



## BIOLOGY

### BOOKS - PRADEEP BIOLOGY (HINGLISH)

#### MINERAL NUTRITION

#### Notable Question

1. Why common salt is used to preserve certain foods?

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2. How the knowledge of water relations and mineral utilization is helpful improving the crop management?

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## Ncert Exercises With Answers

1. 'All elements that are present in a plant need not be essential to its survival'. Comment.

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2. Why is purification of water and nutrient salts so important in studies involving mineral nutrition using hydroponics?

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3. Explain with examples: macronutrients, micronutrients, beneficial nutrients, toxic elements and essential elements.

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4. Name at least five different deficiency symptoms in plants. Describe them and correlate them with the concerned mineral deficiency.

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5. If a plant shows a symptom which could develop due to deficiency of more than one nutrient, how would you find out experimentally, the real deficient mineral element?

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6. Why is that in certain plants deficiency symptoms appear first in younger parts of the plant while in others they do so in mature organs?



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7. How are the minerals absorbed by the plants?



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8. What are the conditions necessary for fixation of atmospheric nitrogen by Rhizobium. What is their role in  $N_2$  -fixation?



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9. What are the steps involved in formation of a root nodule?



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10. Which of the following statements are true? If false, correct them:

(a) Boron deficiency leads to stout axis.

(b) Every mineral element that is present in a cell is needed by the cell.

(c) Nitrogen as a nutrient element, is highly immobile in the plants.

(d) It is very easy to establish the essentiality of micronutrients because they are required only in trace quantities.

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## Additional Questions Very Short Answer Questions

1. What is mineral nutrition?

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2. Name the part of plant body which absorbs mineral nutrients

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3. Name the mineral elements which is essential for photosynthesis.

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4. Name the enzyme involved in biological nitrogen fixation. What are the two mineral elements needed for the activity of enzymes.

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5. What type of condition is created by leghaemoglobin in root nodules of a legume?



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6. Which element is essential part of enzyme urease which catalyzes hydrolysis of urea to  $CO_2$  to  $NH_4$ .



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7. Name the red pigment present in the root nodules of leguminous plants



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8. Name the best known symbiotic nitrogen fixing bacterium.



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9. How is nitrogenase enzyme protected?

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10. Pick out from the following list the two minerals which are not needed by the majority of plants but very much needed by almost all animals : Calcium, Sodium, Potassium, Iron, Iodine.

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11. What protects nitrogenase?

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12. Name one most mobile element and one most immobile element.





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13. What is the exact location of pigment leghamoglobin in root nodules of leguminous plants?



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14. Name a plant, which accumulate silicon.



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15. Carnivorous plants like Nepenthes and venus fly trap have nutritional adaptations. Which nutrient to they especially obtain and from where ?



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16. Name an insectivorous angiosperm.



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17. Yellowish edges appear in leaves deficient in ....



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## Additional Questions Short Answer Questions

1. Which are the two macronutrients that usually play the most important role in limiting plant growth globally?



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2. Why do plants of the legume family usually contain more protein than other plants?

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3. Name the nitrifying bacteria of the soil. Why are they called chemoautotrophs?

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4. Explain the terms plant macroelements and plant microelements. Give one example of each.

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5. A farmer adds *Azotobacter* culture to the soil before sowing maize. How does it increase the yield of maize?

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6. How do some bacteria carry out nitrification? What are such bacteria called?

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7. Name the respective mineral nutrient element that

(a) forms the core constituent of the ring structure of chlorophyll

(b) activates carboxylases

(c) Forms the components of nitrogenase.

(d) Synthesises middle lamella of plant cell.

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8. How is sulphur important for plants ? Name the amino acids in which it is present.

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9. Carnivorous plants exhibit nutritional adaptation. Citing an example explain this fact.

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10. Fill in the blanks

A. Amides are generally formed by combination of ..... And .....

B. Transamination involves transfer of .....group from one amino acid to the .....group of keto acid.

c. Nitrogen fixing plants have the enzyme .....in their nodules,

which is protected by the pigment

D. An example of symbiosis in root nodules of legumes is with .....

E. The.....path way involves movement of minerals by simple diffusion from cell to cell through their primary cell walls.

F. Macronutrients must generally be present in plant tissues in concentration of .....to .....mg per gram of dry matter.



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**11.** Make corrections wherever you find mistake in spelling.words in the following paragraph.sentences.

