CHAPTER 12

Mineral Nutrition

12.2 Essential Mineral Elements

1. 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)	(B)	(C)	(D)
(a)	(ii)	(i)	(iv)	(iii)
(b)	(iv)	(iii)	(ii)	(i)
(c)	(iii)	(iv)	(ii)	(i)
(d)	(iv)	(i)	(ii)	(iii)

(NEET 2020)

2. Which of the following elements is responsible for maintaining turgor in cells?
(a) Magnesium (b) Sodium
(c) Potassium (d) Calcium *(NEET 2018)*

3. In which of the following forms is iron absorbed by plants?
(a) Ferric
(b) Ferrous
(c) Free element
(d) Both ferric and ferrous *(NEET 2018)*

4. Which is essential for the growth of root tip?
(a) Zn (b) Fe
(c) Ca (d) Mn *(NEET-II 2016)*

5. In which of the following all three are macronutrients?
(a) Molybdenum, magnesium, manganese
(b) Nitrogen, nickel, phosphorus
(c) Boron, zinc, manganese
(d) Iron, copper, molybdenum *(NEET-I 2016)*

6. The oxygen evolved during photosynthesis, comes from water molecules. Which one of the following pairs of elements is involved in this reaction?
(a) Magnesium and Molybdenum
(b) Magnesium and Chlorine
(c) Manganese and Chlorine
(d) Manganese and Potassium *(2015)*

7. Minerals known to be required in large amounts for plant growth include
(a) potassium, phosphorus, selenium, boron
(b) magnesium, sulphur, iron, zinc
(c) phosphorus, potassium, sulphur, calcium
(d) calcium, magnesium, manganese, copper.
(2015 Cancelled)

8. Deficiency symptoms of nitrogen and potassium are visible first in
(a) senescent leaves
(b) young leaves
(c) roots
(d) buds. *(2014)*

9. A few normal seedlings of tomato were kept in a dark room. After a few days they were found to have become white-coloured like albinos. Which of the following terms will you use to describe them?
(a) Mutated (b) Embolised
(c) Etiolated (d) Defoliated *(2014)*

10. Which of the following elements is a constituent of biotin?
(a) Magnesium
(b) Calcium
(c) Phosphorus
(d) Sulphur *(Karnataka NEET 2013)*

11. Best defined function of manganese in green plants is
(a) photolysis of water
(b) Calvin cycle
(c) nitrogen fixation
(d) water absorption. *(2012)*

12. Which one of the following elements in plants is not remobilised?
(a) Phosphorus (b) Calcium
(c) Potassium (d) Sulphur *(2011)*

13. Which one of the following is not an essential mineral element for plants while the remaining three are?
(a) Iron (b) Manganese
(c) Cadmium (d) Phosphorus
(Mains 2011)

14. An element playing important role in nitrogen fixation is
(a) molybdenum (b) copper
(c) manganese (d) zinc. *(2010)*

15. Which one of the following is not a micronutrient?
(a) Molybdenum (b) Magnesium
(c) Zinc (d) Boron *(2010)*

16. Manganese is required in
(a) plant cell wall formation
(b) photolysis of water during photosynthesis
(c) chlorophyll synthesis
(d) nucleic acid synthesis. *(2009)*

17. Which one of the following elements is not an essential micronutrient for plant growth?
(a) Zn (b) Cu
(c) Ca (d) Mn *(2007)*

18. A plant requires magnesium for
(a) protein synthesis
(b) chlorophyll synthesis
(c) cell wall development
(d) holding cells together. *(2007)*

19. Sulphur is an important nutrient for optimum growth and productivity in
(a) oilseed crops (b) pulse crops
(c) cereals (d) fibre crops. *(2006)*

20. Farmers in a particular region were concerned that pre-mature yellowing of leaves of a pulse crop might cause decrease in the yield. Which treatment could be most beneficial to obtain maximum seed yield?
(a) Application of iron and magnesium to promote synthesis of chlorophyll
(b) Frequent irrigation of the crop
(c) Treatment of the plants with cytokinins along with a small dose of nitrogenous fertilizer
(d) Removal of all yellow leaves and spraying the remaining green leaves with 2, 4, 5-trichlorophenoxy acetic acid *(2006)*

