

UNIT – V – PLANT PHYSIOLOGY (FUNCTIONAL ORGANISATION)**CHAPTER - 11
TRANSPORT IN PLANTS****TRY AND TEST YOURSELF****LEVEL – I (1 - 50 Questions)**

- In a fully turgid cell
 - DPD = 10 atm; OP = 5 atm; TP = 10 atm
 - DPD = 0 atm; OP = 10 atm; TP = 10 atm
 - DPD = 0 atm; OP = 5 atm; TP = 10 atm
 - DPD = 20 atm; OP = 20 atm; TP = 10 atm
- Which among the following is correct?
 - apoplast is fastest and operate in nonliving part
 - Transmembrane route includes vacuole
 - symplast interconnect the nearby cell through plasmadesmata
 - symplast and transmembrane route are in living part of the cell
 - (i) and (ii)
 - (ii) and (iii)
 - (iii) and (iv)
 - (i), (ii), (iii), (iv)
- What type of transpiration is possible in the xerophyte Opuntia?
 - Stomatal
 - Lenticular
 - Cuticular
 - All the above
- Stomata of a plant open due to
 - Influx of K^+
 - Efflux of K^+
 - Influx of Cl^-
 - Influx of OH^-
- Munch hypothesis is based on
 - Translocation of food due to TP gradient and imbibition force
 - Translocation of food due to TP
 - Translocation of food due to imbibition force
 - None of the above
- Find out the correct statement of the following about the characteristics of diffusion.
 - It is a passive process, hence no energy expenditure involved.
 - It is independent of the living system.
 - Diffusion is obvious in gases and liquids.
 - The rate of diffusion is determined by temperature, concentration gradient and relative density.
 - (i) and (ii)
 - (ii) and (iii)
 - (iii) and (iv)
 - (i), (ii), (iii) and (iv)
- Over _____ types of aquaporins are known from maize.
 - 10
 - 20
 - 30
 - 40
- An _____ is an integral membrane transport protein that simultaneously transports two different molecules, in opposite directions, across the membrane.
 - Antiport
 - Symport
 - Uniport
 - triport
- Pumps use a source of free energy such as ATP or _____ to drive the thermodynamically uphill transport of ions or molecules.
 - Dark
 - Light
 - temperature
 - pH
- Passive transport uses _____ energy of molecules moving down a gradient.
 - cellular energy
 - ATP
 - ADP
 - Kinetic
- The protoplasm of plants is made up of _____ of water.
 - 40 – 50%
 - 50 – 60%
 - 60 – 80%
 - 80 – 90%

12. The swelling of dry seeds, the swelling of wooden windows, tables, doors during the rainy season due to _____ phenomenon.
a) Imbibition b) Diffusion c) Osmosis d) Reverse osmosis
13. Matric Potential is also known as _____ pressure.
a) osmotic pressure b) imbibition pressure c) osmotic potential d) Turgor
14. Osmotic pressure is increased with the increase of _____ solutes in the solution.
a) additional b) delete c) dissolved d) None of them
15. Turgor pressure and wall pressure make the cell fully _____.
a) DPD b) TP c) WP d) Turgid
16. DPD in normal cell: $DPD = \text{_____} TP$.
a) $OP - TP$ b) $OP - WP$ c) $TP - WP$ d) $DPD = OP$
17. _____ is a special type of diffusion.
a) wall pressure b) Osmotic pressure c) Turgor pressure d) Osmosis
18. This is a strong solution, high solute which attracts solvent from other solutions.
a) Hypotonic b) Hypertonic c) Isotonic d) Suction pressure
19. _____ in a plant cell leads to plasmolysis.
a) Endosmosis b) Diffusion c) Imbibition d) Exosmosis
20. _____ is used for purification of drinking water and desalination of seawater.
a) Endosmosis b) Exosmosis c) Reverse Osmosis d) Plasmolysis
21. Wilting of leaves appear in _____ plasmolysis.
a) Incipient plasmolysis b) Evident plasmolysis
c) Starting plasmolysis d) Final plasmolysis
22. _____ is the cytoplasmic channel that interconnects one cell to another cell.
a) Cell wall b) Dead cell c) Plasmodesmata d) protoplasm
23. Vacuole has _____ membrane.
a) Plasma membrane b) Semipermeable membrane c) Impermeable d) Tonoplast
24. These are objections to _____ theory.
a) cell sap concentration b) Root pressure c) both of them d) Osmotic
25. _____ are applied there is a decrease in the rate of respiration and also the rate of absorption of water.
a) ATP b) Chloroform c) KCN d) DPD
26. J. C) Bose invented an instrument called _____ which consists of an electric probe connected to a galvanometer.
a) Crescograph b) Light microscope
c) Compound microscope d) Electron microscope
27. Strasburger and Overton proved that living cells are not mandatory for the ascent of sap. They selected an old oak tree trunk which when immersed in _____ acid and subjected to excessive heat killed all the living cells of the trunk.
a) Sulphuric acid b) Nitric acid c) Picric acid d) Lactic acid
28. Ascent of sap continues even in the absence of _____.
a) leaf b) Stem c) branch d) Root
29. Root pressure is totally absent in _____ which includes some of the tallest plants.
a) Angiosperms b) Gymnosperms c) Pteridophyte d) Bryophytes
30. Capillary theory was suggested by
a) Sachs in 1878 b) Unger in 1876 c) Boehm in 1809 d) Priestly
31. Unger proposed Imbibition theory and supported by _____ in 1878.
a) Strasburger b) Overton c) J. C) Bose d) Sachs

32. Dixon and Jolly proposed the following theory.
a) Capillary theory b) Cohesion-tension theory c) Imbibition theory d) Pulsation theory
33. An important factor which can break the water column is the introduction of _____ in the xylem.
a) water molecule b) cohesion c) adhesion d) air bubble
34. Transpiration pull acts like a rope which connects _____ to root hairs.
a) stem b) leaves c) flower d) buds
35. This is the most dominant form of transpiration and being responsible for most of the water loss (90 - 95%) in plants.
a) Stomatal b) Lenticular c) Cuticular d) None of them
36. The _____ is a waxy or resinous layer of cutin, a fatty substance covering the epidermis of leaves and other plant parts.
a) Endodermis b) cuticle c) Pericycle d) Stele
37. The stoma opens to the interior into a cavity called _____ cavity which remains connected with the intercellular spaces.
a) Guard cells b) accessory cells c) Sub- stomatal d) Subsidiary cells
38. Theory of Photosynthesis in guard cells proposed by _____ in 1856. He observed that stomata open in light and close in the night.
a) Von Mohl b) Lloyd c) Loftfield d) Sayre
39. Sayre in 1920 observed that the opening and closing of stomata depends upon change in _____ of guard cells.
a) Light b) Temperature c) pH d) heat
40. The discovery of enzyme _____ in guard cells by Hanes in 1940 greatly supports the starch-sugar interconversion theory.
a) Sulphatase b) Carboxylase c) Deoxydiase d) phosphorylase
41. Theory of K⁺ transport was proposed by Levit in 1974 and elaborated by _____ in 1975.
a) Hanes b) Gudlewski c) Raschke d) Curtis
42. In guard cell, _____ is converted into organic acid (malic acid).
a) Protein b) Starch c) Lipid d) mineral
43. Low pH and a shortage of water in the guard cell activate the stress hormone _____.
a) Abscisic acid b) Auxin c) Ethylene d) Gibbrellin
44. On hot summer days, the freshness of herbaceous plants reduces turgor pressure at the day time and regains it at night. This kind of wilting is known as
a) Incipient wilting b) Temporary wilting
c) Special wilting d) Permanent wilting
45. To avoid _____, as in Opuntia the stem is flattened to look like leaves called Phylloclade.
a) Photosynthesis b) Storage c) Transpiration d) respiration
46. Example for Cladode or cladophyll in _____ is a modified stem capable of limited growth looking like leaves.
a) Agave b) Asparagus c) Aloe d) Bryophyllum
47. In Acacia melanoxylon, the petioles are flattened and widened, to become _____.
a) Cladode b) Phylloclade c) cladophyll d) phyllode
48. Antitranspirants reduce the enormous loss of water by transpiration in _____ plants.
a) Hydrophytic b) Xerophytic c) Crop d) Trees

49. The liquid coming out of hydathode is not pure water but _____ containing a number of dissolved substances.
a) impure b) water vapour c) solution d) solvent
50. When we place a dry Cobalt chloride on both sides of the leaf, the lower epidermis turns _____.
a) Pink b) Red c) Blue d) Violet

LEVEL – II (51 - 100 Questions)