A. An essential element is defined as one without which the plant cannot compete its life cycle, or one that has a clear phyiological role.

B. Each group of bacteria is surrounded by a membrane called parabacterial membrane. A red pigment-leghemoglobin is filled in the intercellular spaces of nodule cells.

C. The translocation of solute linked with some metabolic reaction/reactions involving release of energy is called active absorption.

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12. Define the following, (a) Nutrients (b) Nutrition (c ) Micronutrients (d) Macronutrients (e ) Active absorption (f) Passive absorption (g) Symplastic pathway (h) Apoplastic pathway

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13. Give three criteria of essentiality of an element.

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**14.** Write short notes on the following (a) Reductive amination (b) Transamination

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**15.** How would you determine whether or not a particular element is essential for plants?

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**16.** Name the organism involved in symbiotic nitrogen fixation. What are the components needed for this purpose ? Explain role.

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**17.** 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 haemoglobin.

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**18.** 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 ?

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**19.** Give scientific reasons to the following,

A. Iron is not a constituent of chlorophyll but its deficiency causes chlorosis.

B. The nodule bacteria-Rhizobium can fix nitrogen only in presence

of the pigment leghaemoglobin

C. Solute enters into the xylem from cortex of roots only passing through symplastic pathway across the endodermis.

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20. A. Give examples of two autotrophs and two heterotrophs

B. Define essential elements.

C. Name the main sources of carbon and hydrogen to the plants.

D. Give two examples of deficiency diseases.

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## Additional Questions Long Answer Questions

1. Make a list of macronutrients and mention their major functions.

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2. Differentiate between the following pairs:

(a) Micronutrients and macronutrients

(b) Ammonification and nitrifications.



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3. Write explanatory notes on biological nitrogen fixation.



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4. Describe the process of symbiotic biological nitrogen fixation.



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5. Describe the mechanism of absorption of mineral salts by roots of higher plants.

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6. Describe the process of development of root nodules in a leguminous plant. Name the oxygen scavenger molecular present in the root nodules.

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7. With the help of examples describe the classification of essential elements based on the function they perform.

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8. Match the items in column A with column B. Each point in column A. has minimum one match in column B and maximum three matches.

Column A

1. Micronutrients
2. Hydroponics
3. Amides
4. Free living  $N_2$  Fixers
5. Nitrification

Column B

- (A) Asparagine
- (b) Azotobacter
- (c) Nitrosomonas
- (d) tank farming
- (e) Trace elements
- (f) Soil less cultivation
- (g) Glutamine
- (h) Cyanobacteria
- (i) Nitrobacter
- (f) Clostridium



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## Analytical Questions

1. What is the role of iron in plants? List one disease that occurs in plants due to iron deficiency.



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2. What is biological nitrogen fixation? List atleast two gorganisms involved in nitrogen fixation.

How is nitrogen improtant ot plantsgt



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3. What is meant by the term NPK fertilizer? Mention role of phosphorus and potassium in plants.



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4. Why have world authorities disregarded the distinction between macro nutrients and micro nutrients? Explain



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5. Why and solute reach upto endodermis through apoplast but it moves through the endodermis by symplast? Explain.

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6. Why do insectivorous plants generally grow in water logged and swampy soils deficient in nitrogen compounds?

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7. Why do higher plants fail to assimilate atmospheric free nitrogen (dinitrogen) directly? Explain.

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8. What is hydroponic? Given one application of this technique.



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9. Prior to sowing rice, a legume crop was cultivated and ploughed back in field, Why? Explain.



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10. Which two bacteria play a role in nitrification? Also mention the chemical steps involved.



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11. Which enzyme is necessary for biological fixation of nitrogen in plants? Mention its two sub units?





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**12.** Why do plants absorb and accumulate those elements which are not essential for their survival?



