



Mineral Nutrition Important Questions With Answers

NEET Biology 2023

1. 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

2. Select the incorrectly matched pair.

- a) Magnesium (Mg) - Formation of mitotic spindle** b) Iron (Fe)- Formation of chlorophyll
c) Chlorine (Cl) - Anion-cation balance in the cell d) Sulphur (S) - Component of vitamins

Solution : -

Major function of magnesium (Mg^{2+}) is formation of chlorophyll, carotenoids and nucleic acids, growth, metabolism and nodule formation in legumes. Ca^{2+} is involved in the organisation of mitotic spindle.

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

Solution : -

Potassium (K^+) is usually found in the growing regions of plant. It is one of the constituents of the protoplasm. In the scarcity of potassium, the normal edges of the leaves become yellowish, and the stem becomes somewhat thin. The plants take potassium from the soil in the form of potassium nitrate and potassium chloride.

4. 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

5. 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

Solution : -

The parts of the plants that show deficiency symptoms depend on the mobility of the element in the plant. Deficiency symptoms appear first in young leaves and young tissues for elements which are relatively immobile inside the plant, e.g., Ca and S are a part of the structural component of the cell and hence are not easily released. The symptoms appear first in old leaves and tissues for those elements which are mobilised from senescing regions for supply to young issues, e.g., N, K, Mg

6. During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by
a) Cytochrome **b) Leghaemoglobin** c) Xanthophyll d) Carotene

Solution : -

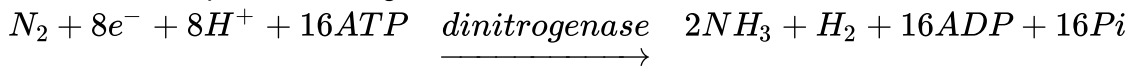
Leghaemoglobin protects nitrogenase from oxygen by combining very rapidly with oxygen. Thus, acting as a very efficient oxygen-scavenger

7. 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) $2NH_3 + 4O_2 \rightarrow 2H^+ + 2H_2O + 2NO_3^-$
d) $2NH_3 + 3O_2 \rightarrow 2NO_2^- + 2H^+ + 2N_2O$

Solution : -

The chemical equation of nitrogen fixation can be summarised as:



ATPs are provided by photosynthesis and respiration.

8. A plant requires magnesium for _____

- a) protein synthesis **b) chlorophyll synthesis** c) cell wall development d) holding cells together

Solution : -

A plant requires magnesium for chlorophyll synthesis. All four rings bind with metal atom magnesium (Mg^{++}), which remain present at the center of chlorophyll molecule.

9. Which one of the following is the incorrect statement?

- a) Phosphorus is a constituent of cell membranes, certain nucleic acids and all proteins**
b) Nitrosomonas 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

Solution : -

Phosphorus is a constituent of nucleotides, ATP, nucleic acids, phospholipids, NAD^+ , $NADP^+$ but not a constituent of proteins.

10. Mineral salts are translocated through JIL along with the IIL 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)	b)	c)	d)
(i) (ii)	(i) (ii)	(i) (ii)	(i) (ii)
xylem ascending	xylem descending	phloem ascending	phloem descending

11. The largest reservoir of nitrogen on Earth is

- a) soil **b) air** c) oceans d) rocks

Solution : -

Nitrogen is the fourth most prevalent element in living systems. It is available in the atmosphere in abundance (78% of atmosphere as dinitrogen or N_2) but plants cannot directly absorb the same. Nitrogen compounds are obtained from reservoir pool through nitrogen fixation.

12. Which is a criteria for essentiality of a mineral element?

- a) Direct role in metabolism b) Requirement is specific c) Deficiency causes hunger signs

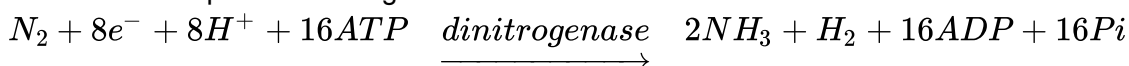
d) More than one option is correct

13. 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

Solution : -

The chemical equation of nitrogen fixation can be summarised as:



ATPs are provided by photosynthesis and respiration.

14. 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

Solution : -

The movement of ions is usually called flux, the inward movement into the cells is influx and the outward movement is called as efflux. The entry or exit of ions to and from the symplast requires the expenditure of metabolic energy, which is an active process.

