ALLEN CAREER INSTITUTE KOTA (RAJASTHAN)

path to success

PRE-MEDICAL

BOTANY

ENTHUSIAST | LEADER | ACHIEVER

EXERCISE

Mineral Nutrition

ENGLISH MEDIUM

EXERCISE-I (Conceptual Questions) — Build Up Your Understanding

INTRODUCTION TO SOIL AS RESERVOIR OF ESSENTIAL ELEMENTS

1. Which of the following group of elements is not essential for a normal plant ?

(1) K, Ca, Mg (2) Fe, Zn, Mn, B

(3) Pb, I, Na (4) Mg, Fe, Mo

MN0001

2. Hydroponics is a technique in which plants are grown in :-

(1) Green house

(2) Water saturated sand

(3) Balanced nutrient solution

(4) Purified distilled water

MN0002

3. For chlorophyll formation a plant needs :-

(1) Fe, Ca & light (2) Fe, Mg & Light

(3) Ca, K & light (4) Mn & Cu

MN0003

4. Activator of nitrate reductase enzyme is :-

(1) Molybdenum (2) Copper

(3) Manganese (4) Magnesium

MN0157

5. Phosphorus is a constituent of :-

(1) All proteins and all nucleic acids

(2) All proteins and certain nucleic acids

(3) Certain proteins and all nucleic acids

(4) Certain proteins and Certain nucleic acids

MN0158

6. Protoplasmic elements are :-

(1) C, H, O, P, N, S (2) C, H,O, Fe, N

(3) N, S, Fe, P, K (4) Fe, Mg, Ca, N, P

MN0007

7. Which element is not considered as macronutrient ?

(1) Mg (2) Ca

(3) Mn (4) P

MN0008

8. The element which can not be placed alongwith micronutrients :-

(1) Mn (2) Mo

(3) Cu (4) Ca

MN0009

9. The amino acid having S in its composition is-

(1) Methionine (2) Cysteine

(3) Both (1) & (2) (4) Glutamic acid

MN0010

10. The group of mineral nutrients known as frame work elements :-

(1) N, S, P (2) C, H, O

(3) Mg, Fe, Zn (4) Zn, Mn, Cu

MN0011

11. Which element essential for stability of chromosome structure ?

(1) Zn (2) Ca

(3) Mo (4) Fe

MN0012

12. Which element is required in comparatively less quantity for the growth of plant ?

(1) Zn (2) N

(3) P (4) Ca

MN0014

13. Which mineral nutrients are called critical element for crops ?

(1) N, P, K (2) C, H, O

(3) N, S, Mg (4) K, Ca, Fe

MN0016

14. Which is most common free ion present in a cell?

(1) P (2) K

(3) Fe (4) B

MN0017

15. Deficiency of which of the following causes premature fall of leaves and buds ?

(1) Iron (2) Phosphorus

(3) Molybdenum (4) Chlorine

MN0159

16. Plants absorb nitrogen mainly in the form of :–

(1) NO_2^- (2) NO_3^-

(3) $N \equiv N$ (4) HNO_2

MN0021

17. The most abundant element present in the plants is –

(1) Iron (2) Carbon

(3) Nitrogen (4) Manganese

MN0022

18. Which is essential for nitrogen metabolism?

(1) B (2) Mo

(3) Cu (4) Mg

MN0023

19. The major portion of the **dry weight** of plants comprises of :-

(1) Nitrogen, phosphorus and potassium

(2) Calcium, magnesium and sulphur

(3) Carbon, nitrogen and hydrogen

(4) Carbon, hydrogen and oxygen

MN0024

20. Which of the following plants accumulates selenium ?

(1) Peach (2) *Equisetum*

(3) *Neptunia* (4) Mustard

MN0160

NITROGEN METABOLISM

21. During the formation of amides from amino acids:-

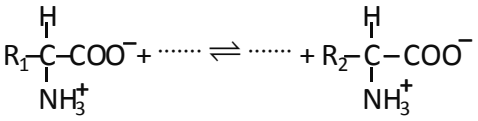
(1) COOH part of acid is replaced by NH_2

(2) NH_2 part of acid is replaced by COOH

(3) OH part of acid group is replaced by NH_2

(4) NH_2 part of acid is replaced by OH

MN0124

22. 

