A-LEVEL

Multiple-choice questions on Mineral Nutrition

1. Which essential mineral is a constituent of chlorophyll?
A. Iron (Fe)
B. Magnesium (Mg)
C. Zinc (Zn)
D. Copper (Cu)
Answer: B. Magnesium (Mg)
Explanation: Magnesium is a vital component of the chlorophyll molecule, playing a crucial role in photosynthesis.
2. In plants, which element is primarily responsible for osmotic regulation?

A. Potassium (K)
B. Sodium (Na)
C. Calcium (Ca)
D. Phosphorus (P)
Answer: A. Potassium (K)
Explanation: Potassium is essential for maintaining cellular turgor pressure and osmotic balance in plant cells.
3. What is the main function of molybdenum (Mo) in plants?
A. Cell elongation
B. Nitrogen metabolism
C. Photosynthesis
D. Water uptake
Answer: B. Nitrogen metabolism
Explanation: Molybdenum is a cofactor for enzymes involved in nitrogen metabolism, particularly nitrate reduction.
4. Which mineral is crucial for the formation of ATP in both plants and animals?
A. Iron (Fe)
B. Zinc (Zn)
C. Phosphorus (P)
D. Magnesium (Mg)

Answer: C. Phosphorus (P)
Explanation: Phosphorus is a key component of ATP (adenosine triphosphate), the primary energy currency in living cells.

5. What is the primary role of iron (Fe) in plants?
A. Cell division
B. Chlorophyll synthesis
C. Root development
D. Water uptake
Answer: B. Chlorophyll synthesis
Explanation: Iron is essential for the synthesis of chlorophyll, the green pigment involved in photosynthesis.

6. Which element is a component of amino acids, nucleic acids, and ATP in plants?
A. Nitrogen (N)
B. Sulphur (S)
C. Calcium (Ca)
D. Potassium (K)
Answer: A. Nitrogen (N)
Explanation: Nitrogen is a fundamental component of amino acids, nucleic acids, and

ATP, playing a central role in plant biochemistry.

7. Plants absorb most of their water through:

A. Root hairs
B. Xylem vessels
C. Phloem cells
D. Stomata

Answer: A. Root hairs

Explanation: Water absorption in plants primarily occurs through specialized structures called root hairs.

8. Which element is essential for the activation of enzymes involved in the reduction of atmospheric nitrogen?

A. Molybdenum (Mo)
B. Zinc (Zn)
C. Copper (Cu)
D. Boron (B)

Answer: A. Molybdenum (Mo)

Explanation: Molybdenum is a cofactor for nitrogenase enzymes, which are crucial for nitrogen fixation.

9. What is the primary function of boron (B) in plants?

A. Cell division
B. Water uptake
C. Pollination
D. Cell wall formation
Answer: D. Cell wall formation
Explanation: Boron is essential for the synthesis of pectin, a component of plant cell walls.
10. Which mineral is important for the activation of enzymes involved in DNA replication and repair?
A. Zinc (Zn)
B. Magnesium (Mg)
C. Manganese (Mn)
D. Copper (Cu)
Answer: A. Zinc (Zn)
Explanation: Zinc is a cofactor for various enzymes, including those involved in DNA replication and repair.
11. What is the primary role of sulfur (S) in plants?
A. Photosynthesis
B. Cell division
C. Protein synthesis
D. Water uptake

Answer: C. Protein synthesis
Explanation: Sulfur is a component of amino acids, playing a crucial role in protein synthesis in plants.

12. Which element is essential for the opening and closing of stomata?
A. Calcium (Ca)
B. Potassium (K)
C. Magnesium (Mg)
D. Sodium (Na)
Answer: B. Potassium (K)
Explanation: Potassium regulates stomatal movement, affecting gas exchange and water loss in plants.

13. Phosphorus deficiency in plants is most likely to affect:
A. Photosynthesis
B. Root development
C. Nitrogen metabolism
D. Flowering
Answer: B. Root development
Explanation: Phosphorus is crucial for root development and overall plant growth.