51. Transpiration is a “_____evil” as stated by Curtis.
a) Positive b) Negative c) necessary d) unnecessary
52. The site of food productive organ _____.
a) Leaf b) Stem c) Root d) Flower
53. _____ is the path of translocation of solutes.
a) Parenchyma b) Phloem c) xylem d) Sclereids
54. In Ringing experiment, involves the removal of all the tissue outside to vascular cambium in woody stems except _____.
a) bark b) Cortex c) Phloem d) Xylem
55. The food translocate from _____ to stem and roots is called downward direction.
a) Root b) Leaves c) Stem d) Radicle
56. From cells of pith to cortex and epidermis, the food materials are _____ translocated.
a) Downwardly b) upwardly c) laterally d) radially
57. Sucrose leave from sieve elements are called
a) loading b) Sieve element unloading
c) Short distance transport d) Storage and metabolism
58. Activated diffusion theory was first proposed by
a) Mason b) Maskell c) both of them d) none of them
59. Fenson in 1957 and Spanner in 1958 proposed
a) Diffusion hypothesis b) Munch Mass Flow hypothesis
c) Electro-Osmotic theory d) Activated diffusion theory
60. _____ flow theory was first proposed by Munch in 1930 and elaborated by Crafts in 1938.
a) Munch b) Mass c) Munch Mass d) Mass Munch
61. Entry of the ion into cell is called
a) Influx b) Efflux c) both of them d) none of them
62. _____ to this theory, soil solution plays an important role by acting as a medium for ion exchange.
a) Ion-Exchange b) Contact Exchange Theory
c) Carbonic Acid Exchange Theory d) Carrier Concept
63. Carrier Concept was proposed by Van den Honert in 1937. The _____ is largely impermeable to free ions.
a) Cell wall b) Cytoplasm c) Chloroplast d) Cell membrane
64. Lundegardh proposed _____ theory in 1950 -1954 by observing anion respiration or salt respiration.
a) Cytochrome Pump b) Active transport c) Passive transport d) Diffusion
65. In 1956, Bennet-Clark proposed that the carrier could be a protein associated with phosphatide called as _____.
a) Cytochrome b) Phytochrome c) Lecithin d) Phycobilins

66. Lecithin-ion complex is broken down into _____ acid and choline along with the liberation of ions.
 a) Phosphoric b) Sulphuric c) Hydrochloric d) phosphatidic
67. The electrical balance or equilibrium controlled by electrical as well as _____ phenomenon is known as the Donnan equilibrium.
 a) Imbibition b) Diffusion c) Osmosis d) Absorption

NEET BASED QUESTIONS:

68. The water potential of pure water is _____ (NEET 2017)
 a) Less than zero b) More than zero but less than one
 c) More than one d) Zero
69. Transpiration and root pressure cause water to rise in plants by _____ (NEET 2015)
 a) pulling it upward b) pulling and pushing it, respectively
 c) pushing it upward d) pushing and pulling it, respectively
70. Movement of ions or molecules in a direction opposite to that of prevailing electro-chemical gradient is known as _____ (C.B.S.E. 2000)
 a) Active transport b) Pinocytosis c) Brownian movement d) Diffusion
71. Correct sequence of events in wilting? (P.M.T. Kerala 2001)
 a) Exosmosis-deplasmolysis-temporary and permanent wilting
 b) Exosmosis-plasmolysis-temporary and permanent wilting
 c) Endosmosis-plasmolysis-temporary and permanent wilting
 d) Endosmosis-deplasmolysis – temporary and permanent wilting
 e) Exosmosis-deplasmolysis-plasmolysis - temporary and permanent wilting
72. What will be the direction of net osmotic movement of water if a solution 'A', enclosed in a semi permeable membrane, having an osmotic potential of '- 30' bars and turgor pressure of '5' bars is submerged in a solution 'B' with an osmotic potential of '- 10' bars and '0' turgor pressure? (C.E.T. Karnataka 2002)
 a) Equal movement in both directions b) 'B' to 'A'
 c) No movement d) 'A' to 'B'
73. The pressure exerted by a swollen vacuole on the cell wall is _____ (C.M.C Vellore 2002)
 a) OP b) WP c) TP d) DPD
74. Who said that 'transpiration is a necessary evil'? (JIPMER-2006)
 a) Curtis b) Steward c) Anderson d) J. C. Bose
75. Which one gives the most valid and recent explanation for stomatal movements? (NEET 2015)
 a) Transpiration b) Potassium influx and efflux
 c) Starch hydrolysis d) Guard cell photosynthesis
76. Carrier proteins are involved in _____ (P M T - UP-1998)
 a) Active transport of ions b) Passive transport of ions
 c) Water transport d) Water evaporation
77. Active transport of ions in the cell requires _____ (PMT MP 2002)
 a) High temperature b) ATP c) Alkaline pH d) Salts
78. Guttated liquid is _____ (AFMC 2002)
 a) Pure water b) Water plus minerals c) Water plus enzymes d) All of these
79. Stomata of a plant open due to _____ (CBSE 2003)
 a) Influx of potassium ions b) Efflux of potassium ions
 c) Influx of hydrogen ions d) Influx of calcium ions

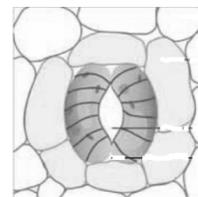
80. Potometer works on the principle of (CBSE 2000)
a) Osmotic pressure
b) Amount of water absorbed equals the amount transpired
c) Potential difference between the tip of the tube and then of the plant
d) Root pressure
81. Most suitable theory for ascent of sap is (CBSE 1991, CPMT-UP 1995)
a) Transpirational pull and cohesion theory of Dixon and Jolly
b) Pulsation theory of J.C) Bose
c) Relay pump theory of Godlewski
d) None of these
82. If a cell kept in a solution of unknown concentration gets deplasmolysed, the solution is, (CPMT-UP 1996)
a) Detonic b) Hypertonic c) Isotonic d) Hypotonic
83. Which is essential for the growth of root tip? (NEET PHASE II 2016)
a) Zn b) Fe c) Ca d) Mn
84. On the basis of symptoms of chlorosis in leaves, a student inferred that this was due to deficiency of nitrogen. The inference could be correct only if we assume that yellowing of leaves appeared first in (AIIMS 2007)
a) old leaves b) young leaves
c) young leaves followed by mature leaves d) mature leaves followed by young leaves.
85. Cytochrome oxidase contains (UP CPMT 2006)
a) Iron b) Magnesium c) Zinc d) Copper
86. Which is correct to saprophytic angiosperms? (UP CPMT 2006)
a) They secrete enzyme outside the body and absorb
b) They have mycorrhizae fungi
c) They take food and then digest it
d) They are photosynthetic
87. The ability of the Venus fly trap to capture insects is due to (JIPMER 2008)
a) chemical stimulation by the prey
b) a passive process requiring no special ability on the part of the plant.
c) Specialized muscle like cells
d) rapid turgor pressure changes
88. Boron in green plants assists in (RPMT 2007)
a) photosynthesis b) Sugar transport
c) activation of enzyme d) acting as enzyme cofactor
89. Which of the following elements is very essential for the uptake of Ca^{2+} and membrane function? (Kerala CEE 2007)
a) phosphorus b) molybdenum c) manganese d) boron
90. Sulphur is not a constituent of (AMU 2011)
a) cysteine b) methionine c) ferredoxin d) pyridoxine
91. Deficiency symptoms of nitrogen and potassium are visible first in _____ (AIPMT 2014)
a) senescent leaves b) young leaves c) roots d) buds
92. The first stable product of fixation of atmospheric nitrogen in leguminous plants is _____ (AIPMT 2013)
a) NO^{-3} b) glutamate c) NO^{-2} d) ammonia

105. Emerson's enhancement effect and Red drop have been instrumental in the discovery of (NEET PHASE I 2016)
- a) two photosystems operating simultaneously
 - b) photophosphorylation and cyclic electron transport
 - c) oxidative phosphorylation
 - d) photophosphorylation and non-cyclic electron transport
106. The process which makes major difference between C₃ and C₄ plants is (NEET PHASE II 2016)
- a) glycolysis
 - b) Calvin cycle
 - c) photorespiration
 - d) respiration
107. Oxidative phosphorylation is (NEET 2016)
- a) formation of ATP by transfer of phosphate group from a substrate to ADP
 - b) oxidation of phosphate group in ATP
 - c) Addition of phosphate group to ATP
 - d) formation of ATP by energy released from electrons during substrate oxidation.
108. Which of the biomolecules is common to respiration-mediated breakdown of fats, carbohydrates and proteins? (NEET 2013, 2016)
- a) glucose-6-phosphate
 - b) fructose 1, 6-bisphosphate
 - c) pyruvic acid
 - d) acetyl CoA
109. Which statement is wrong for Krebs cycle? (NEET 2017)
- a) there is one point in the cycle where FAD is reduced to FADH₂
 - b) during conversion of succinyl CoA to succinic acid, a molecule of GTP is synthesized.
 - c) the cycle starts with condensation of acetyl group acetyl CoA. with pyruvic acid to yield citric acid.
 - d) there are three points in the cycle where NAD⁺ is reduced to NADH+H⁺
110. The three boxes in this diagram represents the three major biosynthetic pathways in aerobic respiration and arrows represent net reacts or products. Arrows numbered 4, 8 and 12 can be (NEET 2013)
- a) ATP
 - b) H₂O
 - c) FAD or FADH₂
 - d) NADH
111. The energy released metabolic process in which substrate is oxidised without an external electron acceptor is called (AIPMT 2010)
- a) glycolysis
 - b) fermentation
 - c) aerobic respiration
 - d) photorespiration
112. Krebs cycle starts with the formation of six carbon compound by a reaction between (CPMT 1980)
- a) malic acid and acetyl coenzyme
 - b) oxaloacetic acid and acetyl coenzyme
 - c) succinic acid and pyruvic acid
 - d) fumaric acid and pyruvic acid
113. Respiration is a process in which (CPMT 1980)
- a) energy is used up
 - b) energy is stored in the form of ADP
 - c) energy is released and stored in the form of ATP
 - d) energy is not released at all
114. The common phase between aerobic and anaerobic respiration is called (CPMT 1984)
- a) glycolysis
 - b) Krebs cycle
 - c) tricarboxylic acid cycle
 - d) oxidative phosphorylation
115. ATP synthesis occurs on/in the (AIIMS 1984)
- a) matrix
 - b) outer membrane of mitochondrion
 - c) inner membrane of mitochondrion
 - d) none of the above
116. Which one of the following acts as a hormone involved in ripening of fruits (CBSE PMT 2000)
- a) naphthalene acetic acid
 - b) ethylene
 - c) indole acetic acid
 - d) zeatin

