. A pigment which absorbs red and far-red light is

- (a) Cytochrome
- (b) xanthophyll
- (c) phytochrome
- (d) carotene.

Answer: c

67. The core metal of chlorophyll is

- (a) Ni
- (b) Cu
- (c) Fe
- (d) Mg.

Answer: d

68. Chlorophyll-a molecule at its carbon atom 3 of the pyrrole ring II has one of the following

- (a) carboxylic group
- (b) magnesium
- (c) aldehyde group
- (d) methyl group.

Answer: d

69. Which combination of gases is suitable for fruit ripening?

- (a) 80 % CH<sub>4</sub> and 20% CO<sub>2</sub>
- (b) 80% CO<sub>2</sub> and 20% O<sub>2</sub>
- (c) 80% C<sub>2</sub>H<sub>4</sub> and 20% CO<sub>2</sub>
- (d) 80% CO<sub>2</sub> and 20% CH<sub>2</sub>.

Answer: c

70. A plant hormone used for inducing morphogenesis in plant tissue culture is

- (a) cytokinins
- (b) ethylene
- (c) abscisic acid
- (d) gibberellins.

Answer: a

71. The rate of photosynthesis is higher in

- (a) very high light
- (b) continuous light
- (c) red light
- (d) green light.

Answer: c

72. ABA is involved in

- (a) shoot elongation
- (b) increased cell division
- (c) dormancy of seeds
- (d) root elongation.

Answer: c

73. In soil, water available for plants is

- (a) gravitational water
- (b) chemically bound water
- (c) capillary water
- (d) hygroscopic water.

Answer: c

74. The first step for initiation of photosynthesis will be

- (a) photolysis of water
- (b) excitement of chlorophyll molecules due to absorption of light
- (c) ATP formation
- (d) glucose formation.

Answer: b

75. When the plants are grown in magnesium deficient but urea rich soil, the symptoms expressed are

- (a) yellowish leaves
- (b) colourless petiole
- (c) dark green leaves
- (d) shoot apex die.

Answer: a

76. Plants take zinc in the form of

- (a)  $ZnSO_4$
- (b) Zn
- (c) ZnO
- (d) Zn.

Answer: b

77. For assimilation of one  $CO_2$  molecule, the energy required in form of ATP and  $NADPH_2$  are

- (a) 2 ATP and 2  $NADPH_2$
- (b) 5 ATP and 3  $NADPH_2$
- (c) 3 ATP and 2  $NADPH_2$
- (d) 18 ATP and 12  $NADPH_2$ .

Answer: c

78. Which hormone is responsible for fruit ripening?

- (a) ethylene
- (b) auxin
- (c) ethyl chloride

(d) cytokinin.

Answer: a

79. By which action a seed coat becomes permeable, to water

- (a) scarification
- (b) stratification
- (c) vernalization
- (d) all of the above.

Answer: a

80. The movement of ions against the concentration gradient will be

- (a) active transport
- (b) osmosis
- (c) diffusion
- (d) all of the above

Answer: a

81. Mg is a component of

- (a) chlorophyll
- (b) cytochrome
- (c) haemoglobin
- (d) haemocyanin.

Answer: a

82. Which pair is wrong?

- (a) C<sub>3</sub>-maize
- (b) C<sub>4</sub>-kranz anatomy
- (c) Calvin cycle-PGA
- (d) Hatch and Slake cycle – O.A.A.

Answer: a

83. Which hormone breaks dormancy of potato tuber?

- (a) gibberellins
- (b) IAA
- (c) ABA
- (d) zeatin.

Answer: a

84. Hormone responsible for senescence is

- (a) ABA
- (b) auxin
- (c) GA
- (d) cytokinin.

Answer: a

85. Which of the following prevents the fall of fruits?

- (a) GA<sub>3</sub>
- (b) NAA
- (c) ethylene
- (d) zeatin.

Answer: b

86. Which pigment system is inactivated in red drop?

- (a) PS-I and PS-II
- (b) PS-I
- (c) PS-II

(d) none of the above.

Answer: c

87. Passive absorption of minerals depend on

- (a) temperature
- (b) temperature and metabolic inhibitor
- (c) metabolic inhibitor
- (d) humidity.

Answer: a

88. Cytochrome is

- (a) metallo flavo protein
- (b) Fe containing porphyrin pigment
- (c) glycoprotein
- (d) lipid.

Answer: b

89. Roots of which plant contains a red pigment which have affinity for oxygen

- (a) carrot
- (b) soyabean
- (c) mustard
- (d) radish.

Answer: b

90. Opening and closing of stomata is due to the

- (a) hormonal change in guard cells
- (b) change in turgor pressure of guard cells
- (c) gaseous exchange
- (d) respiration. Answer: b

91. In photosynthesis energy from light reaction to dark reaction is transferred in the form of

- (a) ADP
- (b) ATP
- (c) RuDP
- (d) chlorophyll.

Answer: b

92. Which of the following absorb light energy for photosynthesis?

- (a) chlorophyll
- (b) water molecule
- (c) Hormone
- (d) RuBP.

Answer: a

93. Main function of lenticel is

- (a) transpiration
- (b) guttation
- (c) gaseous exchange
- (d) bleeding.

Answer: c

94. Which one of the following concerns photophosphorylation?

- (a) ADP + AMP ATP
- (b) ADP + Inorganic PQ,
- (c) ADP + Inorganic  $PO_4$  ATP
- (d) AMP + Inorganic PQ, ATP

Answer: b

95. 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

Answer: c

96. Differentiation of shoot is controlled by

- (a) high auxin : cytokinin ratio
- (b) high cytokinin : auxin ratio
- (c) high gibberellin : auxin ration
- (d) high gibberellin : cytokinin ratio

Answer: b

97. Plants deficient of element zinc, show its effect on the biosynthesis of plant growth hormone

- (a) auxin
- (b) cytokinin
- (c) ethylene
- (d) abscisic acid

Answer: a

98. Which one of the following is wrong in relation to photorespiration?

- (a) it occurs in chloroplast
- (b) it occurs in day time only
- (c) it is a characteristic of C<sub>4</sub> plants
- (d) it is a characteristic of C<sub>3</sub> plants

Answer: c

99. Which fractions of the visible spectrum of solar radiations are primarily absorbed by carotenoids of the higher plants?

- (a) blue and green
- (b) green and red
- (c) red and violet
- (d) violet and blue

Answer: d

100. Coconut milk factor is

- (a) an auxin
- (b) a gibberellin
- (c) abscisic acid
- (d) cytokinin

Answer: d