Choose the **correc**t symbol for the above blanks respectively:-

(1) $R_1-\underset{\underset{O}{\|}}{C}-COO^-$, $R_2-\underset{\underset{O}{\|}}{C}-COO^-$

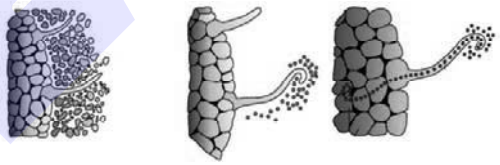
(2) $R_1-\underset{\underset{O}{\|}}{C}-COO^-$, $R_1-\underset{\underset{O}{\|}}{C}-COO^-$

(3) $R_2-\underset{\underset{O}{\|}}{C}-COO^-$, $R_1-\underset{\underset{O}{\|}}{C}-COO^-$

(4) $R_2-\underset{\underset{O}{\|}}{C}-COO^-$, $R_2-\underset{\underset{O}{\|}}{C}-COO^-$

MN0125

23. The figure below shows three steps (A, B, C) of development of root nodules in soyabean. Select the option giving correct identification together with what it represents ?



(A) (B) (C)

(1) **A**-Mature nodule complete with vascular tissues

(2) **C**-Infection thread carries the bacteria to the cortex

(3) **B**-Release of excess bacteria from root nodules

(4) **A**-Root hairs absorb leghaemoglobin from the soil

MN0126

24. In root nodules of legumes, leghaemoglobin is important because it :-

(1) acts as a catalyst in transamination

(2) transports oxygen to the root nodule

(3) provide energy to the nitrogen fixing bacteria

(4) acts as an oxygen scavenger

MN0127

25. Which one of the following options give the correct match of nitrogen fixing organisms with their types (A, B, C) ?

	A Free living aerobic	**B Free living anaerobic**	**C Symbiotic**
(1)	*Rhodospirillum*	*Rhizobium*	*Azotobacter*
(2)	*Rhizobium*	*Azotobacter*	*Rhodospirillum*
(3)	*Rhodospirillum*	*Azotobacter*	*Rhizobium*
(4)	*Azotobacter*	*Rhodospirillum*	*Rhizobium*

MN0128

EXERCISE-I (Conceptual Questions) ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**3**	**3**	**2**	**1**	**3**	**1**	**3**	**4**	**3**	**2**	**2**	**1**	**1**	**2**	**2**
Que.	16	17	18	19	20	21	22	23	24	25					
Ans.	**2**	**2**	**2**	**4**	**3**	**3**	**3**	**2**	**4**	**4**					

EXERCISE-II (Previous Year Questions) AIPMT/NEET

AIPMT 2007

1. A plant requires magnesium for :
(1) Cell wall development
(2) Holding cells together
(3) Protein synthesis
(4) Chlorophyll synthesis

MN0026

2. Which of the following is a flowering plant with nodules containing filamentous nitrogen-fixing microorganism ?
(1) *Cicer arietinum*
(2) *Casuarina equisetifolia*
(3) *Crotalaria juncea*
(4) *Cycas revoluta*

MN0027

3. About 98 percent of the mass of every living organism is composed of just six elements including carbon, hydrogen, nitrogen, oxygen and :
(1) Calcium and phosphorus
(2) Phosphorus and sulphur
(3) Sulphur and magnesium
(4) Magnesium and sodium