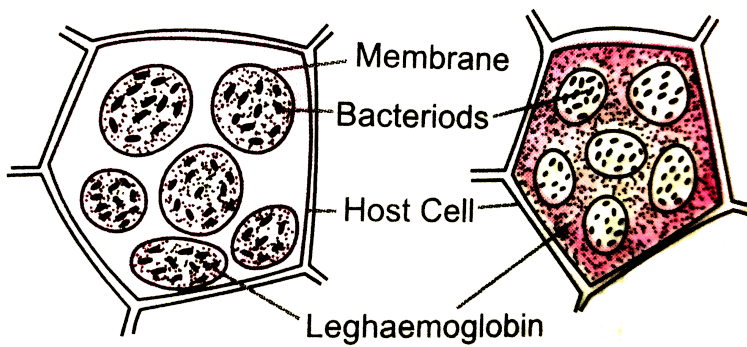
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**13.** When and why leghemoglobin pigment develops in root nodule of leguminous plant? Can leghemoglobin develop in roots bacterial invasion?



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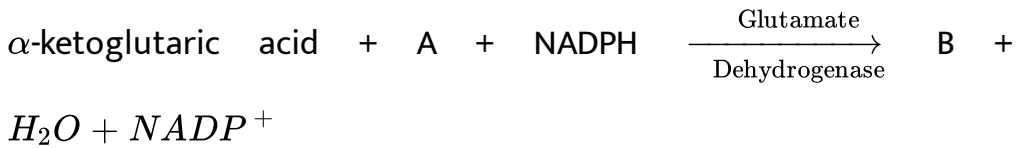
**14.** Where is the leghemoglobin located in the root nodules? What is its Function?



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15. Complete the following by giving the correct option for A and B

:



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16. Complete the following table by explaining A,B,C and D

Element	Macro element or Micro element	Regions of plants in which required	Functions
Nitrogen	Macro element	Every where (More in meristems)	Normal growth and metabolism
Magnesium	A	Leaves and all green parts of plants. Also present in growing areas of root and shoot	B
Manganese	C	All green parts of the plants.	D

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17. What is the meaning of carrier in solute uptake?

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18. What is Arnon's criteria?

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1. The most abundant element present in the plants is

Or

Which of the following is not absorbed through soil

A. Nitrogen

B. Manganese

C. Iron

D. Carbon

**Answer: D**



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2. If by radiation all nitrogenase enzymes are inactivated, then there will be no

A. Fixation of atmosphere nitrogen

- B. Conversion from nitrate to nitrite in legumes
- C. Conversion from ammonium to nitrate in soil
- D. Fixation of nitrogen in legumes

**Answer: A**



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**3. Passive absorption of mineral salts is not dependent on**

- A. Osmosis
- B. Diffusion
- C. Donnan equilibrium
- D. Ion exchange

**Answer: A**



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4. Middle lamella mainly contains

- A. Ca
- B. Mg
- C. Na
- D. K

**Answer: A**



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5. The appearance of yellow edges to leaves is due to deficiency of this mineral element

- A. Calcium

B. Magnesium

C. Potassium

D. Sulphur

**Answer: C**



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6. The macronutrient which is an essential component of all organic compounds, yet not obtained by plants from soil is

A. Nitrogen

B. Carbon

C. Phosphorus

D. Magnesium

**Answer: B**



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7. Which is essential for root hair growth

Or

The mineral present in cell wall is

A. Zn

B. Ca

C. Mo

D. S

**Answer: B**



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8. Prolonged liberal irrigation of agricultural fields is likely to create the problem of

- A. Activity
- B. Aridity
- C. Salinity
- D. Metal toxicity

**Answer: C**



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9. The deficiencies of micronutrients not only affects growth of plants, but also vital functions such as photosynthetic and mitochondrial electron flow. Among the list given below, which

group of three elements shall affect the most, both photosynthetic and mitochondrial electron transport ?

A. Ca K Na

B. Co Ni Mo

C. Mn Co Ca

D. Cu Fe Mn

**Answer: D**



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**10.** Match the following and choose the correct combination from the options given

Column I

Column II

*A* Potassium

1 Constituent of ferredoxin

*B* Sulphur

2 Involved in stomatal movement

*C* Molybdenum

3 Needed in the synthesis of auxin

*D* Zinc

4 Component of nitrogenase

A. a-2,b-1,c-4,d-3

B. a-1,b-2,c-3,d-4

C. a-3,b-4,c-1,d-2

D. a-1,b-3,c-4,d-2

**Answer: A**

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**11. Name the elements which occur in nucleic acid macromolecule**

A. C,H,O,N,S

B. C,O,N,S

C. C,O,P,S

D. C,H,O,N,P

**Answer: D**



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**12.** Function of leghaemoglobin during biological nitrogen-fixation in root nodules of legumes is to

- A. Converts atmospheric  $N_2$  to  $NH_3$
- B. Convert ammonia to nitrate
- C. Transport oxygen for activity of nitrogenase
- D. Protect nitrogenase from oxygen

**Answer: D**



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13. Apple fruit develop internal cork due to deficiency of

Or

'Petiole crack' is caused by the deficiency of

A. Boron

B. Nitrogen

C. Zinc

D. None of these

**Answer: D**



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14. Deficiency of which of the following can casue yellowing of intravenous regions of leaves?