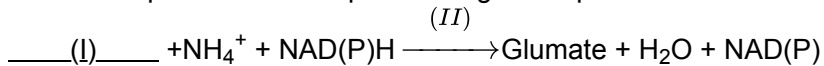
15. Which of the following is a free-living nitrogen fixing cyanobacteria?

a) *Cylindrospermum* b) *Nostoc* c) *Rhodospirillum* **d) Both (a) and (b)**

Solution : -

Many free living blue-green algae or cyanobacteria perform nitrogen fixation, e.g., *Anabaena*, *Nostoc*, *Cylindrospermum*, etc.

16. Select the option which completes the given equation for reductive amination



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

17. Passive absorption of minerals depend on _____

a) temperature b) temperature and metabolic inhibitor c) metabolic inhibitor d) humidity

Solution : -

On this type of mineral absorption, roots do not spend any energy. So application of a metabolic inhibitor will not disturb process.

18. 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.**

Solution : -

Frankia is a symbiotic N_2 -fixing bacterium present in the root nodules of several non-legume plants such as *Casuarina*, *Myrica* and *Alnus*. *Aulosira* is a free-living N_2 -fixing cyanobacterium.

19. A free living nitrogen-fixing cyanobacterium which can also form symbiotic association with the water fern *Azolla* is _____

a) *Tolypothrix* b) *Chlorella* c) *Nostoc* **d) *Anabaena***

Solution : -

Chlorella is simply a green alga. The freshwater fern *Azolla* harbours *Anabaena* (a blue green alga).

20. Which of the following is not a deficiency symptom of minerals?

a) Internode shortening b) Necrosis c) Chlorosis **d) Etiolation**

Solution : -

Etiolation is the abnormal form of growth observed when plants grow in darkness or severely reduced lights. Such plants characteristically have branched leaves and shoots, excessively long shoots, and reduced leaves and root systems.

21. 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

Solution : -

In industrial or abiological nitrogen fixation, ammonia is produced industrially by direct combination of nitrogen with hydrogen (obtained from water) at high temperature and pressure. It is then changed into various types of fertilisers including urea.

22. 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

23. Which of the following can fix atmospheric nitrogen?

- a) Albugo b) Cystopus c) Saprolegnia **d) Anabaena**

Solution : -

Blue-green algae (BGA) are the only organisms, capable of performing oxygenic photosynthesis and fixation of nitrogen, e.g. Anabaena, Nostoc which produce a specialized type of cell, called heterocyst within which N_2 fixation occurs.

24. 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.

Solution : -

The enzyme nitrogenase is a Mo-Fe protein and catalyses the conversion of atmospheric nitrogen to ammonia, which is the first stable product of nitrogen fixation. The enzyme nitrogenase is highly sensitive to the molecular oxygen; it requires anaerobic conditions. The nodules have adaptations that ensure that the enzyme is protected from oxygen.

25. 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

Solution : -

Symbiotic association has been found between Anabaena (blue green alga) and Azolla (a water fern). Azolla pinnata has Anabaena azollae in its fronds. It is often inoculated to rice fields for nitrogen fixation. It is an efficient fertiliser of paddy fields. Estimates of the annual quantities of N_2 fixed by Azolla range between 120 and 312 kg nitrogen per hectare.

26. Select the option that contains micronutrients only.

- a) Mn, Mo, Zn** b) C, H, N c) N, P, O d) Mn, K, S

27. 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

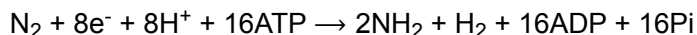
Solution : -

The major portion of the dry weight of plants comprises of carbon, hydrogen and oxygen

28. For its activity, nitrogenase requires:

- a) Light b) Manganese c) Super oxygen radicals **d) High input of energy**

Solution : -

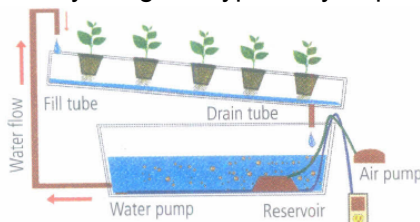


29. Mineral ion concentration in tissues that reduces the dry weight of tissues by about 10% is considered as:
a) critical concentration **b) toxic concentration** c) optimum concentration d) beneficial concentration.

Solution : -

In higher doses, micronutrients become toxic. Mineral ion concentration in the tissues which reduces dry weight of tissues by 10% is called toxic concentration. Critical toxic concentration is different for different micronutrients as well as different plants. For example, Mn^{2+} is toxic beyond $600 \mu\text{g g}^{-1}$ for soybean and beyond $5300 \mu\text{g g}^{-1}$ for sunflower. Toxic effects may be due to an excess of the micronutrient or its interference in the absorption and functioning of other nutrients.