MN0028

4. Which one of the following elements is not an essential micronutrient for plant growth ?
(1) Ca (2) Mn
(3) Zn (4) Cu

MN0029

AIPMT 2008

5. Nitrogen fixation in root nodules of Alnus is brought about by :-
(1) *Frankia*
(2) *Azorhizobium*
(3) *Bradyrhizobium*
(4) *Clostridium*

MN0030

AIPMT 2009

6. Manganese is required in :-
(1) Plant cell wall formation
(2) Photolysis of water during photosynthesis
(3) Chlorophyll synthesis
(4) Nucleic acid synthesis

MN0031

7. Which of the following is a symbiotic nitrogen fixer?
(1) *Azotobacter*
(2) *Frankia*
(3) *Azolla*
(4) *Glomus*

MN0032

AIPMT-Pre 2010

8. An element playing important role in nitrogen fixation is :
(1) Molybdenum
(2) Copper
(3) Manganese
(4) Zinc

MN0033

9. Which one of the following is not a micronutrient ?
(1) Molybdenum
(2) Magnesium
(3) Zinc
(4) Boron

MN0034

10. One of the free-living, anaerobic nitrogen - fixer is :
(1) *Beijernickia*
(2) *Rhodospirillum*
(3) *Rhizobium*
(4) *Azotobacter*

MN0035

11. The common nitrogen - fixer in paddy fields is :

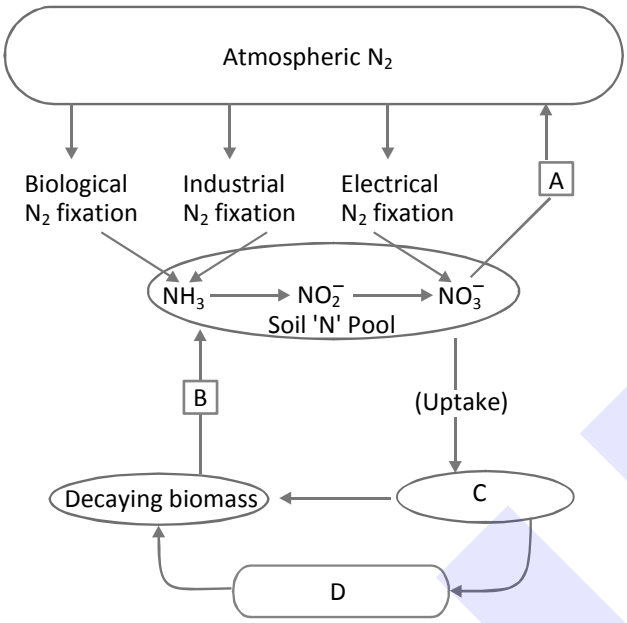
(1) *Rhizobium* (2) *Azospirillum*

(3) *Oscillatoria* (4) *Frankia*

MN0036

AIPMT-Mains 2010

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



	A	B	C	D
(1)	Denitrification	Ammonification	Plants	Animals
(2)	Nitrification	Denitrification	Animals	Plants
(3)	Denitrification	Nitrification	Plants	Animals
(4)	Nitrification	Ammonification	Animals	Plants

MN0037

13. 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 ?

