RAVI MATHS TUITION CENTRE , WHATSAPP - 8056206308

Time : 1 Mins **MINERAL NUTRITION 1** **Marks : 800**

1. One example of a nutrient in its reduced form is
   a) carbon in CO_2 b) hydrogen in H_2O c) nitrogen in NH_3 d) sulphur in sulphate
2. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:
   Assertion: Reduction of nitrogen to ammonia by living organisms is called nitrification.
   Reason: Example of free-living nitrogen fixing anaerobic microbes are Azotobacter and Beijerinckia
   a)
   If both assertion and reason are true and reason is the correct explanation of assertion.
   b)
   If both assertion and reason are true but reason is not the correct explanation of assertion.
   c) If assertion is true but reason is false. d) If both assertion and reason are false
3. While in N, K and Mg deficiency, chlorosis appears first in _____ leaves; in Sand Ca deficiency, _____ leaves are the first to be affected.
   a) young, old b) old, young c) old, old d) young, young
4. Which is essential for the growth of root tip?
   a) Fe b) Ca c) Mn d) Zn
5. Arrange the following elements inorder of their abundancy in human body:
   a) Na > K > Fe > Cu b) Na ≈ K > Fe > Cu c) K > Na > Cu > Fe
   d) Cu > Fe > Na > K
6. Deficiency symptoms of readily mobilised essential elements will first appear in _____
   a) younger tissues b) older tissues c) roots d) shoots
7. Which of the following is not a deficiency symptom of minerals?
   a) Internode shortening b) Necrosis c) Chlorosis d) Etiolation
8. Which of the following is a non-symbiotic nitrogen fixing prokaryote?
   a) Azotobacter b) Clostridium c) Beijerinckia d) All of these
9. Which of the following minerals activate the enzymes involved in respiration?
   a) Nitrogen and phosphorus b) Magnesium and manganese
   c) Potassium and calcium d) Sulphur and iron

10. Which one of the following is a free-living obligate anaerobic bacterium?
    a) Clostridium b) Rhodospirillum c) Azotobacter d) Bacillus subtilis
11. Which one of the following is wrong Statement?
    a) Anabaena and Nostoc are capable of fixing nitrogen in free living state also.
    b) Root nodule forming nitrogen fixers live as aerobes under free-living conditions.
    c)
    Phosphorus is a constituent of cell membranes. certain nucleic acids and cell proteins.
    d) Nitrosomonas and Nitrobacter are chemoautotrophs
12. Mineral salts are translocated through JiLalong with the lliL stream of water, which is pulled up through the plant by transpirational pull. Fill up the blanks in the given statement and select the Correct option.

a)

(i)	**(ii)**
xylem	ascending

b)

(i)	**(ii)**
xylem	descending

c)

(i)	**(ii)**
phloem	ascending

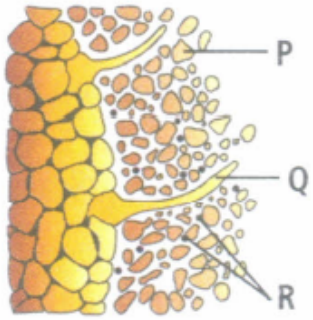
d)

(i)	**(ii)**
phloem	descending

13. Select the option that contains micronutrients only.
    a) Mn, Mo, Zn b) C, H, N c) N, P, O d) Mn, K, S
14. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
    Assertion: Some essential elements are called structural elements of cells.
    Reason: These essential elements are the components of certain biomolecules
    a)
    If both assertion and reason are true and reason is the correct explanation of assertion
    b)
    If both assertion and reason are true but reason is not the correct explanation of assertion.
    c) If assertion is true but reason is false d) If both assertion and reason are false
15. Select the incorrectly matched pair.
    a) Magnesium (Mg) - Formation of mitotic spindle
    b) Iron (Fe)- Formation of chlorophyll c) Chlorine (CI) - Anion-cation balance in the cell
    d) Sulphur (S) - Component of vitamins
16. During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by
    a) Cytochrome b) Leghaemoglobin c) Xanthophyll d) Carotene
17. In which of the following all three are macronutrients ?
    a) Boron, Zinc, Manganese b) Iron, Copper, molybednum
    c) Molybdenum, magnesium, magnanese d) Nitrogen, nickel, phosphorus
18. The process of transfer of amino group from one amino acid to the keto group of a keto acid is called as _____
    a) oxidative amination b) reductive amination c) transamination d) deamination

19. The amino acid which plays a central role in nitrogen metabolism is/are
    a) Glutamic acid b) α-ketoglutaric acid c) Aspartic acid d) Oxaloacetic acid

20. Refer to the given figure and select the correct option.



a)

P	Q	R
Soil particles	Root hair	Bacteria

b)

P	Q	R
Bacteria	Hook	Soil particle

c)

P	Q	R
Nodule	Infection thread	Bacteria

d)

P	Q	R
Bacteria	Infection thread	Root hair

21. Which one of the following statements can best explain the term critical concentration of an essential element?
    a) Essential element concentration below which plant growth is retarded
    b) Essential element concentration below which plant growth becomes enhanced
    c) Essentia lelement concentration below which plant remains in the vegetative phase
    d) None of the above

22. Read the given statements and select the correct option.
    Statement 1: Soil serves as a reservoir of essential elements.
    Statement 2: Soil develops, over the years, through physical and chemical weathering of rocks.
    a) Both statements 1 and 2 are correct.
    b) Statement 1 is correct but statement 2 is incorrect.
    c) Statement 1 is incorrect but statement 2 is correct
    d) Both statements 1 and 2 are incorrect.