117. Which 5-carbon organic acid of the Krebs cycle is a key compound in the N₂ metabolism of a cell? (AIIMS 1989)
a) citric acid b) fumaric acid c) oxalo succinic acid d) α-Ketoglutaric acid
118. Coconut milk factor is (PMT 2003)
a) auxin b) gibberellin c) abscisic acid d) cytokinin
119. Banana is seedless because (JIPMER 2004)
a) it produces asexually b) auxin is sprayed c) both A and B d) none of the above
120. Pruning of plants promotes branching due to sensation of axillary buds by (AIIMS 2004)
a) Ethylene b) Gibberellin c) IAA d) Cytokinin
121. Avena curvature test is bioassay for activity of (AIIMS 2006) (NEET 2016)
a) Auxin b) Ethylene c) Cytokinin d) Gibberellin
122. One of the synthetic auxin is (AIPMT 2009)
a) IBA b) NAA c) IAA d) GA
123. Which one of the following acids is derivative of carotenoids? (AIPMT 2009)
a) Abscisic acid b) Indole butyric acid c) Indole – 3 acetic d) Gibberellic acid
124. Photoperiodism was first characterized in (AIPMT 2010)
a) Cotton b) Tobacco c) Potato d) Tomato
125. One of the commonly used plant growth hormone in tea plantations is (AIPMT 2010)
a) Abscisic acid b) Zeatin c) Indole – 3 – acetic acid d) Ethylene
126. Root development is promoted by (AIPMT 2010)
a) Auxin b) Gibberellin c) Ethylene d) Abscisic acid
127. Senescence as an active developmental cellular process in the growth and functioning of a flowering plant is indicated in (AIPMT 2008)
a) Annual plants b) Floral plants c) Vessels and Tracheid differentiation d) Leaf abscission
128. You are given a tissue with its potential for differentiation in an artificial culture. Which of the following pairs of hormones would you add to the medium to secure shoots as well as roots? (NEET 2016)
a) Gibberellin and abscisic acid b) IAA and gibberellins
c) Auxin and cytokinin d) Auxin and abscisic acid
129. Phytochrome is a (NEET 2016)
a) Chromo protein b) Flavo protein c) Glyco protein d) Lipo protein
130. Typical growth curve in plants is (NEET 2016)
a) Linear b) Stair – steps shaped c) Parabolic d) Sigmoid

Picture Based Question

131. It is the structure of
a) Palisade parenchyma
b) Stomata
c) Spongy parenchyma
d) Vascular bundle



UNIT – V – PLANT PHYSIOLOGY (FUNCTIONAL ORGANISATION)**CHAPTER - 12
MINERAL NUTRITION****TRY AND TEST YOURSELF****LEVEL – I (1 - 59 Questions)**

1. Identify correct match.

- | | | |
|-------------------------------|---|----------|
| 1. Die back disease of citrus | - | (i) Mo |
| 2. Whip tail disease | - | (ii) Zn |
| 3. Brown heart of turnip | - | (iii) Cu |
| 4. Little leaf | - | (iv) B |

- | | |
|--------------------------------|--------------------------------|
| a) 1 (iii) 2 (ii) 3 (iv) 4 (i) | b) 1 (iii) 2 (i) 3 (iv) 4 (ii) |
| c) 1 (i) 2 (iii) 3 (ii) 4 (iv) | d) 1 (iii) 2 (iv) 3 (ii) 4 (i) |

2. If a plant is provided with all mineral nutrients but, Mn concentration is increased, what will be the deficiency?

- | | |
|---|--|
| a) Mn prevent the uptake of Fe, Mg but not Ca | b) Mn increase the uptake of Fe, Mg and Ca |
| c) Only increase the uptake of Ca | d) Prevent the uptake Fe, Mg, and Ca |

3. The element which is not remobilized?

- | | | | |
|----------------|--------------|------------|-------------|
| a) Phosphorous | b) Potassium | c) Calcium | d) Nitrogen |
|----------------|--------------|------------|-------------|

4. Match the correct combination.

	Minerals		Role
A	Molybdenum	1	Chlorophyll
B	Zinc	2	Methionine
C	Magnesium	3	Auxin
D	Sulphur	4	Nitrogenase

- | | | | |
|--------------------|--------------------|--------------------|--------------------|
| a) A-1 B-3 C-4 D-2 | b) A-2 B-1 C-3 D-4 | c) A-4 B-3 C-1 D-2 | d) A-4 B-2 C-1 D-3 |
|--------------------|--------------------|--------------------|--------------------|

5. Identify the correct statement

- I. Sulphur is essential for amino acids Cystine and Methionine
 II. Low level of N, K, S and Mo affect the cell division
 III. Non-leguminous plant Alnus which contain bacterium Frankia
 IV. Denitrification carried out by nitrosomonas and nitrobacter.

- | | | | |
|----------------------|---------------------------|-------------------|--------------------|
| a) I, II are correct | b) I, II, III are correct | c) I only correct | d) all are correct |
|----------------------|---------------------------|-------------------|--------------------|

6. Who first observed that over a period of 5 years soil lost only 56 g in nourishing a seedling into tree?

- | | | | |
|----------------|----------|----------|---------------------|
| a) Van Helmont | b) Arnon | c) Stout | d) Julius Von Sacks |
|----------------|----------|----------|---------------------|

7. Soil provides _____ nutrients required for their growth. This is proposed by Wood word in 1699.

- | | | | |
|----------|------------|-------------|-----------------|
| a) Macro | b) Mineral | c) balanced | d) unclassified |
|----------|------------|-------------|-----------------|

8. Who gave the “law of minimum” theory?

- | | | | |
|----------------|--------------|------------|-----------------|
| a) De saussure | b) Wood word | c) Lie big | d) Robert Brown |
|----------------|--------------|------------|-----------------|

9. Julius Von Sachs in 1860, demonstrated growing a plant in a defined _____ solution.

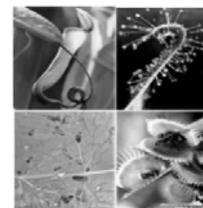
- a) Water b) air c) nutrient d) Salt
10. De Saussure in 1804 proposed plant growth depends on _____ and other elements absorbed by roots from soil.
- a) Carbon b) Hydrogen c) Oxygen d) Nitrogen
11. William Frederick Goerickin 1940 gave the term _____ and commercial technique.
- a) Hydroponics b) Aeroponics c) mineroponics d) microponics
12. These are micro nutrients
- a) Fe b) Mg c) Ca d) S
13. _____ is essential for pest resistance, in plants.
- a) Sodium b) Cobalt c) Silicon d) Selenium
14. In following statements which statement is correct?
- (i) C, H, O, N, P, K, Ca, Mg and S are Macro nutrients
(ii) Fe, Mn, Cu, Mo, Zn, B, Cl and Ni are Micro nutrients
(iii) Actively mobile minerals show deficiency symptoms on old and senescent leaves.
(iv) Relatively immobile minerals show deficiency symptoms first appear on young leaves.
- a) (i) and (iv) are correct b) (ii), (iii) are correct
c) (i), (ii), (iii) are correct d) all are correct
15. _____ is a constituent of urease and hydrogenase.
- a) Mg b) Zn c) Ni d) Mo
16. Structural component minerals
- a) Carbon, Hydrogen b) Oxygen, nitrogen c) both of them d) none of them
17. Magnesium (Mg) is the activator for _____ carboxylase oxygenase and PEP carboxylase.
- a) ATP b) RuBP c) Ru5P d) XY7P
18. Potassium (K) plays a key role in maintaining _____ potential of the cell.
- a) Diffusion b) Turgor c) Imbibition d) Osmosis
19. _____ is responsible for the production Chlorophyll.
- a) Mn b) Mo c) Mg d) K
20. _____ is the energy component present in ATP.
- a) K b) Ca c) Cu d) P
21. Nitrogen is an essential component of proteins, nucleic acids, amino acids, vitamins, hormones, alkaloids, chlorophyll and cytochrome. It is absorbed by the plants as
- a) NO₃ b) NO₂ c) NH₃ d) NH₄
22. Black heart of Celery, Hooked leaf tip in Sugar beet, Musa and Tomato are due to the deficiency of
- a) Nitrogen b) Calcium c) Phosphorus d) Potassium
23. The deficiency symptom of Magnesium causes _____ Chlorosis.
- a) Vein chlorosis b) Leaf chlorosis
c) Intra veinalchlorosis d) Inter veinalchlorosis
24. Sulphur (S) is the essential component of _____ acids like cystine, cysteine and methionine.
- a) Fatty acids b) Sulphuric acid c) aminoacids d) Hydrochloric acid
25. Zinc (Zn) is needed for the biosynthesis of _____ hormone.
- a) Auxin b) ABS c) Cytokinin d) Ethylene
26. Boron (B) is essential for translocation of _____.
- a) Lipid b) Protein c) Vitamin d) Sugar