(1) Nodules act as sites for nitrogen fixation

(2) The enzyme nitrogenase catalyses the converison of atmospheric N_2 to NH_3

(3) Nitrogenase is insensitive to oxygen

(4) Leghaemoglobin scavenges oxygen and is pinkish in colour

MN038

AIPMT-Pre 2011

14. A prokaryotic autotrophic nitrogen fixing symbiont is found in :-

(1) *Alnus* (2) *Cycas*

(3) *Cicer* (4) *Pisum*

MN0039

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

(1) Phosphorus (2) Calcium

(3) Potassium (4) Sulphur

MN0040

16. An organism used as a biofertilizer for raising soyabean crop is :-

(1) *Azotobacter* (2) *Azospirillum*

(3) *Rhizobium* (4) *Nostoc*

MN0041

17. Nitrifying bacteria :-

(1) Oxidize ammonia to nitrates

(2) Convert free nitrogen to nitrogen compounds

(3) Convert proteins into ammonia

(4) Reduce nitrates to free nitrogen

MN0042

18. The function of leghaemoglobin in the root nodules of legumes is :-

(1) Inhibition of nitrogenase activity

(2) Oxygen removal

(3) Nodule differentiation

(4) Expression of nif gene

MN0043

AIPMT-Mains 2011

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

(1) Phosphorus (2) Iron

(3) Manganese (4) Cadmium

MN0044

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

(1) Boron (2) Manganese

(3) Zinc (4) Copper

MN0045

AIPMT-Pre 2012

21. Best defined function of Manganese in green plants is :-
(1) Nitrogen fixation
(2) Water absorption
(3) Photolysis of water
(4) Calvin cycle

MN0046

22. Which one of the following is wrong statement ?
(1) Phosphorus is a constituent of cell membranes, certain nucleic acids and all proteins
(2) Nitrosomonas and Nitrobacter are chemoautotrophs
(3) *Anabaena* and *Nostoc* are capable of fixing nitrogen in free-living state also
(4) Root nodule forming nitrogen fixers live as aerobes under free-living conditions

MN0047

AIPMT-Mains 2012

23. For its action, nitrogenase requires :-
(1) Mn^{2+}
(2) Super oxygen radicals
(3) High input of energy
(4) Light

MN0048

NEET-UG 2013

24. The first stable product of fixation of atmospheric nitrogen in leguminous plants is :
(1) Glutamate (2) NO_2^-
(3) Ammonia (4) NO_3^-

MN0049

AIPMT 2014

25. Deficiency symptoms of nitrogen and potassium are visible first in :
(1) Senescent leaves
(2) Young leaves
(3) Roots
(4) Buds

MN0050

AIPMT 2015

26. Minerals known to be required in large amounts for plant growth include :-
(1) calcium, magnesium, manganese, copper
(2) potassium, phosphorus, selenium, boron
(3) magnesium, sulphur, iron, zinc
(4) phosphorus, potassium, sulphur, calcium

MN0051

Re-AIPMT 2015

27. During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by:
(1) Cytochrome
(2) Leghaemoglobin
(3) Xanthophyll
(4) Carotene

MN0052

28. The oxygen evolved during photosynthesis comes from water molecules. Which one of the following pairs of elements is involved in this reaction?
(1) Magnesium and Chlorine
(2) Manganese and Chlorine
(3) Manganese and Potassium
(4) Magnesium and Molybdenum

MN0053

NEET-II 2016

29. Which is essential for the growth of root tip ?
(1) Ca (2) Mn
(3) Zn (4) Fe

MN0054

NEET(UG) 2017

30. Select the mismatch :
(1) *Rhodospirillum* - Mycorrhiza
(2) *Anabaena* - Nitrogen fixer
(3) *Rhizobium* - Alfalfa
(4) *Frankia – Alnus*

MN0059

NEET(UG) 2018

31. In which of the following forms is iron absorbed by plants ?
(1) Ferric
(2) Ferrous
(3) Free element
(4) Both ferric and ferrous

MN0060

32. Which of the following elements is responsible for maintaining turgor in cells ?
(1) Magnesium
(2) Sodium
(3) Potassium
(4) Calcium

MN0061

NEET(UG) 2019

33. *Thiobacillus* is a group of bacteria helpful in carrying out :
(1) Nitrogen fixation
(2) Chemoautotrophic fixation
(3) Nitrification
(4) Denitrification

MN0122

NEET(UG) 2019 (Odisha)

34. Which of the following bacteria reduce nitrate in soil into nitrogen ?
(1) *Nitrobacter*
(2) *Nitrococcus*
(3) *Thiobacillus*
(4) *Nitrosomonas*