23. The major role of minor elements inside living organisms is to act as_____
    a) binder of cell structure b) co-factors of enzymes
    c) building blocks of important amino acids d) constituent of hormones

24. A plant requires magnesium for____
    a) protein synthesis b) chlorophyll synthesis c) cell wall development
    d) holding cells together

25. Which elements are considered as balancing elements?
    a) Ca & K b) C & H c) N & S d) Mg and Fe

26. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
Assertion: As per carbonic acid exchange theory of mineral salt absorption, CO_2 released during respiration of roots forms H_2CO_3 when dissolved in soil water.
Reason: H_2CO_3 dissociates into H^+ and HCO_3 ions, where H^+ ions exchange with anions adsorbed on clay particles.
a)
If both assertion and reason are true and reason is the correct explanation of assertion
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false. d) If both assertion and reason are false

27. Which of the following set represents micronutrients?
a) B, Ni, Mo, Mn, Fe b) B, N, Mo, Mn, P c) S, Ca, B, Mo, Fe d) N, Mo, Mn, K, Mg

28. Which element is required in comparatively least quantity for the growth of plant?
a) Zn b) N c) P d) Ca

29. Which of the following are macronutrients?
a) Carbon, nitrogen b) Oxygen, phosphorus c) Potassium, sulphur d) All of these

30. Which of the following plant with nodules containing filamentous nitrogen - fixing microorganism?
a) Cicer arietinum b) CesuerItie equisetIfolia c) Cratalaria juncea d) Cycas revoluta

31. Which one of the following is the incorrect statement?
a) Phosphorus is a constituent of cell membranes, certain nucleic acids and all proteins
b) Nitrosmonas and Nitrobacter are chemoautotrophs
c) Anabaena and Nostoc are capable of fixing nitrogen in free-living state also
d) Root nodule forming nitrogen fixers live as aerobes under free-living conditions

32. Plants can be grown in (Tick the incorrect option)
a) soil with essential nutrients b) water with essential nutrients
c) either water or soil with essential nutrients
d) water or soil without essential nutrients

33. Which one is the major constituent of proteins, nucleic acids, vitamins and hormones?
a) P b) N c) K d) S

34. Following observations are made for a plant grown under different conditions.
I. Chloride and magnesium in soil + light $\rightarrow$ green plant
II. Chloride and magnesium in soil + dark $\rightarrow$ etiolated plant
III. Magnesium + light $\rightarrow$ green plant
IV. Intermittent light flashes + chloride $\rightarrow$ etiolated plant
From the above observations, it is concluded that the factors necessary for the green colour in plants are

a) chloride and light b) chloride, magnesium and light c) magnesium and light
d) flash of light with chloride.

35. The macronutrient _____ is a component of all organic compounds but is not obtained from soil.
a) carbon b) hydrogen c) oxygen d) nitrogen

36. During N_2 fixation, reduction of one molecule of nitrogen into 2 molecules of NH_3 consumes _____molecules of ATP.
a) 4 b) 16 c) 56 d) 38

37. Leguminous plants are able to fix atmospheric nitrogen through the process of symbiotic nitrogen fixation. Which one of the following statement is not correct during this process of nitrogen fixation?
a) Nodules act as sites for nitrogen fixation
b) The enzyme nitrogenase catalyses the converison of atmospheric N_2 to NH_3
c) Nitrogenase is insensitiove to oxygen
d) Leghaemoglobin scavenges oxygen and is pinkish in colour

38. Necrosis refers to
a) inhibition of cell division b) delay in flowering c) death of tissues
d) falling of leaves

39. Which one of the following is essential for photolysis of water?
a) Boron b) Manganese c) Zinc d) Copper

40. Which of the following is not caused by deficiency of mineral nutrition?
a) Necrosis b) Chlorosis c) Etiolation d) Shortening of internodes

41. Brown heart rot of beets is due to deficiency of:
a) B b) P c) Mg d) Mo

42. The first stable product of fixation of atmospheric nitrogen in leguminous plants is_____
a) Ammonia b) NO_3 c) Glutamate d) NO_2

43. One of the fiee -living, anaerobic nitrogen - fixer is_____
a) Beijernickia b) Rhodospirillum c) Rhizobium d) Azotobacter

44. Nitrite is oxidised to nitrate with the help of
a) Nitrosomonas b) Nitrococcus c) Nitrobacter d) Thiobacillus

45. Which of the following element is responsible for maintaining turgor in cells:
a) Potassium b) Sodium c) Magnesium d) Calcium

46. Which element essential for stability of chromosome structure?
a) Zn b) Ca c) Mo d) Fe

47. Which of the following statements is incorrect about leghaemoglobin?
a) It acts as O_2 scavenger b) It imparts pink or red colour to the nodules
c) It combines with O_2 and protects nitrogenase d) It is a Mo-Fe protein

48. During nodule formation in leguminous plants, an infection thread is produced carrying the _____(i)_____ _into the ____(ii)_____ of the root, where they initiate the nodule formation in the ____(iii)_____ of the root. Fill up the blanks by choosing the correct option.

a)

(i)	(ii)	(iii)
cyanobacteria	pericycle	cortex

b)

(i)	(ii)	(iii)
bacteria	cortex	cortex

c)

(i)	(ii)	(iii)
cyanobacteria	cortex	pericycle

d)