14. Which mineral is a key component of nucleic acids (RNA and DNA) in plants?
A. Nitrogen (N)
B. Phosphorus (P)
C. Magnesium (Mg)
D. Sulphur (S)
Answer: B. Phosphorus (P)
Explanation: Phosphorus is a structural component of nucleic acids, essential for genetic material.
15. Which element is involved in the activation of enzymes responsible for lignin synthesis in plants?
A. Calcium (Ca)
B. Manganese (Mn)
C. Copper (Cu)
D. Zinc (Zn)
Answer: B. Manganese (Mn)
Explanation: Manganese plays a role in lignin synthesis, contributing to plant cell wall structure.
16. What is the primary role of copper (Cu) in plants?

A. Photosynthesis
B. Electron transport
C. Cell division
D. Water uptake
Answer: B. Electron transport
Explanation: Copper is involved in electron transport, playing a crucial role in energy transfer processes in plants.
17. Which mineral is essential for the synthesis of chlorophyll and nucleic acids?
A. Magnesium (Mg)
B. Potassium (K)
C. Iron (Fe)
D. Zinc (Zn)
Answer: C. Iron (Fe)
Explanation: Iron is a key component of chlorophyll and is also involved in nucleic acid synthesis.
18. Nitrogen is absorbed by plants in the form of:
A. Nitrate (NO3-)
B. Ammonium (NH4+)
C. Urea
D. Nitrogen gas (N2)

Answer: A. Nitrate (NO3-)
Explanation: Nitrate is the primary form of nitrogen absorbed by most plants from the soil.
19. The deficiency of which mineral results in the yellowing of leaves (chlorosis) in plants?
A. Iron (Fe)
B. Magnesium (Mg)
C. Zinc (Zn)
D. Manganese (Mn)
Answer: A. Iron (Fe)
Explanation: Iron deficiency leads to chlorosis, a yellowing of leaves due to impaired chlorophyll synthesis.
20. Which element is important for the activation of enzymes involved in the conversion of nitrate to nitrite?
A. Manganese (Mn)
B. Copper (Cu)
C. Zinc (Zn)
D. Phosphorus (P)
Answer: B. Copper (Cu)
Explanation: Copper is essential for the activity of enzymes involved in the conversion of nitrate to nitrite during nitrogen metabolism.

21. What is the primary role of calcium (Ca) in plants?
A. Photosynthesis
B. Cell wall structure
C. Nitrogen metabolism
D. Water uptake
Answer: B. Cell wall structure
Explanation: Calcium is crucial for maintaining the integrity and structure of plant cell walls.
22. Which mineral is important for the activation of enzymes involved in the breakdown of starch into sugar?
A. Potassium (K)
B. Magnesium (Mg)
C. Sodium (Na)
D. Phosphorus (P)
Answer: A. Potassium (K)
Explanation: Potassium is involved in the activation of enzymes that play a role in starch breakdown.
23. Zinc deficiency in plants is often associated with:
A. Flowering failure
B. Reduced root growth

C. Leaf curling
D. Chlorophyll synthesis
Answer: C. Leaf curling
Explanation: Zinc deficiency can lead to symptoms such as leaf curling and stunted growth in plants.
24. What is the primary role of molybdenum (Mo) in nitrogen metabolism?
A. Nitrate reduction
B. Nitrite reduction
C. Ammonium assimilation
D. Amino acid synthesis
Answer: B. Nitrite reduction
Explanation: Molybdenum is involved in the reduction of nitrite to ammonium in nitrogen metabolism.
25. Which mineral is crucial for the synthesis of ribosomal RNA and protein synthesis in plants?
A. Nitrogen (N)
B. Phosphorus (P)
C. Magnesium (Mg)
D. Iron (Fe)
Answer: A. Nitrogen (N)

Explanation: Nitrogen is a key component of proteins and is essential for ribosomal RNA synthesis.