MN0123

NEET(UG) 2020

35. The product(s) of reaction catalyzed by nitrogenase in root nodules of leguminous plants is/are :
(1) Ammonia and hydrogen
(2) Ammonia alone
(3) Nitrate alone
(4) Ammonia and oxygen

MN0129

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

(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)**
(1)	(iv)	(i)	(ii)	(iii)
(2)	(ii)	(i)	(iv)	(iii)
(3)	(iv)	(iii)	(ii)	(i)
(4)	(iii)	(iv)	(ii)	(i)

MN0130

NEET(UG) 2020 (COVID-19)

37. In *Glycine max*, the product of biological nitrogen fixation is transported from the root nodules to other parts as :
(1) Ammonia
(2) Glutamate
(3) Nitrates
(4) Ureides

MN0131

38. Which of the following elements helps in maintaining the structure of ribosomes ?
(1) Magnesium
(2) Zinc
(3) Copper
(4) Molybdenum

MN0132

NEET(UG) 2021

39. Match **Column - I** with **Column - II.**

	Column -I		Column - II
(a)	*Nitrococcus*	(i)	Denitrification
(b)	*Rhizobium*	(ii)	Conversion of ammonia to nitrite
(c)	*Thiobacillus*	(iii)	Conversion of nitrite to nitrate
(d)	*Nitrobacter*	(iv)	Conversion of atmospheric nitrogen to ammonia

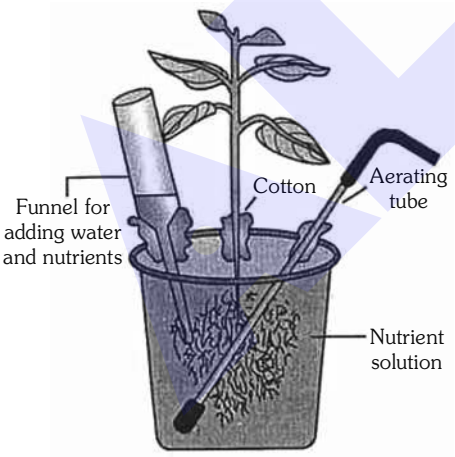
Choose the **correct** answer from options given below.

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

MN0133

NEET(UG) 2021 (Paper-2)

40. This setup is used for



(1) Tissue culture

(2) Soilless culture

(3) Nutrient solution culture

(4) Both (2) and (3)

MN0161

41. Which of the follwing pair of minerals is involved in the activation of enzymes of photosynthesis and respiration ?

(1) Magnesium and manganese

(2) Manganese and molybdenum

(3) Molybdenum and magnesium

(4) Manganese and chlorine

MN0162

42. The anaerobic conditions for the nitrogenase enzymes has been provided by

(1) Rhizobium bacteria

(2) Nitrate reductase

(3) Leguminous haemoglobin

(4) Glutamate dehydrogenase

MN0163

NEET(UG) 2022

43. Match **List-I** with **List-II**.

List-I	List-II
(a) Manganese	(i) Activates the enzyme catalase
(b) Magnesium	(ii) Required for pollen germination
(c) Boron	(iii) Activates enzymes of respiration
(d) Iron	(iv) Functions in splitting of water during photosynthesis

Choose the **correct answer** from the options given below:

(1) (a) - (iv), (b) - (iii),(c) - (ii), (d) - (i)

(2) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)

(3) (a) - (iii), (b) - (i), (c) - (ii), (d) - (iv)

(4) (a) - (iii), (b) - (iv), (c) - (i), (d) - (ii)

MN0164

44. Which one of the following produces nitrogen fixing nodules on the roots of *Alnus* ?

(1) *Frankia* (2) *Rhodospirillum*

(3) *Beijernickia* (4) *Rhizobium*

MN0165

Re-NEET(UG) 2022

45. Match **List - I** with **List - II** :

List - I	List - II
(b) Porins	(i) Pink coloured nodules
(b) leghaemoglobin	(ii) Lumen of thylakoid
(c) H^+ accumulation	(iii) Amphibolic pathway
(d) Respiration	(iv) Huge pores in outer membrane of mitochondria