(i)	(ii)	(iii)
bacteria	pericycle	pericycle

49. Minerals absorbed by roots move to the leaf through_____
a) xylem b) phloem c) sieve tubes d) None of these

50. Which one is the correct summary equation of nitrogen fixation?
a) $N_2 + 8e^- + 8H^+ + 8ATP \rightarrow NH_3 + H_2 + 16ADP + 16P_i$
b) $N_2 + 8e^- + 8H^+ + 16ATP \rightarrow 2NH_3 + H_2 + 16ADP + 16P_i$
c) $2NH_3 + 4O_2 \rightarrow 2H^+ + 2H_2O + 2NO_3^-{}_2$ d) $2NH_3 + 3O_2 \rightarrow 2NO_2^- + 2H^+ + 2N_2O$

51. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:
Assertion: Reductive amination involves the transfer of amino group from one amino acid to the keto group of a keto acid.
Reason: In reductive amination, transfer of NH_2 from glutamic acid takes place
a)
If both assertion and reason are true and reason is the correct explanation of assertion
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false. d) If both assertion and reason are false

52. A. Macronutrients are present in plant tissues in excess of 10m mole kg^{-1} of dry matter.
B. C, H and O are obtained mainly from carbondioxide and water and others are absorbed from soil.
a) Only A is correct b) Only B is correct c) Both A and B are correct
d) Both A and B are incorrect

53. Which of the group of elements is not essential for a normal plant?
a) K, Ca, Mg b) Fe, Zn, Mn, B c) Pb, I, Na d) Mg, Fe, Mo

54. Which of the following is not a micronutrient:
a) Boron b) Molybdenum c) Magnesium d) Zinc

55. A free living nitrogen-fixing" cyanobacterium which can also form symbiotic association with the water fem Azolla is____
a) Tolypothrix b) Chlorella c) Nostoc d) Anabaena

56. You observe that a plant's younger leaves, not the older ones, are yellowing. You recall that the cause of plant sickness can be diagnosed by which leaves are yellowing. What is the most likely cause of your plant's blight?
    a) Too much shade b) Lack of nitrogen-fixing Rhizobium bacteria
    c) A deficiency in a mobile mineral nutrient
    d) A deficiency in a non-mobile mineral nutrient

57. Nitrifying bacteria ____
    a) oxidise ammonia to nitrates b) convert free nitrogen to nitrogen compounds
    c) convert proteins into ammonia d) reduce nitrates to free nitrogen

58. All N_2 fixers belong to
    a) Eubacteria b) Algae c) Plantae d) Protista

59. Which of the following statements about mineral absorption in plants is correct?
    a)
    In the initial phase rapid uptake of ions into the outer space of cells - the apoplast, is a passive process.
    b)
    In the final phase, ions are taken in slowly into the inner space - the symplast of cells, and is an active process.
    c)
    Passive movement of ions into the apoplast occurs through ion-channels, transmembrane proteins which act as selective pores.
    d) All of these

60. Amides are different from amino acids as they contain more
    a) hydrogen b) oxygen c) nitrogen d) carbon

61. The technique of growing plants in a nutrient solution, in complete absence of soil is called as
    a) aeroponics b) water culture c) hydroponics d) soil culture.

62. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:
    Assertion: The movement of ions into or out of the cells is usually called flux.
    Reason: The entry or exit of ions to and from the symplast, is an active process.
    a)
    If both assertion and reason are true and reason is the correct explanation of assertion.
    b)
    If both assertion and reason are true but reason is not the correct explanation of assertion
    c) If assertion is true but reason is false d) If both assertion and reason are false

63. The largest reservoir of nitrogen on Earth is
    a) soil b) air c) oceans d) rocks

64. From _____ acid, more than 17 amino acids are formed through transamination.
a) aspartic b) glutamic c) acetic d) pyruvic

65. The function of leg haemoglobin in the root nodules of legumes is_____
a) inhibition of nitrogenase activity b) oxygen removal c) nodule differentiation
d) expression of nif gene

66. Deficiency symptom of nitrogen and potassium are visible first in:
a) Buds b) Roots c) Senescent leaves d) Young leaves

67. According to carbonic acid exchange theory of mineral salt absorption by roots, which of the following is incorrect?
a) H^+ ions may be exchanged for cations adsorbed on clay particles.
b)
Cations thus released into soil solution are adsorbed on root cells in exchange for anions (e.g., CF^- ions),
c) CO_2 released by the respiration of roots combines with soil H_2O to form H_2CO_3
d) H_2CO_3 dissociates into H^+ and HCO_3^- ions in soil solution

68. The group of mineral nutrients known as frame work elements:
a) N, S, P b) C, H, O c) Mg, Fe, Zn d) Zn, Mn, Cu

69. Phosphorus (P) is a structural element of
a) cell membranes b) proteins c) nucleic acids d) all of these

70. Which of the foolowing set contains macro nutrients?
a) P, N, K and Mg b) K, Mn, Fe and Co c) P, Fe, Mn and K d) Fe, Co, Si and N

71. Which of the four most abundant elements in most plants (C, H, O and N), does a terrestrial green plant procure mainly through its roots from the soil?
a) H and O b) H and N c) C and O d) O and N

72. In which of the following forms is iron absorbed by plants?
a) Free element b) Ferrous c) Ferric d) Both Ferric and Ferrous

73. Select the correctly matched pair
a) Zinc - Helps to maintain the ribosome structure
b) Magnesium - Needed during the formation of mitotic spindle
c) Calcium - Plays a role in the opening and closing of stomata
d)
Manganese - Needed in the splitting of water to liberate oxygen during photosynthesis

74. Premature leaf fall is due to deficiency of
a) sodium b) potassium c) zinc d) phosphorus

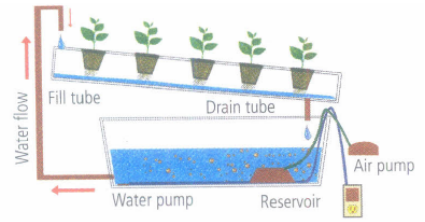
75. Which of the following is a symbiotic nitrogen fixer?
a) Azotobacter b) Frankia c) Azolla N d) Glomus

