

## Mineral Nutrition

### Very Short Answer Type Questions

1. Name a plant, which accumulate silicon.
2. Mycorrhiza is a mutualistic association. How do the organisms involved in this association gain from each other?
3. Nitrogen fixation is shown by prokaryotes and not eukaryotes. Comment?
4. Carnivorous plants like Nepenthes and Venus fly trap have nutritional adaptations. Which nutrient do they especially obtain and from where?
5. Think of a plant which lacks chlorophyll. From where will it obtain nutrition? Give an example of such a type of plant.
6. Name an insectivorous angiosperm.
7. A farmer adds Azotobacter culture to soil before sowing maize. Which mineral element is being replenished?
8. What type of conditions are created by leghaemoglobin in the root nodule of a legume?
9. What is common to Nepenthes, utricularia and Drosera with regard to mode of nutrition?
10. Plants with zinc deficiency show reduced biosynthesis of .
11. Yellowish edges appear in leaves deficient in .
12. Name the macronutrient which is a component of all organic compounds but is not obtained from soil.
13. Name one non-symbiotic nitrogen fixing prokaryote.
14. Rice fields produce an important green house gas. Name it.
15. Complete the equation for reductive amination

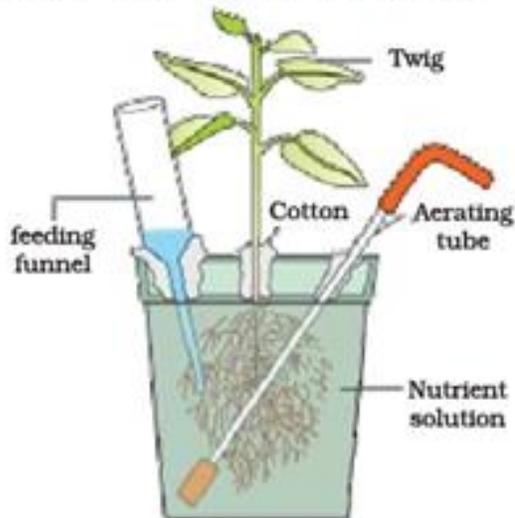


16. Excess of Mn in soil leads to deficiency of Ca, Mg and Fe. Justify.

### Short Answer Type Questions

1. How is sulphur important for plants? Name the aminoacids in which it is present.

2. How are organisms like *Pseudomonas* and *Thiobacillus* of great significance in nitrogen cycle?
3. Carefully observe the following figure



- o a. Name the technique shown in the figure and the scientist who demonstrated this technique for the first time.
  - o b. Name atleast three plants for which this technique can be employed for their commercial production.
  - o c. What is the significance of aerating tube and feeding funnel in this setup?
4. Name the most crucial enzyme found in root nodules for  $N_2$  fixation? Does it require a special pink coloured pigment for its functioning? Elaborate.
5. How are the terms 'critical concentration' and 'deficient' different from each other in terms of concentration of an essential element in plants? Can you find the values of 'critical concentration' and 'deficient' for minerals – Fe & Zn.
6. Carnivorous plants exhibit nutritional adaptation. Citing an example explain this fact.
7. A farmer adds/ supplies Na, Ca, Mg and Fe regularly to his field and yet he observes that the plants show deficiency of Ca, Mg and Fe. Give a valid reason and suggest a way to help the farmer improve the growth of plants.

## Long Answer Type Questions

1. It is observed that deficiency of a particular element showed its symptoms initially in older leaves and then in younger leaves.
  - a. Does it indicate that the element is actively mobilized or relatively immobile?
  - b. Name two elements which are highly mobile and two which are relatively immobile.
  - c. How is the aspect of mobility of elements important to horticulture and agriculture?
2. We find that *Rhizobium* forms nodules on the roots of leguminous plants. Also *Frankia* another microbe forms nitrogen fixing nodules on the roots of non-leguminous plant *Alnus*.
  - a. Can we artificially induce the property of nitrogen fixation in a plant – leguminous or non-leguminous?
  - b. What kind of relationship is observed between mycorrhiza and pine trees?
  - c. Is it necessary for a microbe to be in close association with a plant to provide mineral nutrition? Explain with the help of one example.
3. What are essential elements for plants? Give the criteria of essentiality?  
How are minerals classified depending upon the amount in which they are needed by the plants?
4. With the help of examples describe the classification of essential elements based on the function they perform.
5. We know that plants require nutrients. If we supply these in excess, will it be beneficial to the plants? If yes, how/ If no, why?
6. Trace the events starting from the coming in contact of *Rhizobium* to a leguminous root till nodule formation. Add a note on importance of leg hemoglobin
7. Give the biochemical events occurring in the root nodule of a pulse plant. What is the end product? What is its fate?
8. Hydroponics have been shown to be a successful technique for growing of plants. Yet most of the crops are still grown on land. Why?