26. The movement of water and minerals through the xylem is mainly driven by:

A. Transpiration
B. Photosynthesis
C. Respiration
D. Active transport

Answer: A. Transpiration

Explanation: The movement of water and minerals in the xylem is primarily driven by transpiration, the loss of water vapor from leaves.

27. Which element is crucial for the activation of enzymes involved in the synthesis of DNA and RNA?

A. Manganese (Mn)
B. Copper (Cu)
C. Zinc (Zn)
D. Magnesium (Mg)

Answer: D. Magnesium (Mg)

Explanation: Magnesium is a cofactor for enzymes involved in the synthesis of DNA and RNA.

28. The uptake of which mineral is influenced by soil pH?

A. Potassium (K)
B. Iron (Fe)
C. Calcium (Ca)
D. Phosphorus (P)

Answer: B. Iron (Fe)

Explanation: Iron uptake by plants is significantly influenced by soil pH, with deficiency often occurring in alkaline soils.

29. Which mineral is essential for the formation of coenzymes involved in redox reactions?

A. Copper (Cu)
B. Manganese (Mn)
C. Zinc (Zn)
D. Selenium (Se)

Answer: A. Copper (Cu)

Explanation: Copper is essential for the formation of coenzymes involved in various redox reactions in plants.

30. The deficiency of which mineral results in poor fruit development and blossom-end rot in tomatoes?
A. Calcium (Ca)
B. Magnesium (Mg)
C. Boron (B)
D. Potassium (K)
Answer: A. Calcium (Ca)
Explanation: Calcium deficiency can lead to poor fruit development and blossom-end rot in tomatoes.
31. Which element is crucial for the structure of chloroplast membranes?
A. Iron (Fe)
B. Magnesium (Mg)
C. Phosphorus (P)
D. Sulphur (S)
Answer: D. Sulphur (S)
Explanation: Sulphur is a component of thylakoid membranes in chloroplasts, contributing to membrane structure.
32. What is the primary role of phosphorus (P) in energy transfer within cells?

A. Electron transport
B. ATP synthesis
C. Redox reactions
D. Photosynthesis
Answer: B. ATP synthesis
Explanation: Phosphorus is essential for the synthesis of ATP, the primary energy carrier in cells.
33. The movement of minerals from the root to the shoot in the xylem is mainly driven by:
A. Transpiration
B. Active transport
C. Capillary action
D. Osmosis
Answer: A. Transpiration
Explanation: Transpiration creates a negative pressure in the xylem, facilitating the upward movement of minerals from roots to shoots.
34. What is the primary role of magnesium (Mg) in plant cells?
A. Cell wall formation
B. Photosynthesis
C. Nitrogen metabolism
D. Water uptake

Answer: B. Photosynthesis
Explanation: Magnesium is a central component of the chlorophyll molecule, playing a key role in photosynthesis.
35. Which mineral is involved in the activation of enzymes responsible for the synthesis of plant hormones?
A. Manganese (Mn)
B. Copper (Cu)
C. Zinc (Zn)
D. Molybdenum (Mo)
Answer: C. Zinc (Zn)
Explanation: Zinc is essential for the activation of enzymes involved in the synthesis of plant hormones.
36. What is the primary function of potassium (K) in plant cells?
A. Cell division
B. Water uptake
C. Protein synthesis
D. Osmotic regulation
Answer: D. Osmotic regulation

Explanation: Potassium is crucial for osmotic regulation and the maintenance of cellular turgor pressure in plant cells.

37. Which mineral is essential for the activation of enzymes involved in the conversion of glucose to starch?

A. Manganese (Mn)
B. Calcium (Ca)
C. Zinc (Zn)
D. Phosphorus (P)

Answer: C. Zinc (Zn)

Explanation: Zinc is involved in the activation of enzymes that play a role in the conversion of glucose to starch.

38. The deficiency of which mineral results in poor seed and fruit development?

A. Boron (B)
B. Iron (Fe)
C. Magnesium (Mg)
D. Copper (Cu)

Answer: A. Boron (B)

Explanation: Boron deficiency can lead to poor seed and fruit development in plants.