76. The disease related with deficiency of molybdenum Is;

a) Whiptail disease of cauliflower b) Little leaf disease

c) Reclamation disease of cereals d) Brown heart disease

77. Identify the given type of hydroponic technique and select the co~ct option.



a)

A very shallow stream of water containing dissolved nutrients is recirculated past the roots of plants in a watertight channel

b)

The nutrient solution flows in a thin film over the roots ensuring that the upper part of the roots gets sufficient supply of oxygen

c)

Roots keep suspended in the air over the nutrient solution which is provided in the form of a nutrient mist.

d) Both (a) and (b)

78. Which one of the following is not an essential minerals element for plants while the remaining three are?

a) Iron b) Manganese c) Cadmium d) Phosphorus

79. Which one of the following elements in plants is not remobilised?

a) Phosphorus b) Calcium c) Potassium d) Sulphur

80. Which aquatic fern performs nitrogen fixation?

a) Azolla b) Nostoc c) Salvia d) Salvinia

81. Deficiency symptoms of nitrogen and potassium are visible first in_____

a) Senescent leaves b) young leaves c) Roots d) Buds

82. The non-mineral elements are:

a) C, H, O b) N, Ca, Mg c) Fe, Co, Mn d) Cu, Mo, N.

83. The most abundant element present in the plants is_____

a) Carbon b) Nitrogen c) Manganese d) Iron

84. Select the mismatch

a) Frankia - Alnus b) Rhodospirillum - Mycorrhiza c) Anabaena - Nitrogen Fixer

d) Rhizobium -Alfalafa

85. The core metal of chlorophyll is_____

a) iron b) magnesium c) nickel d) copper

86. Which of the following is not one of the three plant macronutrients included in most fertilisers?

a) O b) N c) P d) K

87. Decomposition of organic nitrogen of dead plants and animals into ammonia is called _____

a) nitrification b) nitrate reduction c) N_2-fixation d) ammonification

88. Mineral ion concentration in tissues that reduces the dry weight of tissues by about 10% is considered as:

a) critical concentration b) toxic concentration c) optimum concentration

d) beneficial concentration.

89. The bacterium __ belonging to group Actinomycetes, produces N_2-fixing nodules on the roots of nonleguminous plants (e.g. Alnus).

a) Frankia b) Rhizobium c) Rhodospirillum d) Clostridium

90. Conversion of $NO_3^- \longrightarrow NO_2^- \longrightarrow NH_4$ is called _____ and is catalysed by _____

a) Nitrate assimilation, nitrate and nitrite reductase

b) Nitrification, nitrate and nitrite reductase

c) Ammonification, glutamate dehydrogenase d) Denitrification, transaminase

91. Protoplasmic elements are:

a) C, H, O, P, N, S b) C, H, O, Fe, N c) N, S, Fe, P, K d) Fe, Mg, Ca, N, P

92. Monovalents (e.g., Na^+, K^+) _____ membrane permeability while divalents (e.g., Ca^{2+}) _____ the same

a) increase, decrease b) decrease, increase c) increase, increase

d) decrease, decrease

93. Symbiotic bacteria are found in the root nodules of members of Family

a) Solanaceae b) Asteraceae c) Leguminosae d) Malvaceae

94. Leghaemoglobin is produced in response to

a) respiration b) fatty acid oxidation c) photosynthesis d) N_2-fixation.

95. The amino acid having 5 in its composition is-

a) Cystine b) Cysteine c) Methionine d) All

96. Passive absorption of minerals depend on____

a) temperature b) temperature and metabolic inhibitor c) rnetabolic inhibitor

d) humidity

97. The technique of hydroponics is being employed for the commercial production of vegetables like

a) tomato b) cucumber c) lettuce d) all of these.

98. The two elements responsible for splitting of H_2O to liberate O_2 during photosynthesis are

a) Mn and Mo b) Ca and Mg c) Mn and Cl d) Mg and Cl

99. Chlorosis, i.e., loss of chlorophyll leading to yellowing in leaves, is caused by the deficiency of:

a) N, K, Mg b) S, Fe, Zn c) Mn, Mo, Mg d) all of these

100. Mineral nutrients absorbed by roots, move to leaves through
a) xylem b) phloem c) sleve tube d) companion cell

101. Hydroponics or soilless culture helps in knowing:
a) essentialny of an element b) deficiency symptoms caused by an element
c) toxicity caused by an element d) all of these.

102. In the following questions, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
Assertion: Nitrate present in the soil is reduced to nitrogen by the process of denitrification.
Reason: Denitrification is carried by bacteria Pseudomonas and Azotobacter.
a)
If both assertion and reason are true and reason is the correct explanation of assertion
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

103. Match the following concerning essential elements and their functions in plants:

Column - I	**Column - II**
A. iron	(i) photolysis of water
B.Zinc	(ii) pollen germination
C. Boron	(iii) Required for chlorophyll biosynthesis
D. Manganese	(iv) IAA biosynthesis

Select the correct option _____ .
a) (iii) (iv) (ii) (i) b) (iv) (i) (ii) (iii) c) (ii) (i) (iv) (iii) d) (iv) (iii) (ii) (i)

104. Which one of the following essential elements plays an important role in opening and closing of stomata?
a) Mg b) k c) Mn d) P

105. Amides are transported to the other parts of the plant via
a) phloem parenchyma b) phloem companion cells c) xylem vessels
d) phloem fibre