A. Calcium

B. Potassium

C. Copper

D. Phosphorus

**Answer: B**



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**15.** A plant requires magnesium for :

A. Protein synthesis

B. Chlorophyll synthesis

C. Cell wall development

D. Holding cells together

**Answer: B**



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16. Which one of the following elements is not an essential micronutrient for plant growth?

A. Zn

B. Cu

C. Ca

D. Mn

Answer: C



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17. The given equation refers to



- A. Ammonification
- B. Nitrification
- C. Nitrogen fixation
- D. Denitrification

**Answer: C**



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**18.** During nitrification, which bacteria converts ammonia to nitrate

- A. Nitrobacter
- B. Pseudomonas
- C. Nitrosomonas
- D. Mycobacterium



**Answer: C**

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**19.** Zn, Mo, Fe, Cu are

- A. Trace elements
- B. Non-essential elements
- C. Macro nutrients
- D. None of these

**Answer: A**

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**20.** Element which regulate stomatal movement is

A. Potassium

B. Sodium

C. Sulphur

D. Phosphorus

**Answer: A**



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**21. K, N, Ca, Mg deficiency causes**

A. Chlorosis

B. Leaf curl

C. Red rust of tea

D. Late blight of potato

**Answer: A**

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22. Element that make up 90% of all elements found in living system

A. C, H, O

B. C, H, O, N

C. C,H,O,N,P

D. C,H,O,P

**Answer: B**

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23. Nitrogenase enzyme converts

- A. Atmospheric nitrogen into ammonia
- B. Ammonia into nitrate and nitrite
- C. Nitrate and nitrite
- D. Nitrate and nitrite into nitrogen

**Answer: A**



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24. Inorganic nutrients are present in the soil in the form of

- A. Molecules
- B. Atoms
- C. Compounds

## D. Electrically charged ions

**Answer: D**



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**25.** Match the following mineral element with their deficiency symptom and choose the correct option

Column I	Column II
<i>A</i> Calcium	1 Chlorotic veins
<i>B</i> Potassium	2 Delayed germination of seeds
<i>C</i> Zinc	3 Necrosis of young leaves
<i>D</i> Iron	4 Scorched leaf tips
<i>E</i> Phosphorus	5 Malformed leaves

A. a-3, b-1, c-5, d-2, e-4

B. a-1, b-4, c-5, d-3, e-2

C. a-3, b-4, c-5, d-1, e-2

D. a-2, b-3, c-4, d-1, e-5

**Answer: C**

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**26.** Nitrogen fixation in root nodules of *Alnus* is brought about by

- A. *Frankia*
- B. *Azorhizobium*
- C. *Bradyrhizobium*
- D. *Clostridium*

**Answer: A**

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**27.** Lime is added to the soil which is too:

A. Sandy

B. Salty

C. Alkaline

D. Acidic

**Answer: D**



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**28.** Which one of the following elements plays an important role in biological nitrogen fixation

or

Browning of cauliflower takes due to deficiency of which one of the following elements

A. Zinc

B. Iron

C. Molybdenum

D. Magnesium

**Answer: C**



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**29.** Which of the following is not an essential

A. Iron

B. Manganese

C. Zinc

D. Iodine

**Answer: D**



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30. Manganese is required in

- A. Plant cell wall formation
- B. Photolysis of water during photosynthesis
- C. Chlorophyll synthesis
- D. Nucleic acid synthesis

**Answer: B**

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31. 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 of inhibition of enzymes

**Answer: B**

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**32.** 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 below which plant remains in the vegetative phase
- D. none of the above

**Answer: A**



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**33.** 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**

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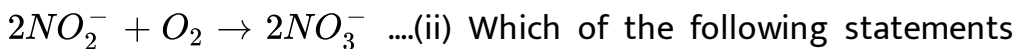
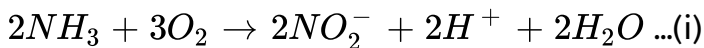
**34.** Which one of the following symptoms is not due to manganese toxicity in plants?