27. Identify the correct combination.
a) Curled leaf margin - K (Potassium) b) Anthocyanin formation - Zn (Zinc)
c) Exanthema in Citrus - Ca (Calcium) d) Necrosis - O₂ (Oxygen)
28. The symptom of Exanthema in Citrus
a) Resins on the bark b) Tannin on the bark c) Gum on the bark d) None of them
29. Loss of Chlorophyll is known as Chlorosis. Death of the tissue is known as _____.
a) mottle leaf b) necrosis c) poor root system d) stunted growth
30. A concentration, at which ____ of the dry weight of tissue is reduced, is considered as toxic.
a) 10% b) 18% c) 25% d) 60%
31. The symptoms of manganese toxicity are appearance of ____ spots surrounded by chlorotic veins.
a) Red b) Yellow c) Green d) brown
32. The commonly used nutrient solutions in Hydroponics are
a) Knop solution b) Arnon and Hoagland solution
c) both of them d) none of them
33. Inspiring act of nature is self _____.
a) awareness b) Potential c) growth d) regulation
34. Nitrogen occurs in atmosphere in the form of N₂ (N≡N), two nitrogen atoms joined together by strong _____ covalent bonds.
a) Mono b) Di c) tri d) tetra
35. Which statements in the following are correct statement? Biological nitrogen fixation occurs in
(i) Symbiotic bacterium like Rhizobium fixes atmospheric nitrogen.
(ii) Cyanobacteria found in Lichens, Anthoceros, Azolla and coralloid roots of Cycas also fix nitrogen.
(iii) Non-symbiotic (free living bacteria) like Clostridium also fix nitrogen.
(iv) Natural electrical discharge during lightening fixes atmospheric nitrogen.
a) (i), (ii) are correct b) (i), (iv) are correct c) (i), (ii), (iii) are correct d) All are correct
36. _____ plants secretes phenolics which attracts Rhizobium Bacteria.
a) Legume b) Non- Legume c) Grass d) Paddy
37. A _____ bound bacterium is formed inside the nodule and is called bacteroid.
a) Cell wall b) membrane c) organelle d) cytoplasm
38. The photosynthetic bacteria
a) Azotobacter b) Clostridium c) Both of them d) None of them
39. Nitrogenase enzyme is active only in _____ condition.
a) Aerobic b) Photosynthetic c) anaerobic d) Chemosynthetic
40. _____ pigment is synthesized in the nodules which acts as oxygen scavenger and removes the oxygen.
a) Haemoglobin b) Leghaemoglobin c) Chlorophyll d) anthocyanin
41. Nitrogen fixing bacteria in root nodules appears _____ due to the presence of this leghaemoglobin pigment.
a) Reddish b) Yellowish c) brownish d) Pinkish
42. Ammonia (NH₃⁺) is converted into Nitrite (NO₂⁻) by _____ bacterium.
a) Nitrosomonas b) Nitrobacter c) Nitrate reductase d) Nitrite reductase
43. Decomposition of organic nitrogen from dead plants and animals into ammonia is called
a) Nitrification b) Ammonification c) Denitrification d) none of them

44. The organisms involved in denitrification
 a) Pseudomonas b) Thiobacillus c) Bacillus subtilis d) All of them
45. Glutamic acid is the main amino acid from which other amino acids are synthesized by transamination. It requires the enzyme
 a) Transaminase b) Coenzyme Pyridoxal phosphate
 c) both of them d) none of them
46. Example for Saprophytic mode of nutrition
 a) Monotropa b) Cuscuta c) Citrus d) Orobanche
47. The angiosperm plant Neottia is otherwise known as
 a) bird of paradise b) Bird's nest orchid c) Indian pipe d) Bamboo
48. The leafless stem twine around the host and produce haustoria. The example for total stem parasite
 a) Nepenthes b) Drosera c) Cuscuta d) Monotropa
49. Rafflesia, Orobanche and Balanophora are examples for
 a) Partial parasite b) Total root parasite c) Partial root parasite d) Partial stem parasite
50. Loranthus grows on fig and _____ trees and absorb water and minerals from xylem.
 a) Neem tree b) Banyan tree c) Coconut tree d) Mango tree
51. This is a partial root parasite
 a) Santalum album b) Loranthus c) Citrus d) Orobanche
52. The other name of Cuscuta is _____, it is a rootless plant growing on Zizyphus, and Citrus.
 a) Mistletoe b) Dodder c) host d) Indian grass
53. Lichens have _____ mode of nutrition.
 a) Saprophytic b) Parasitic c) Symbiotic d) Autotrophic
54. Fungi associated with roots of higher plants including Gymnosperms is termed as _____.
 a) Lichens b) Mycorrhizae c) Legumes d) coralloid roots
55. Coralloid Root is seen in
 a) Monotropa b) Cuscuta c) Pinus d) Cycas
56. Find out the correct option in the following.
 a) Nepenthes - Venus fly trap b) Drosera - Pitcher plant
 c) Utricularia - Bladder wort d) Dionaea - Sun dew
57. It is a hydrophytic insectivorous plant.
 a) Dionaea b) Utricularia c) Nepenthes d) Drosera
58. Lichens are indicators of _____ pollution and a pioneer species in xeric succession.
 a) NO₂ b) CO₃ c) SO₂ d) KOH

Picture Based Question

59. Give the name of the following plants
- Drosera, Nepenthes, Dionaea, Utricularia
 - Dionaea, Drosera, Utricularia, Nepenthes
 - Nepenthes, Drosera, Utricularia, Dionaea
 - Utricularia, Drosera, Dionaea, Nepenthes



UNIT – V – PLANT PHYSIOLOGY (FUNCTIONAL ORGANISATION)

CHAPTER - 13 PHOTOSYNTHESIS

TRY AND TEST YOURSELF



LEVEL – I (1 - 50 Questions)

- Assertion (A): Increase in Proton gradient inside lumen responsible for ATP synthesis.
Reason (R): Oxygen evolving complex of PS I located on thylakoid membrane facing Stroma, releases H⁺ ions
 - Both Assertion and Reason are True.
 - Assertion is True and Reason is False.
 - Reason is True and Assertion is False.
 - Both Assertion and Reason are False.
- Which chlorophyll molecule does not have a phytol tail?
 - chlorophyll - a
 - chlorophyll - b
 - chlorophyll - c
 - chlorophyll - d
- The correct sequence of flow of electrons in the light reaction is
 - PS II, plastoquinone, cytochrome, PS I, ferredoxin.
 - PS I, plastoquinone, cytochrome, PS II ferredoxin.
 - PS II, ferredoxin, plastoquinone, cytochrome, PS I.
 - PS I, plastoquinone, cytochrome, PS II, ferredoxin.
- For every CO₂ molecule entering the C₃ cycle, the number of ATP & NADPH required
 - 2ATP + 2NADPH
 - 2ATP + 3NADPH
 - 3ATP + 2NADPH
 - 3ATP + 3NADPH
- Identify true statement regarding light reaction of photosynthesis?
 - Splitting of water molecule is associate with PS I.
 - PS I and PS II involved in the formation of NDPH + H⁺.
 - The reaction center of PS I is Chlorophyll 'a' with absorption peak at 680 nm.
 - The reaction center of PS II is Chlorophyll 'a' with absorption peak at 700 nm.
- Life on earth is made up of organic compounds. How do we get these organic compounds from the following?
 - Soil
 - mud
 - Plants
 - Human beings
- _____ is the process produces 1700 million tonnes of dry matter per year by fixing 75×10^{12} Kg of carbon every year.
 - Transpiration
 - Photosynthesis
 - Respiration
 - Growth
- _____ in 1727, observed plants obtain nourishment from air and light.
 - Van Helmont
 - Lavoisier
 - Dutrochet
 - Stephen Hales
- Who was performed experiments with candle, mice and Mint plant and concluded that vegetation purifies the air?
 - Jean – Ingen - Housz
 - Blackman
 - Joseph Priestley
 - Hill
- Who confirmed Priestley's experiment that oxygen released by the plants is possible only in light?
 - Lie big
 - Van Mayer
 - Van Neil
 - Jean- Ingen- Housz
- Desaussurein 1804 explained the importance of _____ in the process of photosynthesis.
 - Water
 - Carbon di-oxide
 - Chlorophyll
 - Sun light
- Dutrochetin 1837 explained the importance of _____ in Photosynthesis.
 - Chlorophyll
 - Water
 - CO₂
 - plant
- Who is called as "Father of Plant Physiology"?
 - Van Mayer
 - Blackman
 - Van Meil
 - Stephen Hales