Choose the **correct answer** from the options given below :

(1) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)

(2) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)

(3) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

(4) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)

MN0166

46. Which of the following protects nitrogenase inside the root nodule of a leguminous plant ?

(1) Catalase

(2) leghaemoglobin

(3) Transaminase

(4) Glutamate dehydrogenase

MN0167

47. Which of the following pair represents free living nitrogen fixing aerobic bacteria?

(1) *Rhizobium* and *Frankia*

(2) *Azotobacter* and *Beijernickia*

(3) *Anabaena* and *Rhodospirillum*

(4) *Pseudomonas* and *Thiobacillus*

MN0168

EXERCISE-II (Previous Year Questions) ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**4**	**2**	**1**	**1**	**1**	**2**	**2**	**1**	**2**	**2**	**3**	**1**	**3**	**2**	**2**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**3**	**1**	**2**	**4**	**2**	**3**	**1**	**3**	**3**	**1**	**4**	**2**	**2**	**1**	**1**
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	**1**	**3**	**4**	**3**	**1**	**4**	**4**	**1**	**1**	**4**	**1**	**3**	**1**	**1**	**2**
Que.	46	47													
Ans.	**2**	**2**													

EXERCISE-III(A) NCERT BASED QUESTIONS

1. Which element is an activator of enzyme used in nitrogen fixation ?
(1) Mg (2) Mo (3) Zn (4) Cu
MN0068

2. Microbe producing nitrogen fixing nodule on the roots of non-leguminous plant (eg. *Alnus*) is –
(1) *Rhizobium*
(2) *Azotobacter*
(3) *Rhodospirillum*
(4) *Frankia*
MN0070

3. In the following which is not a function of calcium?
(1) Synthesis of cell wall
(2) Formation of mitotic spindle
(3) Formation of chlorophyll
(4) Normal functioning of cell membrane
MN0071

4. Symptoms of manganese toxicity may actually be the deficiency symptoms of :-
(1) Iron
(2) Magnesium
(3) Calcium
(4) All the above
MN0072

5. Which of the following is/are free living in soil, but as symbionts, can fix atmospheric nitrogen ?
(1) *Rhizobium*
(2) *Frankia*
(3) Both (1) and (2)
(4) *Azotobacter*
MN0073

6. Which element delay flowering if its concentration in plants is low ?
(1) Nitrogen (2) Sulphur
(3) Molybdenum (4) All the above
MN0074

7. Which of the following group is associated with beneficial elements ?
(1) Na, K, Cl, Ca
(2) Na, Se, Si Ca
(3) Na, Se, Si, Co
(4) N, Se, Si, Co
MN0075

8. Which of the following is not an anaerobic N_2 fixing organism ?
(1) *Azotobacter*
(2) *Clostridium*
(3) *Rhodospirillium*
(4) *Rhodopseudomonas*
MN0078

9. Passive absorption of ions usually occurs through:-
(1) Pump proteins (2) Phospholipids
(3) Ion channels (4) All the above
MN0079

10. Which of following mineral element is needed during the formation of mitotic spindle, accumulates in older leaves & is involved in normal functioning of cell membrane ?
(1) Fe (2) S (3) Ca (4) P
MN0080

11. Which mineral element is needed for synthesis of Auxin?
(1) B (2) Zn (3) Cu (4) Cl
MN0081

12. Which mineral element is required for uptake & utilisation of Ca^{+2}, membrane functioning & pollen germination ?

(1) B (2) Zn (3) Cu (4) Fe

MN0082

13. Which process results in decrease of nitrogen content in soil ?

(1) Ammonification

(2) Biological nitrogen fixation

(3) Denitrification

(4) Nitrification

MN0083

14. Any mineral ion concentration in tissues that reduces the dry weight of tissues by about 10 percent is considered as :-