106. Phosphorus 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

107. Hydroponics is a technique in which plants are grown in?
a) Green house b) Water saturated sand c) Balanced nutrient solution
d) Purified distilled water

108. Nitrogen is a limiting nutrient for
a) natural ecosystem b) aquatic ecosystem c) agricultural ecosystem
d) both (a) and (c)

109. Some functions of a nutrient element are given below
(i) Important constituent of proteins involved in ETS
(ii) Activator of catalase
(iii) Important constituent of cytochrome
(iv) Essential for chlorophyll synthesis
The concerned nutrient is _____ .
a) Cu b) Fe c) Ca d) Mo

110. Match the element with its associated functions/roles and choose the correct option among given below

A.	Boron	(i)	Splitting of H_2O to liberat e O_2 durinq photosynthesis
B.		(ii)	Needed for synthesis of auxins
C.		(iii)	Component of nitrogenase
D.		(iv)	Pollen qermination
E.		(v)	Component of ferredoxin

a) A-(i), B-(ii), C-(iii), D-(iv), E-(v) b) A-(iv), B-(i), C-(iii), D-(ii), E-(v)
c) A-(iii), B-(ii), C-(iv), D-(v), Hi) d) A-(ii), B-(iii), C-(vl. D-(i), E-(iv)

111. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
Assertion: The technique of growing plants in a nutrient solution is known as hydroponics.
Reason: Hydroponics is used for commercial production of vegetables such as tomato, seedless cucumber and lettuce.
a)
If both assertion and reason are true and reason is the correct explanation of assertion
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false.

112. Match column I with column II and select the correct option from the given codes.

Column I	**Column II**
A. Nitrosomonas, Nitrosococcus	(i) Ammonia to nitrite
B. Nitrobacter, Nitrocystis	(ii) Nitrite to nitrate
C. Pseudomonas, Thiobacillus	(iii) Nitrate to N_2

a) A-(i), B-(ii), C-(iii) b) A-(i), B-(iii), C-(ii) c) A-(ii), B-(i), C-(iii) d) A-(ii), B-(iii), C-(i)

113. Match column I with column II and select the correct option from the codes given below

Column I (Activator element)	**Column II (Enzyme)**
A. Mg^{2+}	(i) Nitrate reductase
B. Zn^{2+}	(ii) RuBisCO,PEPCase
C. Mo	(iii) Alcohol dehydrogenase

a) A-(ii), B-(iii), (C)-(i) b) A-(iii), B-(ii), (C)-(i) c) A-(i), B-(iii), (C)-(ii)
d) A-(ii), B-(i), (C)-(iii)

114. The process of conversion of atmospheric free N_2 gas to nitrogenous compounds like NH_3 is termed as
a) nitrification b) nitrate reduction c) N_2 fixation d) ammonification

115. Minerals are absorbed in the form of
a) molecules b) ions c) compounds d) mixtures

116. The inorganic essential elements which are obtained from the soil are called as:
a) mineral elements b) non-mineral elements c) non-essential elements
d) both (b) and (c).

117. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
Assertion: Necrosis occurs due to deficiency of Ca, Mg, Cu and K.
Reason: Necrosis is the death of tissue, particularly leaf tissue.
a)
If both assertion and reason are true and reason is the correct explanation of assertion
b)
If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false d) If both assertion and reason are false.

118. Which one of the following elements is not an essential micronutrient for plant growth?
a) Zn b) Cu c) Ca d) Mn

119. Nodules in soybean plant export the fixed nitrogen in the form of
a) ureides b) amides c) amino acids d) both (b) and (c).

120. An organism used as a biofertilizer for raising soyabean corp is:
a) Azotobacter b) Azsopirillum c) Rhizobium d) Nostoc

121. Minerals known to be required in large amounts for plant growth include _____ .
a) calcium, magnesium, manganese. copper
b) potassium, phosphorus, selenium, boron c) magnesium, sulphur, iron. zinc
d) phosphorus, potassium, sulphur, calciurn

122. A farmer adds Azotobacter culture to soil before sowing maize. Which mineral element will be replenished by doing so?
a) N b) P c) K d) S

123. The common nitrogen fixer in paddy fields is
a) Frankia b) Rhizobium c) Azospirillum d) Oscillatoria

124. Minerals which maintain cation-anion balance in cells are
a) Cl and K b) K and Fe c) Cl and Mg d) Ca and Mg

125. Deficiency of which of the following elements delay flowering in plants?
a) Fe, Mn, Mo b) N, s. Mo c) Ca, Mg, K d) N, K, S

126. Nitrogen and hydrogen combine to form ammonia under high temperature and pressure conditions. This is an example of
a) biological N_2 fixation b) natural N_2 fixation c) industrial N_2 fixation
d) electrical N_2 fixation

127. The product(s) of reaction catalyzed by nitrogenase in root nodules of leguminous plant is / are_____
a) Ammonia and oxygen b) Ammonia and hydrogen c) Ammonia alone
d) Nitrate alone

128. Certain non-leguminous plants also form nodules to fix N_2 . Example of such plants is
a) Alnus b) Casuarina c) Myrica d) all of these.

129. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
Assertion: Sulphur is the main constituent of several coenzymes, vitamins and ferredoxin.
Reason: Sulphur is present in two amino acids - valine and cysteine
a)
If both assertion and reason are true and reason is the correct explanation of assertion
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

130. Deficiency symptoms of an element tend to appear first in young leaves. It indicates that the element is relatively immobile. Which one of the following elemental deficiency would show such symptoms?
a) Sulphur b) Magnesium c) Nitrogen d) Potassium

131. Which of the following elements are required for chlorophyll synthesis?
a) Fe and Mg b) Mo and Ca c) Cu and Ca d) Ca and K

132. For its activity, nitrogenase requires:
a) Light b) Manganese c) Super oxygen radicals d) High input of energy

133. Which is a criteria for essentiality of a mineral element?
a) Direct role in metabolism b) Requirement is specific
c) Deficiency causes hunger signs d) More than one option is correct

134. Minerals associated with redox reactions are:
a) Na, Cu b) N, Cu c) Fe, Cu d) Ca, Fe

135. Manganese is required in :
a) Plant cell wall formation b) Photolysis of water during photosynthesis
c) Chlorophyll synthesis d) Nucleic acid synthesis

136. The cofactor of nitrate reductase is.
a) Cu b) Zn c) Ca d) Mo

137. With regard to the Biological Nitrogen Fixation by Rhizobium in association with soybean, which one of the following statement/statements does not hold true?
a) Nitrogenase may require oxygen for its functioning. b) Nitrogenase is Mo-Fe protein
c) Leghaemoglobin is a pink coloured pigment.
d) Nitrogenase helps to convert N_2 gas into two molecules of ammonia

138. Necrosis mainly occurs by the deficiency of
a) Ca, Mg b) N, S c) Mn, Mo d) Fe, Mn

139. More than _____ elements of the _____ discovered so far are found in different plants.
a) 60, 105 b) 105, 60 c) 30, 60 d) 4, 105

140. Which of the following helps in pollen germination, membrane functioning and cell differentiation?
a) B b) Mn c) Ni d) S

141. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
Assertion: The enzyme nitrogenase is a Mo-Fe protein and catalyses the conversion of atmospheric nitrogen to ammonia.
Reason: The enzyme nitrogenase is highly sensitive to the molecular oxygen.
a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false.

142. The nodules present in the leguminous plants appear pink in colour due to the presence of
a) RBCs b) leg haemoglobin c) nitrogenase enzyme d) bacterial secretion

143. In plants inulin and raphides____

a) reserved food material b) wastes c) secretory material
d) insect attracting material

144. Sulphur is a constituent of which of the following amino acids?
a) Threonine b) Cysteine c) Methionine d) Both (b) and (c)

145. A prokaryotic autotrophic nitrogen fixing symboint is found in__
a) Alnus b) Cycas c) Cicer d) pisum

146. The element which can not be placed along with mlcronutrients:
a) Mn b) Mo c) Cu d) Ca

147. Read the following statements and select the correct answer.
(i) Rhizobium leguminosarum is also known as Bacillus radicicola.
(ii) Nitrifying bacteria (Nitrosomonas, etc.) are chemoautotrophs.
(iii) Enzyme nitrogenase fixes N_2 under aerobic conditions.
(iv) Leghaemoglobin creates aerobic conditions for the enzyme nitrogenase.
a) Statements (i), (ii) and (iii) are correct b) Statements (i) and (ii) are correct
c) Statements (iii) and (iv) are correct d) All statements are correct.

148. The limiting factor in nitrogen fixation of soil is
a) soil nature (pH) b) light c) temperature d) air

149. N_2-fixing blue-green alga Anabaena which is extensively used in rice cultivation, forms symbiotic association with:
a) Cycas roots b) Azolla c) Anthoceros d) Alnus

150. Yellowish edges appear in leaves deficient in
a) potassium b) calcium c) magnesium d) phosphorus

151. If by radiation all nitrogenase enzyme is inactivated, then there will be no
a) fixation of nitrogen in legumes b) conversion of nitrate into nitrogen
c) conversion from nitrate to nitrite in legumes
d) conversion from ammonium to nitrate in soil

152. Selectthe option which completes the given equation for reductive amination

$$\underline{\quad(I)\quad} + NH_4^+ + NAD(P)H \xrightarrow{(II)} Glumate + H_2O + NAD(P)$$

a)

(I)	**(II)**
α-ketoglutaric acid	Transaminase

b)

(i)	**(ii)**
α-ketoglutaric acid	Glutamate dehydrogenase

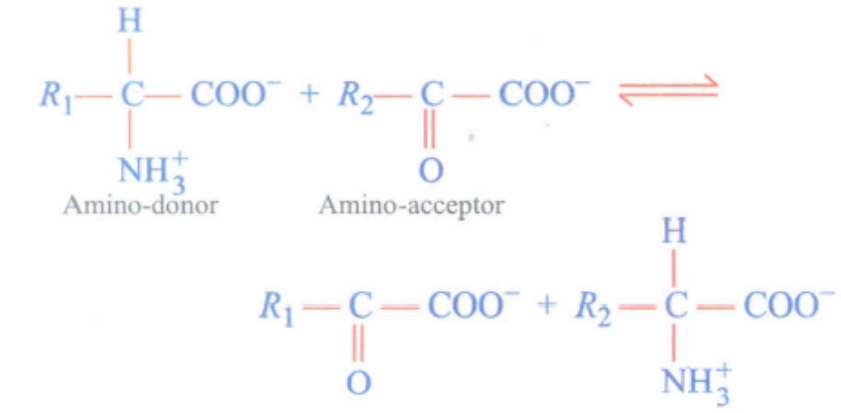
c)

(I)	**(II)**
Asparagine	Glutamate dehydrogenase

d)

(I)	**(II)**
Glutamine	Transaminase

153. Refer to the given reaction. What does it depict?



a) Oxidative ami nation b) Reductive ami nation c) Transamination d) Deamination

154. Erzyme involved in nitrogen assimilation_____
a) nitrogenase b) nitrate reductase c) transferase d) transaminase

155. For chlorophyll formation a plant needs:
a) Fe, Ca & light b) Fe, Mg & Light c) Ca, K & light d) Mn & Cu

156. Which of the following statements will not hold true if a plant is grown in only sand (S), only clay (C) and only humus (H)?
a) Water availability to the roots will be more in (C) and (H) as compared to (S).
b) Ability of roots to penetrate (S) and (H) will be low as compared to (C).
c) Nutrient availability to roots will be less in (S) as compared to (C) and (H).
d) Oxygen availability to roots will be low in (C) as compared to (S) and (H).