- A. calcium translocation in shoot apex is inhibited
- B. Deficiency in both Iron and Nitrogen is induced
- C. Appearance of brown spot surrounded by chlorotic veins
- D. none of the above

**Answer: B**

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35. Reaction carried out by  $N_2$  fixing microbes include



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**

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36. With regard to the biological nitrogen fixation by Rhizobium in association with soy bean, which one of the following statement/statements does not hold true?

- A. Nitrogenase any require oxygen for its functioning
- B. Nitrogenase in MO-Fe protein
- C. Leg-haemoglobin is a pink coloured pigment.
- D. Nitrogenase helps to converts  $N_2$  gas into two molecules of ammonia.

**Answer: A**

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

- A. Boron (i). Splitting of  $H_2O$  to liberate  $O_2$  during  
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

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**



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**38.** 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: C**



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**39.** Which one of the following elements (miconutrients) in plants is not remobilised ?

A. phosphorus

B. calcium

C. Potassium

D. Sulphur

**Answer: B**



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40. The function of leghaemoglobin in the root nodules of legumes is

- A. inhibition of nitrogenase activity
- B. oxygen removal
- C. nodule differentiation
- D. expression of nif gene

**Answer: B**

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

- A. iron

B. manganese

C. cadmium

D. Phosphorus

**Answer: C**



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**42.** A prokaryotic autotrophic nitrogen fixing symbiont is found in

A. Alnus

B. Cycas

C. Cicer

D. Pisum

**Answer: D**



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**43.** Micronutrients are

- A. Mn, Ni Zn
- B. O, Cu, B
- C. Mg, Mn, Mo
- D. Ca, S, Fe

**Answer: A**



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**44.** Best defined function of manganese in green plants is

- A. Photolysis of water
- B. Calvin cycle

C. Nitrogen fixation

D. Water absorption

**Answer: A**



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**45.** A nitrogen fixing microbe associated with Azolla in rice-fields is:-

A. spirulina

B. Anabaena

C. Frankia

D. Tolypothrix

**Answer: B**



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46. Which one of the following helps in absorption of phosphorus from soil by plants

or

Which one of the following microbes forms symbiotic association with plants and helps them in their nutrition

A. Azotobacter

B. Aspergillus

C. Glomus

D. Trichoderma

**Answer: C**



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47. 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 lives as aerobeas under free living conditions.
- C. Phosphorous is constiuent of cell membrances, certain nucleic acids and cell proteins.
- D. Nitrosomonas and Nitrobacter are chemoautotrophs

**Answer: C**

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**48.** For its action, nitrogenase requires

- A. high input of energy
- B. light

C.  $Mn^{2+}$

D. super oxygen radicals

**Answer: A**

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**49.** The first stable product of fixation of atmospheric nitrogen in leguminous plants is

A. ammonia

B.  $NO_3^-$

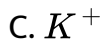
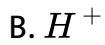
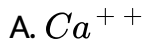
C. glutamate

D.  $NO_2^-$

**Answer: A**

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50. The most abundant intracellular cations is



**Answer: C**



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51. Deficiency symptoms of nitrogen and potassium are visible first  
in

A. Senescent leaves



B. Young leaves

C. Roots

D. Buds

**Answer: A**



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52. Leghaemoglobin helps in

A. nitrogen-fixation

B. protecting nitrogenase from  $O_2$

C. destroy bacteria

D. transport of food in plants

**Answer: B**



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53. During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by

- A. Cytochrome
- B. Leghaemoglobin
- C. Xanthoplyll
- D. Carotene

**Answer: B**



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54. In which of the following, all the three are macronutrients

- A. Iron, Copper, molybdenum

B. Molybdenum, magnesium, manganese

C. Nitrogen, nickel, phosphorus

D. Boron, zinc, manganese

**Answer:**



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**55.** Select the mismatch

A. Rhodospirillum - Mycorrhiza

B. Anabaena - Nitrogen fixer

C. Rhizobium - Alfalfa

D. Frankia - Alnus

**Answer: A**



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56. In which of the following forms is iron absorbed by plants

- A. Ferric
- B. Ferrous
- C. Free element
- D. Both ferric and ferrous

**Answer: A**



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### Practice Questions Assertion Reason

1. Assertion. Farmers grow a leguminous crop and plough it back in the field

Reason. Leguminous plant fix atmospheric nitrogen through a symbiotic nitrogen fixing bacteria-Rhizobium.

