Biology- Class XI

MINERAL NUTRITION- CHAPTER 12

EXEMPLAR QUESTIONS

Multiple Choice Questions-

1. 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

Answer: b. changing the chemistry of the soil

Reason: The element is being studied with respect to the plant, thus, the effect it has on the plant will be the criteria for it being an essential element or not. Biomolecules, energy related chemical compounds (ATP, NADPH, etc. ) and enzymes are all parts of the plant itself and all need constitutive essential mineral elements while chemistry of soil is in no part related to the essentiality of the elements.

2. 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 stunted.

c. essential element concentration above which plant remains in the vegetative phase.

d. none of the above

Answer: a. essential element concentration below which plant growth is retarded.

Reason: Check definition of critical concentration on page 198, Section 12.2.3 [NCERT 2021-22]

3. 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

Answer: a. sulphur

Reason: When elements are immobile, they are unable to be transported out of the organs, hence there functions are limited to a specific organ and their deficiency directly affects these organs.

All other options listed above are mobile elements.

|  |  |
| --- | --- |
| Mobile elements: | Immobile elements: |
| Nitrogen | Calcium |
| Potassium | Copper |
| Chlorine | Sulphur |
| Phosphorous | Iron |
| Sodium  | Boron |
| Zinc |  |
| Magnesium |  |
| Molybdenum |  |

4. Which one of the following symptoms is not due to manganese toxicity in plants?

1. Calcium translocation in shoot apex is inhibited
2. Deficiency in both Iron and Nitrogen is induced
3. Appearance of brown spot surrounded by chlorotic veins
4. None of the above

Answer: b. Deficiency in both Iron and Nitrogen is induced

Reason: Manganese toxicity symptoms include:

* Appearance of brown spots surrounded by chlorotic veins.
* Manganese inhibits calcium translocation in shoot apex.
* It competes with Iron and Magnesium for uptake and with Magnesium for binding with enzymes.

Refer page 199, Section 12.2.4 [NCERT 2021-22]

5. Reaction carried out by N2 fixing microbes include

a. 2NH3 + 3O2 🡪 2NO2 –+ 2H+ + 2H2O (i)

b. 2NO2 - + O2 🡪 2NO3- (ii)

Which of the following statements about these equations is not true?

a. step (i) is carried out by Nitrosomonas or Nitrococcus

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

Answer: d. bacteria carrying out these steps are usually photoautotrophs

Reason: These bacteria, carrying out the process of nitrification are called chemoautotrophs.

Refer page 201, section 12.6.1 [NCERT 2021-22]

6. 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. Leg-hemoglobin is a pink coloured pigment.

d. Nitrogenase helps to convert N2 gas into two molecules of ammonia.

Answer: a. Nitrogenase may require oxygen for its functioning.

Reason: The enzyme nitrogenase is a Mo-Fe protein and it catalyses the conversion of atmospheric nitrogen to ammonia which is the first stable product of nitrogen fixation.

Refer ‘Nodule Formation’ on page 202, Section 12.6.2 [NCERT 2021-22]

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

|  |  |
| --- | --- |
| A. Boron | i. splitting of H2O to liberate O2 during photosynthesis |
| B. Manganese | ii. needed for synthesis of auxins |
| C. Molybdenum | iii. component of nitrogenase |
| D. Zinc | iv. Pollen germination |
| E. Iron | v. component of ferredoxin |

Options:

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, E-i

d. A-ii, B-iii, C-v, D-i, E-iv

Answer: b. A-iv, B-i, C-iii, D-ii, E-v

Reason: Refer Section 12.2.2 [NCERT 2021-22]

8. 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.

Answer: d. water or soil without essential nutrients.

Reason: Essential elements are key to plant growth.