30. Identify the given type of hydroponic technique and select the correct 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)**

Solution : -

The given figure represents the nutrient film technique of hydroponics. In this technique, a very shallow stream of water containing all the dissolved nutrients required for plant growth is recirculated past the bare roots of plants in a watertight channel. The depth of the recirculating stream is very shallow (thin film), which ensures that the thick root and mat, which develops at the bottom of the channel, has an upper surface in sufficient supply of air/oxygen. The main advantage of this system is that the plant roots are exposed to adequate quantities of water, O_2 and nutrients

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

32. The non-mineral elements are:
a) C, H, O b) N, Ca, Mg c) Fe, Co, Mn d) Cu, Mo, N.

Solution : -

Essential elements derived from soil are termed as mineral elements. E.g., P, K, S, Mg, Ca, Fe, Zn, Mn, B, Cu, Mo, Cl and N. Essential elements got from air or water are known as non-mineral elements. E.g., C, H, O. In aquatic habitats as well as in soil solution, mineral elements occur dissolved in water. Nitrogen is included in both mineral and non-mineral elements.

33. 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

34. 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

Solution : -

Phosphorous is a component a constituent of cell membranes, certain nucleic acid and all proteins. This is wrong statement. Because phosphorus is a component of DNA and RNA not protein.

35. Which element is required in comparatively least quantity for the growth of plant?

- a) Zn** b) N c) P d) Ca

36. Read the following statements and select the correct answer.

- (i) Rhizobium leguminosarum is also known as Bacillus radiculicola.
- (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.

37. 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.

Solution : -

Soil serves as a reservoir of essential elements. More than sixty essential elements are found in soil. It is the upper weathered humus containing part of Earth's surface which sustains terrestrial plant life. Weathering or breaking of rock into fine powder can occur due to atmospheric changes, mechanical forces, chemical changes and biological breakdown over the years.

38. 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

Solution : -

Nitrogen fixation is the conversion of inert atmospheric nitrogen or dinitrogen (N_2) into utilisable compounds of nitrogen like nitrate, ammonia, amino acids. Nitrogen fixation can be atmospheric, industrial or biological.

39. 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**

Solution : -

Deficiency symptoms of immobile elements tend to appear first in the young tissues because the elements are relatively immobile and are not transported out of mature organs, e.g., elements like sulphur and calcium are a part of the structural component of the cell and hence are not easily release

40. Boron in green plants assists in_____

- a) sugar transport** b) activation of enzymes c) acting as enzyme cofactor d) photosynthesis

Solution : -

Manganese is an activator of enzymes, Copper is essential for photosynthesis. Molybdenum is a cofactor of enzymes. Boron assists in sugar transport.

41. Which of the following helps in pollen germination, membrane functioning and cell differentiation?

- a) **B** b) Mn c) Ni d) S

42. Which of the following is a symbiotic nitrogen fixer?

- a) Azotobacter **b) Frankia** c) Azolla N d) Glomus

Solution : -

Frankia is a symbiotic nitrogen fixer. In Casuarina has nitrogen fixing root nodules in which filamentous streptomycetes like symbiotic nitrogen fixing organisms are present which are involved in nitrogen fixing

43. The technique of hydroponics was first demonstrated by

- a) M. Calvin (1961) **b) Julius Von Sachs(1860)** c) Arnon (1940) d) Hoagland (1940).

44. 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

Solution : -

Manganese (Mn^{2+}) and chlorine (Cl^-) both are micro elements, responsible for photo production of oxygen during photolysis of water in photosynthesis.

45. In which of the following all three are macronutrients ?

- a) Boron, Zinc, Manganese b) Iron, Copper, molybdenum c) Molybdenum, magnesium, manganese
d) Nitrogen, nickel, phosphorus

Solution : -

More appropriate as nitrogen and phosphorus are macronutrients.

46. 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

47. The process that is the opposite of nitrogen fixation is

- a) nitrification **b) denitrification** c) ammonification d) nitrate reduction

Solution : -

Denitrification is the opposite process of nitrogen fixation in which nitrates (NO_3^-) get converted into N_2 gas by bacteria *Pseudomonas denitrificans* and *Thiobacillus denitrificans*.

48. 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.

Solution : -

Plants absorb calcium from the soil in the form of calcium ions (Ca^{2+}). Calcium is required by meristematic and differentiating tissues. During cell division it is used in the synthesis of cell wall, particularly as calcium pectate in the middle lamella. It is also needed during the formation of mitotic spindle. It activates certain enzymes and

plays an important role in regulating metabolic activities.

49. 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

50. 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

Solution : -

In the soil, phosphorus and nitrogen are present as negatively charged ions

e.g. H_2PO_4^- , NO_2^- , NO_3^- ions

These are usually supplied by fertilisers as urea.