- 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.

**Answer: A**

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2. Assertion : If you burn a plant , its nitrogen component is given off as ammonia and other gases .

Reason : Hydroponics does not allow plants to grow well if they are supplied with all the mineral nutrients they need.

- 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.

**Answer: C**

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3. Assertion. Ash analysis of a plant gives exact picture of the elements essential for the plants.

Reason. Roots take in some mineral nutrients selectively, only those which are essential for them.

- 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.

**Answer: D**

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**4.** Assertion. Leaves develop chlorosis in the absence of iron.

Reason. Iron is a constituent of chlorophyll

Reason. Iron is a constituent of chlorophyll

- 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.

**Answer: C**

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5. Assertion. Calcium deficiency symptoms first appear in the apical region.

Reason. Calcium is highly mobile in plants



- 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.

**Answer: B**

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6. Assertion. Plants growing in magnesium deficient soil show interveinal chlorosis in leaves.

Reason. Magnesium is a constituent of chlorophyll.

- 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.

**Answer: A**

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7. Assertion. Active absorption of minerals is inhibited when roots deprived of oxygen.

Reason. Active absorption of minerals requires expenditure of metabolic energy which comes from respiration in presence of 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.

**Answer: A**

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**8.** Assertion. The insectivorous plants grow in nitrogen deficient soil.

Reason. In case of deficiency. Nitrogen moves from younger leaves to older leaves.

- 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.

**Answer: C**

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**9.** Assertion The insectivorous plants grow in nitrogen deficient soil.  
Reason. They get their nitrogen requirement from the captured animal prey.

- 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.

**Answer: A**



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10. [A] : Soil particles , particularly clay and organic matter in soil , contain negative charges that attract positively charged ions such as  $Ca^{++}$  ,  $K^{+}$  and  $Mg^{++}$

[R] : This attraction keeps these ions at a soil level where they are available to plants .

- 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.

**Answer: C**

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**11.** Assertion. Plants generally to form urea and require urease.  
Reason. The enzyme urease hydrolyzes urea.

- 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.

**Answer: A**



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**12.** Assertion. Copper is a trace elements.

Reason. Because we can trace in movement inside the plants.

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.

**Answer: C**

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**13.** Assertion. Soils are more commonly deficient in nitrogen than any other element.

Reason. Nitrogen is a major constituent of amino acids and proteins.

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.

**Answer: B**



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**14.** Assertion. Algae living in salty water accumulate a high concentration of solutes.

Reason. They accumulate solutes to prevent plasmolysis

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.

**Answer: A**

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**15.** Assertion. Cyanobacteria are the only photosynthetic nitrogen fixing prokaryotes producing oxygen.

Reason. Oxygen is required for the activity of enzyme nitrogenase.

- 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.

**Answer: C**



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**16.** Assertion. Nitrogen deficiency induced purplish colouration in stems, petioles and lower leaf surfaces of some plants.

Reason. Purple colour appears due to accumulation of anthocyanin.

- 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.

**Answer: A**





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17. Assertion. Many insectivorous plants are able to survive without feeding on insects.

The growth of insectivorous plants is stimulated when they trap and utilise insects.

- 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.

**Answer: B**



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**18.** Assertion . Lamina is modified into pitcher in Nepenthes to capture insects for nitrogenous food.

Reason. They lack chlorophyll and are not green in colour.

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.

**Answer: C**



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**19.** Assertion : Nitrogen - fixing bacteria in legume root nodules survive in oxygen - depleted cells of nodules.

Reason : Leghaemoglobin completely removes oxygen from the nodule cells.

- 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.

**Answer: D**

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**20. Assertion:** Deficiency of sulphur causes chlorosis in plants

**Reason :** Sulphur is a constituent of chlorophyll, proteins and nucleic acids.

- 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.

**Answer: C**

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21. Assertion. Removal of keystone species causes serious disruption in the functioning of the community.

Reason. Keystone species are low in abundance (or biomass) than the dominant species.

- 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.

**Answer: B**



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