14. Increase in organic substances comes from water alone by growing a Willow tree that gains weight but soil loses only 2 ounces of the original weight. This was discovered by ____ in 1648.
a) Dutrochet b) Stephen Hales c) Van Helmont d) Joseph Priestley
15. _____ in 1783, purifying gas produced by plants in sunlight is Oxygen and noxious gas produced by burning of candle is Carbon di oxide.
a) T. W. Engelmann b) Lavoisier c) Van Neil d) Warburg
16. Von Mayer in 1845, Green plants convert ____energy into chemical energy of organic matter.
a)thermal b) solar c) water d) physical
17. Liebig in 1845, discovered that Organic matter of plants was derived from _____.
a) O₂ b) N₂ c) H₂ d) CO₂
18. Julius Von Sachs in 1854 discovered that product of photosynthesis was _____ and chlorophyll the green substance is located in special structures (Chloroplast).
a) Amino acid b) Fat c) Starch d) Vitamins
19. T.W. Engelmann in 1888 found out, the plotted action spectrum of _____.
a) Respiration b) Translocation c) Osmosis d) photosynthesis
20. Blackman in 1905, proposed Law of _____ factors.
a) maximum b) minimum c) optimum d) heavy
21. Warburg in 1920 used unicellular green algae _____ for the study of Photosynthesis.
a) Chlorella b) Chlamydomonas c) Yeast d) Dacteria
22. Van Neil in 1931 invented that Oxygen released during photolysis comes from ____and not from CO₂.
a) Chlorophyll b) Carotenoid c) Water d) Phycobilins
23. Who conducted experiments in Purple green bacteria and demonstrated Photosynthesis?
a) Emerson b) Melvin Calvin c) Huber d) Van Neil
24. They conducted existence of light and dark reaction by flashing light experiments.
a) Ruben &Kamen b) Hatch & Slack c) Emerson &Arnold d) Huber & Michel
25. R. Hill in 1937, explained photolysis with the help of isolated _____ and electron acceptors in the presence of light.
a) Chloroplast b)Chromoplast c) Leucoplast d) Proteinoplast
26. Ruben and Kamenin 1941, used ¹⁸O radioactive Oxygen to prove that oxygen evolves from
a) CO₂ b) H₂S c) Water d) HNO₃
27. Arnon, Allen and Whatley in 1954, used radioactive ¹⁴CO₂ to show fixation of _____ by isolated chloroplast.
a) H₂ b) CO₂ c) O₂ d) Water
28. _____ in1954, used radioactive ¹⁴CO₂ and traced path of carbon in the dark phase of photosynthesis or C₃ Cycle.
a) Melvin Calvin b) Lie big c) Von Mayer d) Dissenhofer
29. Emerson et al., in 1957, reported existence of _____ photosystems.
a) only one b) Two c) Three d) Four
30. Hatch and Slack in 1965, Reported _____ pathway and CO₂ fixation in this plants.
a) C₂ b) C₃ c) C₄ d) CO₂
31. Huber, Michel and Dissenhoferdiscovered crystalized photosynthetic reaction centre of _____ and received the Nobel Prize in 1988.
a) Rhizobium b)Rhodobacter c)Acetobacter d) Bacillus
32. Photosynthesis is the most important _____ process.
a) anabolic b) catabolic c) both of them d) none of them
33. Examples of anaerobic photosynthesis.
a) Green sulphur b) Purple sulphur c) Green filamentous bacteria d) All of them
34. Fuels such as coal, _____ and other fossil fuels are from preserved photosynthetic plants.
a) Diamond b) Petroleum c) Gold d) Silver

35. Thylakoids found in granum are called _____ lamellae and in stroma are called stroma lamellae.
 a) Quantosomes b) DNA c) Grana d) $\text{NADPH}^- + \text{H}^+$
36. In _____ thylakoid lies freely in cytoplasm without envelope.
 a) Bacteria b) Cyanobacteria c) Chlorobium d) Rhodospirillum
37. Chlorophyll _____ is the primary pigment which acts as a reaction centre.
 a) 'a' b) 'b' c) 'c' d) 'd'
38. In which chlorophyll is present in Xanthophyceae Algae?
 a) 'c' b) 'd' c) 'e' d) 'b'
39. Chlorophyll 'c' is seen in
 a) Dinoflagellates b) Diatoms c) Brown Algae d) All of them
40. Chlorophyll 'd' is present in
 a) Brown Algae b) Red Algae c) Green Algae d) Purple Algae
41. Chlorophyll molecule consists of Mg-Porphyrin head and Phytol tail. The phytol tail is otherwise known as
 a) Hydrophilic head b) Hydrophilic tail c) Lipophilic tail d) Lipophilic head
42. The intermediate acid of Krebs cycle
 a) Succinic acid b) Malic acid c) Folic acid d) Citric acid
43. Carotene is the most abundant in plants and it is a precursor of
 a) Vitamin B b) Vitamin K c) Vitamin E d) Vitamin A
44. In autumn season, the following pigments are seen in the plants
 a) Lutein b) Violaxanthin c) Fucoxanthin d) All of them
45. Which statement in the following is the correct statement?
 a) Phycoyanin found in Cyanobacteria b) Phycoerythrin found in Rhodophyceae
 c) a is correct, b is wrong d) a and b both are correct
46. The wavelength of solar radiation which reaches the earth is between 300 to _____ nm.
 a) 2000 nm b) 2300 nm c) 2600 nm d) 2900 nm
47. Electromagnetic spectrum consists of _____ types of radiations.
 a) 8 b) 9 c) 10 d) 11
48. Steinman in 1952, observed granular structures in chloroplast lamellae under _____ microscope.
 a) Light b) Compound c) Electron d) Dark field
49. Park and Biggins in 1964, confirmed the granular structures as physiological units of photosynthesis and coined the term _____.
 a) Ribosome b) Lysosome c) Peroxisome d) Quantasome
50. Chlorophyll 'a' 680 (P680) and Chlorophyll 'a' 700 (P700) function as trap centre for PS II and _____ respectively.
 a) PS I b) PS III c) PS IV d) PS V

LEVEL – II (51 - 89 Questions)

51. Phosphorylation is the process of synthesis of _____ by the addition of inorganic phosphate to ADP
 a) NADP b) NADPH_2 c) ATP d) PEP
52. _____ electron transport PS I and PS II both are involved
 a) Cyclic b) Non- Cyclic c) both of them d) none of them
53. Identify the correct statement of the following regarding Non-cyclic photophosphorylation.
 a) Phosphorylation takes place at two places b) Photolysis of water does not takes place
 c) ATP and $\text{NADPH} + \text{H}^+$ are synthesized d) Electrons released are cycled back
54. C_4 plants utilize _____ to evolve one oxygen molecule.
 a) 5ATP, 2 $\text{NADPH} + \text{H}^+$ b) 5ATP, 3 $\text{NADPH} + \text{H}^+$
 c) 6ATP, 2 $\text{NADPH} + \text{H}^+$ d) 6ATP, 3 $\text{NADPH} + \text{H}^+$

55. The evolution of one oxygen molecule requires _____ quanta of light.
a) 4 b) 6 c) 7 d) 8
56. To evolve 6 molecules of Oxygen 18 ATPs and 12 NADPH + H⁺ and to evolve 6 molecules of Oxygen 30 ATPs and 12 NADPH + H⁺ are utilized respectively in
a) C₄ plants and C₃ plants b) C₃ plants and C₄ plants
c) C₂ plants and C₃ plants d) C₂ plants and C₄ plants
57. The acceptor molecule of carbon dioxide in Dark Reaction
a) PEP b) Fr 1, 6 BP c) RUBP d) None of them
58. The first product of the pathway is 3-carbon compound (PhosphoGlyceric Acid - PGA) this pathway is called as C₃ cycle (or) _____
a) Dark Reaction b) Biosynthetic phase
c) Photosynthetic Carbon Reduction Cycle (PCR) d) All of them
59. Dark reaction is _____ dependent and so it is also called thermo-chemical reaction.
a) Temperature b) Light c) Oxygen d) CO₂
60. The first formed acid in C₄ plant is
a) Phosphoglyceric acid b) Nitric acid c) Oxalo acetic acid d) Sulphuric acid
61. In _____ plants, CO₂ fixation takes place in two places one in mesophyll and another in bundle sheath cell.
a) C₂ plants b) C₃ plants c) C₁ plants d) C₄ plants
62. Example for C₃ plants
a) Paddy b) Wheat c) Potato d) All of them
63. Sugar cane, Maize, Sorghum, Amaranthus plants are example for
a) C₂ plants b) C₃ plants c) C₄ plants d) All of them
64. Which statement of the following is a wrong statement in C₃ plants?
a) CO₂ fixation takes place in mesophyll cells only. b) 18 ATPs used to synthesize one glucose
c) Optimum temperature 20° C to 25° C d) Dimorphic chloroplast
65. PEP Carboxylase and RUBP Carboxylase used in
a) C₃ plants b) C₄ plants c) C₂ plants d) none of them
66. CAM or Crassulacean Acid Metabolism takes place in
a) Agave b) Opuntia c) Pine apple d) All of them
67. Dark respiration involves in
a) Mitochondria b) Lysosome c) Cell Wall d) Plasma membrane
68. Photorespiration occurs in
a) Chloroplast b) Peroxisome c) Mitochondria d) All of them
69. Dark respiration involves in
a) Glycolysis b) Krebs cycle
c) ETS (Electron Transport System) d) All of them
70. Hydrogen peroxide is not produced in
a) Photorespiration b) Dark Respiration c) both of them d) none of them
71. The common end product both in Photorespiration and Dark respiration
a) CO₂ b) Water c) PGA d) PEP
72. In Photorespiration Serine enters into _____ to form hydroxy pyruvate.
a) Mitochondria b) Peroxisome c) Chloroplast d) Cell wall
73. In Photorespiration, Glyceric acid is cycled back to chloroplast utilising ATP and becomes _____ and enters into the Calvin cycle (PCR cycle).
a) H₂O₂ b) RUBP c) PGA d) DHAP