21. The deficiencies of micronutrients, not only affect growth of plants but also vital functions such as photosynthetic and mitochondrial electron flow. Among the list given below, which group of three elements shall affect most, both photosynthetic and mitochondrial electron transport?
(a) Co, Ni, Mo (b) Ca, K, Na
(c) Mn, Co, Ca (d) Cu, Mn, Fe *(2005)*

22. Gray spots of oat are caused by deficiency of
(a) Cu (b) Zn
(c) Mn (d) Fe. *(2003)*

23. Boron in green plants assists in
(a) activation of enzymes
(b) acting as enzyme co-factor
(c) photosynthesis
(d) sugar transport. *(2003)*

24. Mg is a component of
(a) chlorophyll (b) cytochrome
(c) haemoglobin (d) haemocyanin. *(2000)*

25. Plants take zinc in the form of
(a) $ZnSO_4$ (b) Zn^{++}
(c) ZnO (d) Zn. *(2000)*

26. When the plants are grown in magnesium deficient but urea rich soil, the symptoms expressed are
(a) yellowish leaves (b) colourless petiole
(c) dark green leaves (d) shoot apex die. *(2000)*

27. Which of the following is not caused by deficiency of mineral nutrition?
(a) Etiolation
(b) Shortening of internode
(c) Necrosis
(d) Chlorosis *(1997)*

28. Which one of the following elements is almost non-essential for plants?
(a) Zn (b) Na (c) Ca (d) Mo
(1996)

29. Which of the following elements plays an important role in biological nitrogen fixation?
(a) Copper (b) Molybdenum
(c) Zinc (d) Manganese *(1995)*

30. Mineral associated with cytochrome is
(a) Cu (b) Mg
(c) Cu and Mg (d) Fe. *(1991)*

31. Which one is an essential mineral, not constituent of any enzyme but stimulates the activity of many enzymes?
(a) Zn (b) Mn (c) K (d) Mg
(1989)

32. 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. *(1989)*

12.3 Mechanism of Absorption of Elements

33. Passive absorption of minerals depends on
(a) temperature
(b) temperature and metabolic inhibitor
(c) metabolic inhibitor
(d) humidity. *(2001)*

12.6 Metabolism of Nitrogen

34. The product(s) of reaction catalysed by nitrogenase in root nodules of leguminous plants is/are
(a) ammonia alone
(b) nitrate alone
(c) ammonia and oxygen
(d) ammonia and hydrogen. *(NEET 2020)*

35. *Thiobacillus* is a group of bacteria helpful in carrying out
(a) denitrification
(b) nitrogen fixation
(c) chemoautotrophic fixation
(d) nitrification. *(NEET 2019)*

36. Which of the following bacteria reduce nitrate in soil into nitrogen?
(a) *Nitrobacter* (b) *Nitrococcus*
(c) *Thiobacillus* (d) *Nitrosomonas*
(Odisha NEET 2019)

37. During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by
(a) carotene (b) cytochrome
(c) leghaemoglobin (d) xanthophyll. *(2015)*

38. The first stable product of fixation of atmospheric nitrogen in leguminous plants is
(a) NO_3^-
(b) glutamate
(c) NO_2^-
(d) ammonia. *(NEET 2013)*

39. Which two distinct microbial processes are responsible for the release of fixed nitrogen as dinitrogen gas (N_2) to the atmosphere?
(a) Aerobic nitrate oxidation and nitrite reduction
(b) Decomposition of organic nitrogen and conversion of dinitrogen to ammonium compounds
(c) Enteric fermentation in cattle and nitrogen fixation by *Rhizobium* in root nodules of legumes
(d) Anaerobic ammonium oxidation and denitrification *(Karnataka NEET 2013)*

40. 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 all proteins.
(d) *Nitrosomonas* and *Nitrobacter* are chemo-autotrophs. *(2012)*

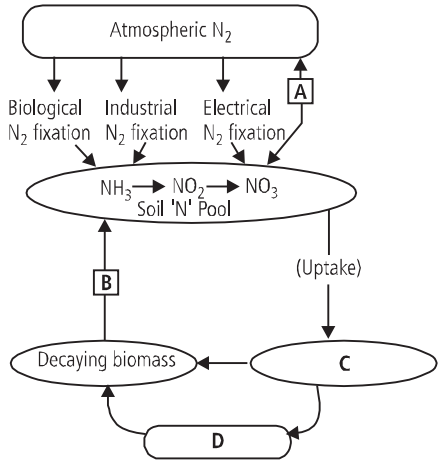
41. For its action, nitrogenase requires
(a) high input of energy
(b) light
(c) Mn^{2+}
(d) super oxygen radicals. *(Mains 2012)*

