

**M.Sc. (Ag.) Examination, 2019**  
**Semester-II**  
**Genetics and Plant Breeding**  
**Course : CPH-502**  
**(Mineral Nutrition of Plants)**

**Time : 3 Hours**

**Full Marks : 50**

**Questions are of value as indicated in the margin**

Answer **any five** questions from the following

1. Differentiate between the following (**any four** pairs): 2.5×4=10
  - i) Trace elements and macro elements
  - ii) Active transport and passive transport
  - iii) Apoplastic and symplastic pathway
  - iv) Deficiency and toxicity
  - v) Nitrate uptake and potassium uptake
  - vi) Deficiency symptoms of Magnesium and calcium
2. Write short notes on **any four** of the following: 2.5×4=10
  - i) Criteria of essentiality
  - ii) VAM
  - iii) Essential elements
  - iv) Chlorosis due to the deficiency of minerals
  - v) Roles of iron in plants
  - vi) Long distance transport of mineral ions
  - vii) Potassium transporters
3. What is chelating agent? Name some chelating agents. How do phytochelatins help in mineral ion absorption and transport in plant system? What are the names of mineral elements that are transported in plant body through chelation. Mention the name of the great scientist who first coined the concept of criteria of essentiality of minerals. 2+1+(2+2)+2+1=10
4. Write down the physiological roles and deficiency symptoms of nitrogen, phosphorus and potassium in plants. Why does heart rot of beet and whip tail of cauliflower occur? (3+3+2)+(1+1)=10
5. Discuss briefly about the factors influence the absorption of mineral elements by plants. How do the plants maintain the synergistic relationship with mycorrhiza? How are plants benefitted from the fungus, state the mechanism. 4+3+3=10
6. Describe the mechanism of nitrate uptake through by plant roots. What are the different phosphate transporters present in the root system? Through which tissue the long distance transport of mineral nutrients does occur? Selenium is essential for the growth of which type of plant? How do plants respond to mineral toxicity? 3+2+1+1+3=10

P.T.O.

(2)

7. Narrate briefly the molecular physiology of mineral nutrient acquisition in plants. Describe the genes responsible for encoding the mineral ion transporters. What the strategies that plant adopt to acquire and transport minerals under deficient levels.  
3+2+5=10
8. What are the different types of active and passive transport mechanisms in plant cells? Describe them in brief with diagram. Write the name of at least one disease in each case of manganese, born and zinc deficiency. What is the importance of trace elements?  
2+3+3=2=10
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