74. During photorespiration _____ is formed and it protects cells from photo oxidation.
 a) Glycolate b) Serine c) Glycine d) Rubisco
75. Different wavelengths of light affect to rate of _____ because pigment system does not absorb all the rays equally.
 a) Transpiration b) Respiration c) Absorption d) Photosynthesis
76. Photosynthetic rate is maximum in
 a) blue light b) red light c) both of them d) none of them
77. Red light induces highest rate of photosynthesis and _____ light induces lowest rate of photosynthesis.
 a) Violet b) Green c) Yellow d) Orange
78. The CO₂ concentration in the atmosphere is
 a) 300 ppm b) 310 ppm c) 330 ppm d) 360 ppm
79. If concentration is increased beyond 500ppm, rate of photosynthesis will be affected showing the _____ effect.
 a) normal effect b) special c) initial d) inhibitory
80. The rate of photosynthesis decreases when there is an increase of _____ concentration. This Inhibitory effect of oxygen was first discovered by Warburg using green algae Chlorella.
 a) Oxygen b) Nitrogen c) Helium d) Hydrogen
81. In general, the optimum temperature for photosynthesis is 25° C to _____.
 a) 30° C b) 35° C c) 36° C d) 37° C
82. Which of the following statement is the correct statement?
 a) The ideal temperature for Opuntia is 55° C
 b) The ideal temperature for Lichen is 20° C
 c) The ideal temperature for Algae growing in hot spring photosynthesis is 75° C
 d) All of them are correct
83. Minerals involved in the synthesis of chlorophyll
 a) Mg b) Fe c) N d) All of them
84. The minerals involved in Photolysis of water
 a) Mn b) Cl c) both of them d) none of them
85. Air pollutants affected rate of photosynthesis. They are
 a) SO₂ b) NO₂ c) O₃ d) All of them
86. Hydrated _____ is essential for photosynthesis.
 a) Protoplasm b) Mitochondria c) both of them d) none of them
87. Hormones like gibberellins and _____ increase the rate of photosynthesis.
 a) Auxin b) IAA c) Cytokinin d) Ethylene
88. Pigments present in bacteria are bacteriochlorophyll, they are
 a) Bacteriochlorophyll 'a' b) Bacteriochlorophyll 'b'
 c) Carotenoids d) All of them

Picture Based Question

89. This diagram explains the following experiment
 a) Potato Osmoscope
 b) Hydroponics
 c) Test tube, Funnel
 d) Aeroponics



UNIT – V – PLANT PHYSIOLOGY (FUNCTIONAL ORGANISATION)**CHAPTER - 14
RESPIRATION****TRY AND TEST YOURSELF****LEVEL – I (1 - 57 Questions)**

- The number of ATP molecules formed by complete oxidation of one molecule of pyruvic acid is
a) 12 b) 13 c) 14 d) 15
- During oxidation of two molecules of cytosolic $\text{NADH} + \text{H}^+$, number of ATP molecules produced in plants are
a) 3 b) 4 c) 6 d) 8
- The compound which links glycolysis and Krebs cycle is
a) succinic acid b) pyruvic acid c) acetyl CoA d) citric acid
- Assertion (A): Oxidative phosphorylation takes place during the electron transport chain in mitochondria.
Reason (R): Succinyl CoA is phosphorylated into succinic acid by substrate phosphorylation.
a) A and R is correct. R is correct explanation of A
b) A and R is correct but R is not the correct explanation of A
c) A is correct but R is wrong
d) A and R is wrong
- Which of the following reaction is not involved in Krebs cycle.
a) Shifting of phosphate from 3C to 2C
b) Splitting of Fructose 1, 6 biphosphate of into two molecules 3C compounds.
c) Dephosphorylation from the substrates
d) All of these
- If you are sleeping under a _____ during night time you will feel difficulty in breathing.
a) House b) building c) Tree d) All of these
- During night, plants take up oxygen and release carbon dioxide and as a result _____ will be abundant around the tree.
a) O_2 b) CO_2 c) N_2 d) H_2
- There are two types of compensation point. One is CO_2 compensation point and _____ compensation point.
a) Light b) Temperature c) CO_2 d) O_2
- During aerobic respiration, the following food materials are completely oxidised into CO_2 , H_2O and energy is released.
a) Carbohydrates b) Fats c) Proteins d) All of them
- Link reaction-conversion of pyruvic acid into acetyl coenzyme-A in _____ matrix.
a) Cytoplasmic b) Mitochondrial c) Chloroplast d) Vacuole
- Krebs cycle-conversion of acetyl coenzyme A into ___ and water in the mitochondrial matrix.
a) CO_2 b) H_2 c) O_2 d) N_2
- Aerobic respiration occurs in _____ and mitochondria.
a) Cell membrane b) Cytoplasm c) Lysosome d) Dictyosome

13. Anaerobic Respiration occurs yeast and some _____.
- a) Algae b) Bryophytes c) Pteridophytes d) Bacteria
14. The end products of Anaerobic Respiration is/are
- a) Alcohol b) CO₂ c) Lactic acid d) All of them
15. EMP pathway is otherwise known as
- a) Glycolysis b) Krebs cycle c) ETP d) Energy budget
16. When fats are respiratory substrate they are first broken down into glycerol and _____ acid.
- a) Lactic acid b) Citric acid c) Fatty acid d) nitric acid
17. Krebs cycle is otherwise known as _____ nature.
- a) Monobolic nature b) Dibolic nature c) Amphibolic nature d) none of them
18. In the case of aerobic prokaryotes due to lack of _____ each molecule of glucose produces 38 ATP molecules.
- a) Cell wall b) Chloroplast c) Mitochondria d) Ribosome
19. Complete oxidation of a glucose molecule in aerobic respiration results in the net gain of _____ ATP molecules in plants.
- a) 34 b) 36 c) 38 d) 39
20. It prevents synthesis of ATP from ADP, as it directs electrons from Co Q to O₂.
- a) 2, 4 DNP b) Cyanide c) Rotenone d) Oligomycin
21. The Respiratory Quotient of glucose is
- a) 2 b) 1 c) ∞(infinity) d) 0
22. The Respiratory Quotient of glucose anaerobically is
- a) 1 b) 2 c) ∞(infinity) d) 0
23. In some succulent plants like Opuntia, _____ carbohydrates are partially oxidised to organic acid, particularly malic acid.
- a) Acetic acid b) Fatty acid c) Glutamic acid d) Malic acid
24. RQ of glucose in $\frac{\text{zero molecule of } CO_2}{3 \text{ molecules of } O_2} = ?$
- a) 1 b) -2 c) 0 d) -0
25. When respiratory substrate is protein or fat, then RQ will be _____ than unity.
- a) high b) more c) less d) none
26. RQ of Tripalmitin = $\frac{102 \text{ molecules of } CO_2}{\text{? molecules of } O_2} = 0.7$ (less than unity)
- a) 140 b) 142 c) 143 d) 145
27. Respiratory quotient of Malic acid is _____.
- a) 1 b) 1.2 c) 1.33 d) 2
28. _____ value indicates which type of respiration occurs in living cells, either aerobic or anaerobic.
- a) OP b) WP c) TP d) RQ
29. Respiratory quotient of Oxalic acid is
- a) 2.0 b) 3.0 c) 4.0 d) 2.0
30. Peter Mitchel, a British Biochemist received Nobel Prize for Chemistry in 1978 for his work on the coupling of oxidation and _____ in mitochondria.
- a) Reduction b) Dehydration c) Phosphorylation d) Krebs cycle
31. The other name of fermentation is
- a) Animal Respiration b) Dark Respiration
c) Photo Respiration d) Anaerobic Respiration

32. Match the following and find out the correct option.
- | | | | |
|------------------|---|---------------|--|
| A) Proteins | - | (i) 1.6 | |
| B) Oleic acid | - | (ii) 0.36 | |
| C) Palmitic acid | - | (iii) 0.8-0.9 | |
| D) Tartaric acid | - | (iv) 0.71 | |
- | | |
|-----------------------------------|-----------------------------------|
| a) A-(iii), B-(iv), C-(ii), D-(i) | b) A-(i), B-(ii), C-(iii), D-(iv) |
| c) A-(iv), B-(iii), C-(i), D-(ii) | d) A-(i), B-(iv), C-(iii), D-(ii) |
33. In Glycolysis, the total ATP production is
- | | | | |
|------|------|------|------|
| a) 4 | b) 6 | c) 7 | d) 8 |
|------|------|------|------|
34. 24 ATP molecules are formed during
- | | | | |
|----------------|----------------------|-----------------------------|----------------|
| a) Krebs cycle | b) Citric acid cycle | c) Tricarboxylic acid cycle | d) All of them |
|----------------|----------------------|-----------------------------|----------------|
35. Saccharomyces is a _____
- | | | | |
|--------------|-------------|----------|----------|
| a) Chlorella | b) Bacteria | c) Yeast | d) Virus |
|--------------|-------------|----------|----------|
36. In bakeries, _____ fermentation is used for preparing bread, cakes and biscuits.
- | | |
|---------------------------|-----------------------------|
| a) alcoholic fermentation | b) lactic acid fermentation |
| c) acid fermentation | d) mixed acid fermentation |
37. Some bacteria (Bacillus), fungi and muscles of vertebrates produce lactic acid from pyruvic acid and _____ NAD⁺ formed.
- | | | | |
|------|------|------|------|
| a) 1 | b) 2 | c) 3 | d) 4 |
|------|------|------|------|
38. Mixed acid fermentation is a characteristic feature of
- | | | | |
|------------------|---------------|-----------------------|--------------|
| a) Euphorbiaceae | b) Asteraceae | c) Enterobacteriaceae | d) Liliaceae |
|------------------|---------------|-----------------------|--------------|
39. Alcoholic fermentation forms acetaldehyde as _____ compound.
- | | | | |
|------------|--------------|-------------|-----------------|
| a) primary | b) secondary | c) tertiary | d) intermediate |
|------------|--------------|-------------|-----------------|
40. Which of the following is correct statement in Lactic acid fermentation?
- | |
|--|
| a) It takes place in single step. |
| b) Does not form any intermediate compound |
| c) It uses one enzyme, lactate dehydrogenase with Zn ⁺⁺ . |
| d) All of them are correct |
41. Anaerobic respiration is characterized by the production of CO₂ and it is used for _____ fixation in photosynthesis.
- | | | | |
|-----------|-------------|-----------|------------|
| a) Carbon | b) Hydrogen | c) Copper | d) Sulphur |
|-----------|-------------|-----------|------------|
42. Number of net products from one molecule of glucose under Glycolysis in anaerobic respiration is
- | | | | |
|------|------|------|-------|
| a) 4 | b) 6 | c) 8 | d) 10 |
|------|------|------|-------|
43. Kuhne's fermentation experiment demonstrate
- | | |
|-----------------------------|----------------------------|
| a) Fatty acid fermentation | b) alcoholic fermentation |
| c) lactic acid fermentation | d) mixed acid fermentation |
44. The optimum temperature of respiration is
- | | | | |
|---------|---------|---------|---------|
| a) 28°C | b) 29°C | c) 30°C | d) 32°C |
|---------|---------|---------|---------|
45. High concentration of CO₂ _____ the rate of respiration
- | | | | |
|-------------|------------|---------------|-----------|
| a) increase | b) reduces | c) accelerate | d) starts |
|-------------|------------|---------------|-----------|
46. Light is an _____ factor affecting the rate of respiration
- | | | | |
|------------|-----------|-------------|---------------|
| a) induced | b) direct | c) indirect | d) initiative |
|------------|-----------|-------------|---------------|
47. Which chemical substance acts as inhibitors.
- | | | | |
|------------|------------|------------|-------------|
| a) Glucose | b) Sucrose | c) Protein | d) Cyanides |
|------------|------------|------------|-------------|