(1) Critical concentration
(2) Toxic concentration
(3) Beneficial concentration
(4) Transition concentration

MN0084

15. The enzyme, nitrogenase which is capable of nitrogen reduction, is present :-

(1) only in some eukaryotes
(2) exclusively in prokaryotes
(3) exclusively in eukaryotes
(4) in all the living organisms

MN0085

16. *Rhizobium* has symbiotic relationship with the roots of :-

(1) Garden pea (2) *Alfalfa*
(3) Sweet clover (4) All of the above

MN0086

17. Which of the following criteria not exhibits essentiality of any mineral to plants ?

(1) Never substituted by any other mineral
(2) Must be directly involved in metabolism of the plant
(3) Plants do not complete their life cycle properly in the absence of this mineral
(4) Mineral must be present for activity of all enzymes

MN0091

18. Toxicity of (A) affects the activity and uptake of (B).

(1) A = Mg, B = Fe, Ca and Zn
(2) A = Mn, B = Mg, Ca and Zn
(3) A = Mn, B = Mg and Fe
(4) A = Mg, B = Mn, Fe and Ca

MN0094

19. Glutamate dehydrogenase is an important enzyme involved in :-

(1) Krebs cycle
(2) Amino acid biosynthesis
(3) Nitrogen fixation
(4) Nitrate reduction

MN0095

20. Which of the following is the method by which essential elements were identified in plants ?

(1) Plant ash analysis

(2) Hydroponics

(3) Plant tissue culture

(4) Nitrogen fixation

MN0134

21. Which of the following essential elements is required by plants in excess of 10 m mole kg^{-1} of dry matter?

(1) Magnesium (2) Manganese
(3) Molybdenum (4) Selenium

MN0135

22. Choose the pair from the following in which one element is essential to plant while other is beneficial but not essential.

(1) Copper and Molybdenum
(2) Sodium and Silicon
(3) Chlorine and Cobalt
(4) Selenium and Cobalt

MN0136

23. Which of the following element is an activator for both ribulose bisphosphate carboxylase oxygenase enzyme and phosphoenol pyruvate carboxylase enzyme?

(1) Zinc (2) Copper
(3) Magnesium (4) Chlorine

MN0137

24. Choose the pair from the following in which both the elements share common function during photosynthesis in plants.

(1) Chlorine and Magnesium

(2) Potassium and Phosphorus

(3) Boron and Molybdenum

(4) Manganese and Chlorine

MN0138

25. If deficiency symptoms of any element appear first in the senescent leaves, this element should not be :

(1) Calcium (2) Nitrogen

(3) Potassium (4) Magnesium

MN0139

26. Which of the following bacteria oxidise the ammonia into nitrite?

(1) *Nitrococcus*

(2) *Nitrobacter*

(3) Both (1) and (2)

