

Mineral Nutrition

I. Select the correct answer from the following questions:

Question 1.

Name the scientist who first showed that plants obtain minerals from the soil for their growth and development.

- (a) Woodward
- (b) de-Saussure
- (c) Armon
- (d) Stout.

▼ [Answer](#)

Answer: (a) Woodward.

Question 2.

A mineral element is considered essential for plant if it fulfills the need for

- (a) Specific symptoms
- (b) Normal growth and development
- (c) Direct nutrition of plant
- (d) All of these

▼ [Answer](#)

Answer: (d) All of these.

Question 3.

An element which is constituent of every enzyme and is thus essential for all biochemical reactions in plants is

- (a) Nitrogen
- (b) Sulphur
- (c) Phosphorus
- (d) Carbon

▼ [Answer](#)

Answer: (a) Nitrogen.

Question 4.

An element which is constituent of chlorophyll and also acts as a co-factor for various enzymes taking part in cellular respiration is

- (a) Magnesium
- (b) Nitrogen
- (c) Carbon
- (d) Iron.

▼ [Answer](#)

Answer: (a) Magnesium.

Question 5.

Main source of nitrogen for plants is

- (a) Atmosphere
- (b) Soil
- (c) Nitrifying bacteria
- (d) Water soluble nitrites nitrates.

▼ [Answer](#)

Answer: (a) Atmosphere.

Question 6.

Animal and other heterotrophic organisms obtain nitrogen from

- (a) Atmosphere
- (b) Plants
- (c) Nitrifying bacteria
- (d) All of these.

▼ [Answer](#)

Answer: (b) Plants.

Question 7.

Elements obtained by plants from the soil are known as

- (a) Mineral elements
- (b) Non-mineral elements

- (c) Both (a) and (b)
- (d) None of these.

▼ Answer

Answer: (a) Mineral elements.

Question 8.

Elements obtained by plants from atmosphere of water are known as

- (a) Mineral elements
- (b) Non-mineral elements
- (c) Gases
- (d) Both (a) and (b)

▼ Answer

Answer: (b) Non-mineral elements.

Question 9.

Non-mineral elements of plants are

- (a) Carbon, hydrogen and sulphur
- (b) Carbon, oxygen and nitrogen
- (c) Sulphur, chlorine and nitrogen
- (d) Carbon, hydrogen and oxygen.

▼ Answer

Answer: (d) Carbon, hydrogen and oxygen.

Question 10.

An element of plants which is derived both from mineral and non-mineral resources is

- (a) Carbon
- (b) Sulphur
- (c) Nitrogen
- (d) Hydrogen.

▼ Answer

Answer: (c) Nitrogen.

Question 11.

The technique of growing the plants by placing their roots in nutrient solution instead of growing in soil is called

- (a) Water culture
- (b) Hydroponics
- (c) Soilless culture
- (d) All of these.

▼ Answer

Answer: (d) All of these.

Question 12.

Phosphorus is very essential for

- (a) Photosynthesis and respiration as carbohydrates taking part in different reactions react in phosphorylated form
- (b) It is constituent of NADP which plays crucial role in light reaction of photosynthesis.
- (c) Helps in storing chemical energy in glucose.
- (d) All of these.

▼ Answer

Answer: (d) All of these.

Question 13.

Loss of chlorophyll that leads to yellowing of entire leaf or part of it is called

- (a) Chlorosis
- (b) Necrosis
- (c) Abscission
- (d) Mottling

▼ Answer

Answer: (a) Chlorosis

Question 14.

Appearance of patches of green and non-green areas on the leaves are called

- (a) Necrosis
- (b) Chlorosis
- (c) Curling
- (d) Mottling.

▼ [Answer](#)

Answer: (d) Mottling.

Question 15.

Localised death of tissue of leaf is called

- (a) Chlorosis
- (b) Necrosis
- (c) Mottling
- (d) Dieback.

▼ [Answer](#)

Answer: (b) Necrosis.

Question 16.

The yellow disease in tea plant occurs due to

- (a) Deficiency of sulphur
- (b) Deficiency of nitrogen
- (c) Excess of sulphur
- (d) None of these

▼ [Answer](#)

Answer: (a) Deficiency of sulphur.

Question 17.

Which one is not related with plant ash?

- (a) Trace element
- (b) Essential elements
- (c) Nitrogen
- (d) Mineral elements.

▼ [Answer](#)

Answer: (c) Nitrogen.

Question 18.