42. 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. *(2011)*

43. The function of leghaemoglobin in the root nodules of legumes is
(a) inhibition of nitrogenase activity
(b) oxygen removal
(c) nodule differentiation
(d) expression of *nif* gene. *(2011)*

44. Leguminous plants are able to fix atmospheric nitrogen through the process of symbiotic nitrogen fixation. Which one of the following statements is not correct during this process of nitrogen fixation?
(a) Leghaemoglobin scavenges oxygen and is pinkish in colour.
(b) Nodules act as sites for nitrogen fixation.
(c) The enzyme nitrogenase catalyses the conversion of atmospheric N_2 to NH_3.
(d) Nitrogenase is insensitive to oxygen.
(Mains 2010)

45. Study the cycle shown below and select the option which gives correct words for all the four blanks A, B, C and D.



	A	B	C	D
(a)	Nitrification	Ammoni-fication	Animals	Plants
(b)	Denitrification	Ammoni-fication	Plants	Animals
(c)	Nitrification	Denitri-fication	Animals	Plants
(d)	Denitrification	Nitrification	Plants	Animals

(Mains 2010)

46. One of the free-living, anaerobic nitrogen-fixer is
(a) *Beijerinckia* (b) *Rhodospirillum*
(c) *Rhizobium* (d) *Azotobacter*. *(2010)*

47. Which of the following is a flowering plant with nodules containing filamentous nitrogen-fixing microorganism?
(a) *Crotalaria juncea*
(b) *Cycas revoluta*
(c) *Cicer arietinum*
(d) *Casuarina equisetifolia* *(2007)*

48. If by radiation all nitrogenase enzyme are inactivated, then there will be no
(a) fixation of nitrogen in legumes
(b) fixation of atmospheric nitrogen
(c) conversion from nitrate to nitrite in legumes
(d) conversion from ammonium to nitrate in soil. *(2004)*

49. Roots of which plant contains a red pigment which have affinity for oxygen?
(a) Carrot (b) Soybean
(c) Mustard (d) Radish *(2001)*

50. What is true for cyanobacteria?
(a) Oxygenic with nitrogenase
(b) Oxygenic without nitrogenase
(c) Non oxygenic with nitrogenase
(d) Non oxygenic without nitrogenase *(2001)*

51. Which aquatic fern performs nitrogen fixation?
(a) *Azolla* (b) *Nostoc*
(c) *Salvia* (d) *Salvinia* *(2001)*

52. Enzyme first used for nitrogen fixation
(a) nitrogenase (b) nitroreductase
(c) transferase (d) transaminase. *(2001)*

53. Which of the following is free-living aerobic non-photosynthetic nitrogen-fixing bacterium?
(a) *Nostoc* (b) *Azospirillum*
(c) *Rhizobium* (d) *Azotobacter* *(1997)*

54. A non-photosynthetic aerobic nitrogen fixing soil bacterium is
(a) *Rhizobium* (b) *Clostridium*
(c) *Azotobacter* (d) *Klebsiella*.
(1994, 1990)

ANSWER KEY

1.	(c)	**2.**	(c)	**3.**	(a)	**4.**	(c)	**5.**	(*)	**6.**	(c)	**7.**	(c)	**8.**	(a)	**9.**	(c)	**10.**	(d)
11.	(a)	**12.**	(b)	**13.**	(c)	**14.**	(a)	**15.**	(*)	**16.**	(b)	**17.**	(c)	**18.**	(b)	**19.**	(a)	**20.**	(a)
21.	(d)	**22.**	(c)	**23.**	(d)	**24.**	(a)	**25.**	(b)	**26.**	(a)	**27.**	(a)	**28.**	(b)	**29.**	(b)	**30.**	(d)
31.	(c)	**32.**	(b)	**33.**	(a)	**34.**	(d)	**35.**	(a)	**36.**	(c)	**37.**	(c)	**38.**	(d)	**39.**	(d)	**40.**	(c)
41.	(a)	**42.**	(a)	**43.**	(b)	**44.**	(d)	**45.**	(b)	**46.**	(b)	**47.**	(d)	**48.**	(a)	**49.**	(b)	**50.**	(a)
51.	(a)	**52.**	(a)	**53.**	(d)	**54.**	(c)												

*None of the options is correct.