48. _____ of plant organs stimulates the rate of respiration in that region.
 a) Some part b) few parts c) Wounding d) Normal parts
49. When sufficient amount of _____ is available the rate of aerobic respiration will be optimum and anaerobic respiration is completely stopped. This is called Extinction point.
 a) CO₂ b) O₂ c) H₂ d) SO₂
50. The amount of _____ and its state of activity influence the rate of respiration
 a) Mitochondria b) Chloroplast c) Golgi apparatus d) Protoplasm
51. Match the following and find out the correct option.
 A) Glyceraldehyde-3-phosphate - (i) 7C
 B) Erythrose-4-phosphate - (ii) 5C
 C) Ribose-5-phosphate - (iii) 4C
 D) Sedoheptulose-7-Phosphate - (iv) 3C
 a) A-(iv), B-(iii), C-(ii), D-(i) b) A-(iv), B-(ii), C-(iii), D-(i)
 c) A-(i), B-(iii), C-(ii), D-(iv) d) A-(iv), B-(i), C-(ii), D-(iii)
52. The net result of complete oxidation of one glucose-6-phosphate yield _____ CO₂ and 12NADPH + H⁺.
 a) 3 b) 4 c) 5 d) 6
53. Ribose-5-phosphate and its derivatives are used in the synthesis of
 a) DNA b) RNA c) ATP d) All of them
54. Coenzyme NADPH generated is used for reductive biosynthesis and counter damaging the effects of _____ free radicals.
 a) C b) O₂ c) CO₂ d) N₂
55. For synthesis of anthocyanin, lignin and other aromatic compounds are produced by
 a) Fructose b) Maltose c) Erythrose d) Glucose
56. In aerobic respiration 36 ATP molecules are produced in plant mitochondria but in animals _____ ATP molecules are produced per glucose molecule.
 a) 34 b) 35 c) 36 d) 38

Picture Based Questions

57. Find out the wrong statement about the given diagram

- a) It is called power house of the cell
 b) It produces ATP molecules
 c) Krebs cycle takes place within
 d) It is the structure of Ribosome



UNIT – V – PLANT PHYSIOLOGY (FUNCTIONAL ORGANISATION)**CHAPTER - 15
PLANT GROWTH AND DEVELOPMENT****TRY AND TEST YOURSELF****LEVEL – I (1 - 50 Questions)**

1. Select the wrong statement from the following:
 - a) Formative phase of the cells retain the capability of cell division.
 - b) In elongation phase development of central vacuole takes place.
 - c) In maturation phase thickening and differentiation takes place.
 - d) In maturation phase, the cells grow further.
2. If the diameter of the pulley is 6 inches, length of pointer is 10 inches and distance travelled by pointer is 5 inches. Calculate the actual growth in length of plant.
 - a) 3 inches
 - b) 6 inches
 - c) 12 inches
 - d) 30 inches
3. In unisexual plants, sex can be changed by the application of
 - a) Ethanol
 - b) Cytokinins
 - c) ABA
 - d) Auxin
4. Select the correctly matched one

A) Human urine	-	(i) Auxin –B
B) Corn gram oil	-	(ii) GA ₃
C) Fungus	-	(iii) Abscisic acid II
D) Herring fish	-	(iv) Kinitin sperm
E) Unripe maize	-	(v) Auxin A grains
F) Young cotton	-	(vi) Zeatin bolls

 - a) A-(iii) B-(iv) C-(v) D-(vi) E-(i) F-(ii)
 - b) A-(v) B-(i) C-(ii) D-(iv) E-(vi) F-(iii)
 - c) A-(iii) B-(v) C-(vi) D-(i) E-(ii) F-(iv)
 - d) A-(ii) B-(iii) C-(v) D-(vi) E-(iv) F-(i)
5. Seed dormancy allows the plants to
 - a) overcome unfavourable climatic conditions
 - b) develop healthy seeds
 - c) reduce viability
 - d) prevent deterioration of seeds
6. Growth increases in _____ at cellular level.
 - a) Cytoplasm
 - b) nucleus
 - c) Protoplasm
 - d) none of them
7. The primary growth of the plant is due to the activity of apical meristem where, new cells are added to root and shoot apex causing linear growth of plant body.
 - a) Primary
 - b) Secondary
 - c) Lateral
 - d) intercalary
8. The secondary vascular cambium and _____ add new cells to cause increase in girth.
 - a) Cork cambium
 - b) Phellogen
 - c) Both of them
 - d) None of them
9. Paddy and Bean are _____ annual plants produce flowers only once during lifetime and dies.
 - a) Bicarpic
 - b) Polycarpic
 - c) tricarpic
 - d) monocarpic
10. The indication of growth is increase in fresh or _____ weight.
 - a) Low
 - b) less
 - c) dry
 - d) Wet
11. Formative phase of growth occurs in meristematic cells of shoot and _____ tips.
 - a) Node
 - b) Internode
 - c) root
 - d) bud
12. In Elongation Phase of growth requires _____ and food supply.
 - a) Auxin
 - b) Ethylene
 - c) ABA
 - d) Cytokinin
13. In _____ phase the cells do not grow further.
 - a) Formative phase
 - b) Elongation phase
 - c) Maturation phase
 - d) None of them

14. _____ phase is the initial stage of growth. In other words, growth starts from this period.
 a) Log phase b) Lag phase c) Steady phase d) Decline phase
15. The other name of Decelerating phase is
 a) Decline phase b) Slow growth phase c) both of them d) none of them
16. Maturation phase is otherwise known as
 a) Steady state period b) Lag phase c) Log phase d) Decelerating phase
17. If the length of a plant organ is plotted against time, it shows a linear curve and this growth is called
 a) Sigmoid curve b) Grand period curve c) Arithmetic Growth d) Geometric Growth
18. This growth occurs in many higher plants and plant organs and is measured in size or weight.
 a) Arithmetic growth b) Geometric Growth
 c) Arithmetic and Geometric Growth d) Meristematic growth
19. Plants often grow by a combination of arithmetic and geometric growth patterns. A young embryonic plant grows _____ and cell division becomes restricted to certain cells at the tips of roots and shoots.
 a) Arithmetically b) actively c) slowly d) geometrically
20. Plant growth is influenced by a variety of external and _____ factors.
 a) morphological b) physiological c) Internal d) Cytological
21. Water is essential for cell _____ as well as growth in the size of the cell.
 a) Division b) Enlargement c) maturation d) size
22. It plays an important role in the formation of protoplasm.
 a) Micro elements b) Macro elements c) Both of them d) None of them
23. Proper growth of a plant occurs at about 28° C to _____ temperature.
 a) 29° C b) 30° C c) 31° C d) 32° C
24. Temperature 45° C will damage the _____ and hinders the growth.
 a) protoplasm b) nucleus c) Cytoplasm d) none of them
25. Absence of light may lead to yellowish in colour. This is called
 a) Petiolation b) Peducilation c) Etiolation d) setiolation
26. The apparatus which is used to calculate the actual growth of a plant.
 a) Arc meter b) Poto meter c) Thermometer d) Arc auxanometer
27. Actual growth in length = $\frac{\text{Distance travelled by the pointer} \times \text{radius of the pulley}}{\text{Length of the _____}}$
 a) Weight b) potted plant c) pointer d) Stand
28. _____ is the regaining of the ability of cell division by the differentiated cells.
 a) Differentiation b) Dedifferentiation c) Redifferentiation d) Plasticity
29. Example of Redifferentiation.
 a) Secondary xylem b) Secondary phloem c) Both of them d) None of them
30. Plant Growth Regulators are classified as natural and _____ based on their source.
 a) auxin b) hormone c) synthetic d) phytohormones
31. Natural Plant Growth Regulators are
 a) Auxin b) Gibberellin c) Cytokinin d) All of them
32. Activity of auxin and gibberellins or cytokinins have _____ effect.
 a) Synergistic effect b) Antagonistic effect c) both of them d) none of them
33. Growth inhibitors are
 a) Ethylene b) Auxin c) Cytokinin d) Gibberellins
34. Synthetic hormones are
 a) NAA b) 2-4- D c) 2, 4, 5- T d) All of them