157. Which one of the following is a micronutrient for plants?
a) Calcium b) Magnesium c) Manganese d) Nitrogen

158. Which of the following can fix atmospheric nitrogen?
a) Albugo b) Cystopus c) Saprolegnia d) Anabaena

159. _____ is a free-living N2-fixing aerobic bacterium.
a) Rhodospirillum b) Azotobacter c) Clostridium d) Rhizobium

160. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:
Assertion: Plants obtain molybdenum in the form of molybdate ions (MoO_4^{2+}).
Reason: Molybdenum is a component of pollen germination, cell elongation and cell differentiation.
a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

161. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
Assertion: Plants absorb calcium from soil in the form of calcium ions (Ca^{2+}).
Reason: Calcium is required by meristematic and differentiating tissues.
a)
If both assertion and reason are true and reason is the correct explanation of assertion
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false. d) If both assertion and reason are false.

162. Select the mismatched pair.
a) Symbiotic bacteria - Rhizobium, Frankia
b) Symbiotic cyanobacteria - Frankia, Aulosira
c) Free-living bacteria - Beijerinckia, Azotobacter d) None of these

163. Ammonia synthesis by nitrogenase requires
a) high input of energy b) super oxygen radicals c) Mn^{2+} d) none of these

164. With reference to absorption of minerals, the term 'outer space' represents _____ while 'inner space' represents _____
a) intercellular space and cell wall; cytoplasm and vacuole
b) cytoplasm and vacuole; intercellular space and cell wall
c) intercellular space; vacuole d) cytoplasm; vacuole

165. Which one of the following is not a micronutrient?
a) Molybdenum b) Magnesium c) Zinc d) Boron

166. In the following questions, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
Assertion: Ammonia is converted into nitrate by soil bacteria like Nitrosomonas and Nitrobacter.
Reason: These nitrifying bacteria are photoautotrophs.
a)
If both assertion and reason are true and reason is the correct explanation of assertion
b)
If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false

167. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as :
Assertion: The prominent symptom of manganese toxicity is the appearance of brown spots surrounded by chlorotic veins.
Reason: Excess of manganese may induce deficiencies of iron, magnesium and calcium

a)
If both assertion and reason are true and reason is the correct explanation of assertion.

b)
If both assertion and reason are true but reason is not the correct explanation of assertion

c) If assertion is true but reason is false d) If both assertion and reason are false.

168. Which one of the following roles is not characteristic of an essential element?
a) Being a component of biomolecules b) Changing the chemistry of soil

c) Being a structural component of energy related chemical compounds

d) Activation or inhibition of enzymes

169. Select the correct statement(s) regarding the solution culture techniques
a)
Successfulhydroponic culture requires a large volume of nutrient solution or frequent adjustment of the nutrient solution to prevent roots from producing radical changes in nutrient concentrations and pH of the medium.

b)
In nutrient film growth system, plant roots lie on the surface of a trough, and nutrient solutions flow in a thin layer along the trough over the roots.

c)
In aeroponics technique, plants are grown with their roots suspended in air while being sprayed continuously with a nutrient solution.

d) All of these

170. Read the given statements and select the correct option.
Statement 1 : Deficiency symptoms of N, K and Mg are first visible in the senescent leaves.
Statement 2 : Biomolecules containing these elements are broken down in the older leaves, making these elements available for mobilising to younger leaves
a) Both statements 1 and 2 are correct

b) Statement 1 is correct but statement 2 is incorrect

c) Statement 1 is incorrect but statement 2 is correct.

d) Both statements 1 and 2 are incorrect

171. Die back disease in citrus Is due to deficiency of:
a) Mo b) B c) Cu d) Zn

172. Read the following statements and select the incorrect ones.
(i) The co-ordinated activities of the legume and Rhizobium bacteria depend on chemical interactions between the symbiotic partners.
(ii) Leguminous roots secrete chemical attractants that attract Rhizobium bacteria living nearby.

(iii) N, P and K usually do not get deficient in soil due to their low plant requirement.
(iv) Nitrogen cycle is regular circulation of nitrogen amongst living organisms with its reservoir pool in lithosphere and cycling pool in atmosphere.
a) (i) and (ii) b) (ii) and (iii) c) (iii) and (iv) d) (ii), (iii) and (iv)

173. Which one of the following mineral elements plays an important role in biological nitrogen fixation?
a) Molybdenum b) Copper c) Manganese d) Zinc

174. Which of the following is not a criterion for essentiality of an element?
a) Requirement of the element is specific
b) Necessary for normal growth and reproduction
c) Not replaceable by another element d) Indirectly involved in plant metabolism

175. The process that is the opposite of nitrogen fixation is
a) nitrification b) denitrification c) ammonification d) nitrate reduction

176. The major portion of the dry weight of plants comprises of _____
a) Carbon, hydrogen and oxygen b) Nitrogen, phosphorus and potassium
c) Calcium, magnesium and sulphur d) Carbon, nitrogen and hydrogen

177. Essential elements are:
a) only macronutrients b) only micronutrients c) both macro and micronutrients
d) C. H, O and N only.