(4) *Thiobacillus*

MN0140

27. Which of the following is correct regarding non leguminous plant *Alnus*?

(1) Free living nitrogen fixation by *Beijernickia*

(2) Free living nitrogen fixation by *Frankia*

(3) Symbiotic nitrogen fixation by filamentous microbe

(4) Symbiotic nitrogen fixation by *Rhizobium*

MN0141

28. During biological nitrogen fixation the energy input is :

(1) 16 ATP for each NH_3

(2) 8 ATP for two NH_3

(3) 32 ATP for two NH_3

(4) 8 ATP for each NH_3

MN0142

29. During nitrogen metabolism in plants, transaminase enzyme is used in conversion of :

(1) Glutamic acid into other amino acids

(2) α-Ketoglutaric acid into glutamic acid

(3) Glutamic acid into glutamine

(4) NH_4^+ into glutamic acid

MN0143

30. Proper aeration is required in hydroponics.

(1) to avoid the toxicity of minerals

(2) for translocation of mineral from root to shoot

(3) for absorption of minerals

(4) to decrease the osmotic pressure in root cells

MN0144

31. Which of the following is not a beneficial element for plant life ?

(1) Na (2) Sr

(3) Si (4) Co

MN0145

32. Water potential of a cell is mainly determined by which of the following element ?

(1) Mg^{++} (2) Ca^{++}

(3) K^+ (4) Fe^{2+}

MN0146

33. The element is said to be deficient, when present:

(1) below critical concentration

(2) above critical concentration

(3) at critical concentration

(4) both below and above critical concentration

MN0147

34. Deficiency symptoms of element can be visualised by what kind of changes ?

(1) Physiological changes

(2) Morphological changes

(3) Chemical changes

(4) Anatomical changes

MN0148

35. Deficiency symptoms for which of the following element tend to appear first in young tissues?

(1) N & P

(2) N & Ca

(3) Ca

(4) S & K

MN0149

36. Mn toxicity leads to Ca deficiency by :

(1) competing with Ca uptake

(2) inhibiting translocation to shoot apex

(3) competetive inhibition for enzymes

(4) All of the above

MN0150

37. What is the major fate of NH_3 produced by ammonification ?

(1) Volatilise to re-enter in the atmosphere

(2) Absorbed by plants

(3) Converted into nitrates

(4) Denitrification

MN0151

38. In which of the following root tissues nodule formation is initiated after successful infection ?

(1) Epidermis

(2) Cortex

(3) Endodermis

(4) Root hairs

MN0152

39. First stable product of biological nitrogen fixation is:

(1) HN = NH

(2) $H_2N - NH_2$

(3) NH_3

(4) NO_3^- or NO_2^-

MN0153

EXERCISE-III(B) ANALYTICAL QUESTIONS

40. Mineral absorption is :

(1) Mostly passive with water absorption

(2) Mostly passive without water absorption

(3) Mostly active

(4) Always active

MN0088

41. Molybdenum is essential :-

(1) For RuBisCO of cyanobacteria

(2) For nitrogenase enzyme

(3) For RuBisCO of eukaryotic organism

(4) For transaminase activity

MN0089

42. Identify the correct match :

(i)	Manganese	(a)	Synthesis of auxin
(ii)	Zinc	(b)	Pollen germination
(iii)	Boron	(c)	Splitting of water
(iv)	Molybdenum	(d)	Nitrogen metabolism

(1) i-c, ii-b, iii-a, iv-d

(2) i-c, ii-a, iii-b, iv-d

(3) i-b, ii-a, iii-d, iv-c

(4) i-c, ii-b, iii-d, iv-a

MN0093

43. How many essential elements in the list given below are nonmineral elements?

Manganese, Carbon, Magnesium, Hydrogen, Oxygen, Calcium.

Options :

(1) Six (2) Three

(3) Two (4) Four

MN0154

44. The root nodule formation in leguminous plants involves participation of hormones auxin and cytokinin, in which:-

(1) Auxin is provided by host, cytokinin by bacteria

(2) Auxin is provided by bacteria, cytokinin by host

(3) Both auxin and cytokinin are provided by host

(4) Both auxin and cytokinin are provided by bacteria

MN0169

45. Which of the following statements is not correct?

(1) Formation of amides from amino acids by addition of amino group is called catalytic amidation.

(2) Growing of plants in nutrients rich moistened air is called aeroponics

(3) C, H, O are called frame work elements

(4) 'nif' gene is present in both *Rhizobium* bacterium and legume plant to induce nitrogenase formation.

MN0156

EXERCISE-III ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**2**	**4**	**3**	**4**	**3**	**4**	**3**	**1**	**3**	**3**	**2**	**1**	**3**	**2**	**2**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**4**	**4**	**3**	**2**	**2**	**1**	**3**	**3**	**4**	**1**	**1**	**3**	**4**	**1**	**3**
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	**2**	**3**	**1**	**2**	**3**	**2**	**3**	**2**	**3**	**3**	**2**	**2**	**2**	**1**	**4**