Deficiency of boron in plants causes disease

- (a) Corky spot of apples
- (b) Heart rot of sugar beet
- (c) Top sickness of tobacco
- (d) All of these.

▼ [Answer](#)

Answer: (d) All of these

Question 19.

In nitrogen cycle, the nitrifying bacteria

- (a) convert ammonia into nitrogen
- (b) Fix atmospheric nitrogen
- (c) Convert amino acids into ammonia
- (d) Convert ammonia into nitrates.

▼ [Answer](#)

Answer: (d) Convert ammonia into nitrates.

Question 20.

The most common symbiotic nitrogen fixing organism/s is

- (a) Azotobacter
- (b) Closteridium
- (c) Rhizobium leguminaris
- (d) Chlorobium.

▼ [Answer](#)

Answer: (c) Rhizobium leguminaris

Question 21.

In non-leguminous plants like Casurina and Alnus symbiotic N fixing bacteria occur in their roots like

- (a) Frankia
- (b) Closteridium
- (c) Rhizobium
- (d) Azotobacter.

▼ Answer

Answer: (a) Frankia.

Question 22.

The main source of nitrogen nutrition in plants is

- (a) Nitrogen in the atmosphere
- (b) Nitrogen fixing bacteria
- (c) Mineral nitrogen
- (d) All of these.

▼ Answer

Answer: (a) Nitrogen in the atmosphere.

Question 23.

The mineral uptake occurs in plants

- (a) Against concentration gradient
- (b) Along concentration gradient
- (c) Both (a) and (b)
- (d) None of these.

▼ Answer

Answer: (a) Against concentration gradient.

Question 24.

The most common mineral element which becomes deficient in agricultural soils is

- (a) Phosphorus
- (b) Nitrogen
- (c) Potassium
- (d) All of these.

▼ Answer

Answer: (d) All of these.

Question 25.

Biological nitrogen fixation involves reduction of N_2 by addition of

- (a) A pair of hydrogen atoms
- (b) A pair of CO_2 molecules
- (c) A pair of oxygen atoms
- (d) None of these.

▼ Answer

Answer: (a) A pair of hydrogen atoms.

II. Fill in the blanks

Question 1.

Julius Sachs technique of growing plants in a nutrient solution is known as

▼ Answer

Answer: hydroponics

Question 2.

The element must be necessary for supporting normal growth and reproduction.

▼ Answer

Answer: absolutely

Question 3.

The requirement of the element and not by another element.

▼ Answer

Answer: must be specific, replaceable

Question 4.
The element must be in the metabolism of the plant.

▼ [Answer](#)

Answer: directly involved

Question 5.
..... must generally be present in plant tissues in concentration of 1 to 10 mg/L of dry matter.

▼ [Answer](#)

Answer: Macronutrients

Question 6.
..... or trace elements, are needed in very small amount (equal to or less than 0.1 mg/L of dry matter).

▼ [Answer](#)

Answer: Micronutrients

Question 7.
..... is the mineral element required by plants in the greatest amount.

▼ [Answer](#)

Answer: Nitrogen

Question 8.
..... is absorbed by the plants from soil in the form of phosphate ions (either as H_2PO_4^- or HPO_4^{2-}).

▼ [Answer](#)

Answer: Phosphorus

Question 9.
..... is absorbed as potassium ion (K^+)

▼ [Answer](#)

Answer: Potassium

Question 10.
Plant absorbs from the soil in the form of calcium ions (Ca^{2+}).

▼ [Answer](#)

Answer: calcium

Question 11.
Magnesium activates the enzymes of respiration, photosynthesis and are involved in the synthesis of and

▼ [Answer](#)

Answer: DNA, RNA

Question 12.
Sulphur is present in two amino acids and and is the main constituent of several coenzymes, vitamins and ferredoxin.

▼ [Answer](#)

Answer: Cysteine, methionine

Question 13.
Plants obtain in the form of ferric ions (Fe^{3+}).

▼ [Answer](#)

Answer: iron

Question 14.
Manganese activates many enzymes involved in, and

▼ [Answer](#)

Answer: photosynthesis, respiration, nitrogen metabolism

Question 15.
Copper is essential for the overall in plants. Like iron

▼ [Answer](#)

Answer: metabolism

III. Mark the statement true (T) or false (F)

Question 1.
Chlorine is absorbed in the form of chloride anion (Cl^-).

▼ [Answer](#)

Answer: True.