178. Which of the following elements in plants is not immobilized?
a) Sulphur b) Phosphorus c) Calcium d) Potassium

179. Boron in green plants assists in____
a) sugar transport b) activation of enzymes c) acting as enzyme cofactor
d) photosynthesis

180. _____ conditions are created by leghaemoglobin in the root nodule of a legume.
a) Aerobic b) Anaerobic c) Acidic d) Alkaline

181. Deficiency symptoms tend to appear first in _____ whenever the essential elements are relatively immobile and are not transported out of the mature organs.
a) younger tissues b) older tissues c) roots d) shoots

182. In the initial phase of mineral ion absorption, there is a rapid uptake of ions into _____ space of cells. Ions absorbed in this phase are _____ exchangeable. It is _____ uptake as it _____ the expenditure of metabolic energy.
a) inner, not freely, active, requires b) inner, freely, passive, requires
c) outer, freely, passive, does not require d) outer, not freely, active, requires

183. Reaction carried out by N2 fixing microbes include
$2NH_3 + 3O_2 \rightarrow 2NO_2^- + 2H+ + 2H_2O$ (i)
$2NO_2^- + O_2 \rightarrow 2NO$; (ii)
Which of the following statements about these equations is not true?

a) Step (i) is carried out by Nitrosomonas or Nitrosococcus.
b) Step (ii) is carried out by Nitrobacter.
c) Both steps (i) and (ii) can be called nitrification.
d) Bacteria carrying out these steps are usually photoautotrophs.

184. Which of the following is a free-living nitrogen fixing cyanobacteria?
a) Cylindrospermum b) Nostoc c) Rhodospirillum d) Both (a) and (b)

185. The process of conversion of soil nitrates into free N2 is called ____(i)____ and is carried out by bacteria ____(ii)___.

a)

I	II
nitrification	Nitrosomonas

b)

I	II
denitrification	Nitrobacter

c)

I	II
denitrification	Thiobacillus

d)

I	II
N_2 fixation	Rhizobium

186. An element playing important role in nitrogen fixation is_____
a) Molybdenum b) Copper c) Manganese d) Zinc

187. Best defined function of Manganese in green plants is____
a) Photolysis of water b) Calvin cycle c) Nitrogen fixation d) Water absorption

188. Nitrogen is absorbed by plants in form of
a) NO_3^- b) NH_3 c) NO_2^- d) both (a) and (c).

189. Micronutrients are present in plant tissues in concentrations less than _____ of dry matter.
a) 1 m mole Kg^{-1} b) 10 m mole Kg^{-1} c) 0.1 m mole Kg^{-1} d) 2 m mole Kg^{-1}

190. A. The parts of plants that show deficiency symptoms also depend on mobility of the element in the plant.
B. Actively mobilised elements like N, P, Mg which are exported to young developing tissues show deficiency symptoms first in older, senescent parts.
a) Only A is correct b) Only B is correct c) Both A and B are correct
d) Both A and B are incorrect

191. A. Nitrogen is a limiting nutrient for both natural and agricultural ecosystems
B. Plants do not compete with microbes for limited nitrogen available in soil.
a) Only A is correct b) Only B is correct c) Both A and B are correct
d) Both A and B are incorrect

192. Consider the following steps involved in nodule formation in the root of a legume.
(i) Bacteria release chemicals and enzymes.
(ii) Bacteria stop dividing and form bacteroides.
(iii) Roots secrete chemical attractants.
(iv) Formation of infection thread.
(v) Formation of nodules.

(vi) Division of infected cortical cells.
(vii) Curling of root hair and degradation of their cell wall.
(viii) Infection thread grows along with multiplication of bacteria.
Arrange the steps in the right sequence and mark the correct option
a) (iii), (i), (vii). (iv), (viii), (vi), (v), (ii) b) (iii), (iv), (viii), (i), (vi), (vii), (ii), (v)
c) (i), (iv), (iii), (vi), (v), (vii), (viii), (ii) d) (i), (iii), (vi), (iv), (viii), (ii), (v), (vii)

193. Which one of the following symptoms is not due to manganese toxicity in plants?
a) Calcium translocation in shoot apex is inhibited.
b) Deficiency in both iron and nitrogen is induced.
c) Appearance of brown spot surrounded by chlorotic veins. d) None of the above

194. Select the correct statement regarding manganese toxicity
a) Appearance of brown spots surrounded by chlorotic veins
b) Inhibition of Ca translocation in shoot apex c) Induction deficiencies of Mg and Fe
d) All of these

195. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:
Assertion: Deficiency symptoms appear when the availability of the essential nutrients falls below the critical concentration.
Reason: Critical concentration is that limited concentration of the essential element below which growth of the plant is reduced
a)
If both assertion and reason are true and reason is the correct explanation of assertion
b)
If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

196. Which one of the following is correctly matched?
a) Passive transport of nutrients - ATP b) Apoplast - plasmodesmata
c) Potassium - Readily immobilisation d) Bakane of rice seedlings - F. Skoog

197. Which element is not considered as macronutrient?
a) Mg b) Ca c) Mn d) P

198. Which one of the following is not an essential element for plants?
a) Potassium b) Iron c) Iodine d) Zinc

199. The technique of hydroponics was first demonstrated by
a) M. Calvin (1961) b) JuliusVon Sachs(1860) c) Arnon (1940)
d) Hoagland (1940).

200. Which of the following is a free living aerobic non-photosynthetic nitrogen fixer?
a) Rhizobium b) Azotobacter c) Azospirillum d) Nostoc