35. Plants follow different pathways in response to environment or phases of life to form different kinds of structures.
 a) Plastocyanin b) Plasticity c) Plasma membrane d) Plastoquinone
36. These are natural Auxins
 a) IAA b) IPA c) IBA d) All of them
37. Auxins move out of tissues as they are easily diffusible. They are called as
 a) Free auxin b) Bound auxin c) both of them d) none of them
38. IAA- Aspartic acid is _____ auxin.
 a) 2- 4-D b) Bound auxin c) Free auxin d) NAA
39. The amino acid Tryptophan is the precursor of IAA and _____ is required for its synthesis.
 a) Fe b) S c) Cl d) Zn
40. Auxin has similar chemical structure of _____.
 a) Cytokinin b) Gibberellin c) Acetic acid d) IAA
41. _____ means transport through phloem from shoot to root.
 a) Acropetal b) Basipetal c) Centripetal d) Centrifugal
42. Acropetal means transport through _____ from root to shoot.
 a) phloem b) xylem c) parenchyma d) collenchymas
43. Auxin is responsible for initiation and promotion of cell division in _____.
 a) Sclerenchyma b) Collenchyma c) Cambium d) Xylem
44. _____ seeds are rich in gibberellins.
 a) mature b) Immature c) Germinating d) Seed Dormancy
45. The primary precursor of gibberellins.
 a) Nitrate b) Citrate c) acetate d) phosphate
46. GA promotes the formation of male flowers in _____.
 a) Maivaceae b) Arecaceae c) Rubiaceae d) Cucurbitaceae
47. The most widely occurring cytokinin in plants is
 a) Iso pentenyl adenine b) Indole propionic acid
 c) Indole butyric acid d) Phenyl Acetic acid
48. _____ cotyledons are measured and placed in cytokinin solution as well as in ordinary water. Enlargement of cotyledons is an indication of cytokinin activity.
 a) Mango b) Castor c) Neem d) Citrus
49. In tissue culture these two hormones are used
 a) Auxin, Cytokinin b) Auxin, Gibberellin
 c) Gibberellin, Ehtylene d) Gibberellin, ABA
50. This hormone is a Gaseous Phytohormone
 a) Auxin b) Gibberellins c) Ethylene d) ABA

LEVEL – II (51 - 88 Questions)

51. Ethylene is a derivative of amino acid methionine, linolenic acid and _____ acid.
 a) Malic acid b) Aspartic acid c) Citric acid d) Fumaric acid
52. Ethylene _____ the stem elongation.
 a) initiate b) acclerates c) reduce d) inhibits
53. All fruits cannot be ripened by exposure to ethylene. Such fruits are called non climacteric fruits and are insensitive to ethylene. They are
 a) Grapes b) Water melon c) Orange d) All of them
54. A liquid called _____ is being used in fruit ripening as it continuously releases ethylene.
 a) Acetol b) Formaldehyde c) ethephon d) none of them
55. It helps in reducing transpiration rate by closing stomata. It induces bud and seed dormancy.
 a) ABA b) GA c) IPA d) IPB

56. Match the following.
- | | | |
|-------------------------------|---|----------------|
| A) Fruit ripening | - | (i) Cytokinin |
| B) Yellowing of leaf | - | (ii) Auxin |
| C) Apical dominance | - | (iii) Ethylene |
| D) Promote lateral bud growth | - | (iv) ABA |
- a) A-(i), B-(ii), C-(iii), D-(iv) b) A-(ii), B-(i), C-(iv), D-(iii)
c) A-(iii), B-(iv), C-(ii), D-(i) d) A-(ii), B-(iii), C-(i), D-(iv)
57. Maryland mammoth (tobacco variety) requires _____ hours of light.
a) 10 b) 11 c) 12 d) 13
58. The plants that require a short critical day length for flowering are called
a) Long day plants b) Short long day plants
c) Long short day plants d) Short day plants
59. These require a photoperiod between long day and short day for flowering.
a) Long day plants b) Short day plants
c) intermediate day plants d) Day neutral plants
60. Day neutral plants are called as
a) Photo neutrals b) indeterminate plants c) both of them d) none of them
61. Floral hormone is synthesised in leaves and translocated to the _____ tip to promote flowering.
a) axillary b) apical c) stem d) root
62. The nature of flower producing stimulus has been elusive so far. It is believed by many physiologists that it is a hormone called _____.
a) Gibberellins b) Auxin c) Ethylene d) Florigen
63. The term florigen was coined by _____ in 1936 but it is not possible to isolate.
a) Charles Darwin b) F. W. Went c) Chailakyan d) Smith
64. The P_r form absorbs red light in 660nm and P_{fr} form absorbs far red light in _____ nm.
a) 700 b) 730 c) 760 d) 790
65. In short day plants, P_r promotes flowering and P_{fr} inhibits _____.
a) flowering b) fruiting c) both of them d) none of them
66. According to Lysenko, development of an annual seed plant consists of _____ phases.
a) 3 b) 4 c) 5 d) 2
67. According to Purvis in 1961, formation of A substance is converted into B, B is converted into D called Vernalin. Vernalin is converted to F. _____ induces flower formation.
a) Auxin b) IAA c) Florigen d) ABA
68. In Technique of Vernalization the _____ are first soaked in water and allowed to germinate at 10° C to 12°C.
a) Fruits b) seeds c) leaves d) Stem
69. During _____ germination cotyledons are pushed out of the soil. This happens due to the elongation of the hypocotyl.
a) Vivipary b) Hypogeal c) Epigeal d) Intergeal
70. During hypogeal germination _____ remain below the soil due to rapid elongation of epicotyls.
a) Plumule b) Cotyledons c) Radicle d) embryo
71. The optimum temperature for seed germination is 25°C to _____ for most tropic species.
a) 27° C b) 28° C c) 30° C d) 35° C
72. The seeds which respond to light for germination and these seeds said to be
a) Thermoplastic b) Oxyblastic c) Photoblastic d) none of them
73. Usually seeds remain viable or living only for a particular period. Maximum viability (1000 years) has been recorded in _____ seeds.
a) Lily b) Water hyacinth c) Hydrilla d) Lotus

74. Viability of seeds of Oxalis range from a _____ days.
 a) many b) few c) 100 years d) 1000 years
75. _____ seed coat causes barrier effect as impermeability of water and gas.
 a) hard b) tough c) both of them d) none of them
76. Many species of seeds produce imperfectly developed embryos called _____ embryos which promotes dormancy.
 a) developed embryo b) incomplete embryo
 c) well developed embryo d) rudimentary embryo
77. The dormancy of photoblastic seeds can be broken by exposing them to _____ light.
 a) red b) blue c) green d) violet
78. In some seeds water and oxygen are unable to penetrate _____ due to blockage by cork cells.
 a) ovule b) micropyle c) both of them d) none of them
79. This kind of senescence occurs in annual plants when entire plant gets affected and dies.
 a) Progressive senescence b) Deciduous senescence
 c) Top senescence d) Over all senescence
80. Example for Deciduous senescence
 a) Elm b) Banana c) Agave d) Annual
81. The branch of _____ which deals with ageing, abscission and senescence is called Phytogerontology
 a) Biology b) Botany c) Cytology d) Genetics
82. Match the following.
 A) Bamboo - (i) Progressive senescence
 B) Gladiolus - (ii) Overall senescence
 C) Maple - (iii) Top senescence
 D) Common in annuals - (iv) Deciduous senescence
 a) A-(iii), B-(i), C-(ii), D-(iv) b) A-(ii), B-(iii), C-(iv), D-(i)
 c) A-(iv), B-(ii), C-(i), D-(iii) d) A-(i), B-(iv), C-(ii), D-(iii)
83. The proteolytic enzymes involving PCD in plants are phytaspases and in animals are _____.
 a) Lipase b) Hydrogenase c) Caspases d) None of these
84. When the plant parts are removed from abscission, the plant seals off its _____ system to prevent loss of water and nutrients.
 a) Root b) Leaf c) Shoot d) Vascular
85. In temperate regions all the leaves of deciduous plants fall in _____ and give rise to naked appearance,
 a) Spring b) Autumn c) Winter d) Summer
86. In _____ plants there is gradual abscission of leaves, the older leaves fall while new leaves are developed continuously throughout the year.
 a) tree type b) Green trees c) Evergreen d) herbs
87. Auxins and cytokinins retard abscission, while abscisic acid (ABA) and _____ induce it.
 a) IAA b) GA c) Ethylene d) IPR

Picture Based Question

88. Which type of senescence seen in this diagram?
 a) Overall Senescence
 b) Top Senescence
 c) Deciduous Senescence
 d) Progressive Senescence