Question 2.
Boron is required for uptake and utilisation of Ca^{2+} , membrane functioning, pollen germination, cell elongation, cell differentiation and carbohydrate translocation.

▼ [Answer](#)

Answer: True.

Question 3.
Plants obtain it in the form of molybdate ions (MoO_4^{2-}).

▼ [Answer](#)

Answer: True.

Question 4.
The concentration of the essential element below which plant growth is retarded is termed as critical concentration.

▼ [Answer](#)

Answer: True.

Question 5.
The toxicity symptoms are very easy to identify.

▼ [Answer](#)

Answer: False.

Question 6.
The process of conversion of nitrogen (N_2) to ammonia is termed as nitrogen fixation.

▼ [Answer](#)

Answer: True.

Question 7.
Ammonia is second oxidised to nitrite by the bacteria *Nitrosomonas* and/or *Nitrococcus*.

▼ [Answer](#)

Answer: False.

Question 8.
Reduction of nitrogen to ammonia by living organisms is called symbiotic nitrogen fixation.

▼ [Answer](#)

Answer: False.

Question 9.

Both Rhizobium and Frankia are free-living in soil, but as symbionts, can fix the atmospheric nitrogen.

▼ [Answer](#)

Answer: True.

Question 10.

At physiological pH, the ammonia is protonated to form NH_4^+ (ammonium) ion.

▼ [Answer](#)

Answer: True.

Question 11.

Glutamic acid is the main amino acid from which the transfer of NH_2 , the amino group takes place and other amino acids are formed through transamination.

▼ [Answer](#)

Answer: True.

Question 12.

Majority of the minerals that are essential for the growth and development of plant become available to roots due to weathering and breakdown of rocks.

▼ [Answer](#)

Answer: True.

Question 13.

Mineral salts are translocated through xylem along with the ascending stream of water, which is pulled up through the plant by transpirational pull.

▼ [Answer](#)

Answer: True.

Question 14.

Any mineral ion concentration in tissues that reduces the dry weight of tissues by about 80 percent is considered toxic.

▼ [Answer](#)

Answer: False.

Question 15.

The basic needs of all living organisms are essentially the same. They require macromolecules, such as carbohydrates, proteins and fats, and minerals for their growth and developments..

▼ [Answer](#)

Answer: True.

IV. Match the items of column I with the items of column II

Column I	Column II
(a) Hydroponics.	1. Macronutrients
(b) Iron, manganese, copper, molybdenum, zinc, boron, chlorine and nickel.	2. NO_2 or NO_4 .
(c) Potassium	3. In plants, this is required in more abundant quantities in meristematic tissues, buds, leaves and root tips.
(d) Nitrogen is absorbed mainly as NO_3 though some are also taken up as	4. Micronutrients
(e) Carbon, hydrogen, Oxygen, nitrogen, phosphorous, sulphur, potassium, calcium and magnesium.	5. The technique of growing plants in a nutrient solution.
(f) It is an important constituent of proteins involved in the transfer of electrons like ferredoxin and cytochromes.	6. This symptom is caused by the deficiency of elements N, K, Mg, S, Fe, Mn, Zn
(g) Chlorosis is the loss of chlorophyll leading to yellowing in leaves.	7. Flux
(h) The movement of ions is usually called	8. Iron
(i) The process of conversion of nitrogen (N_2) to ammonia is termed as	9. Fate of ammonia.
(j) Rhizobium	10. Transamination

(k) At physiological pH, the ammonia is protonated to form NH_4^+ (ammonium) ion.	11. It is absorbed in the form of chloride ion (Cl^-)
(l) It involves the transfer of amino group from one amino acid to the keto group of a keto acid.	12. Zinc.
(m) It is also needed in the synthesis of auxin.	13. nitrogen- fixation.
(n) Chlorine	14. Symbiotic biological nitrogen fixation.
(o) Potassium plays an important role in the	15. opening and closing of stomata.

▼ Answer

Answer:

Column I	Column II
(a) Hydroponics.	5. The technique of growing plants in a nutrient solution.
(b) Iron, manganese, copper, molybdenum, zinc, boron, chlorine and nickel.	4. Micronutrients
(c) Potassium	3. In plants, this is required in more abundant quantities in meristematic tissues, buds, leaves and root tips.
(d) Nitrogen is absorbed mainly as NO_3 though some are also taken up as	2. NO_2 or NO_4 .
(e) Carbon, hydrogen, Oxygen, nitrogen, phosphorous, sulphur, potassium, calcium and magnesium.	1. Macronutrients
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