BIOLOGY

NEET & AIIMS

MINERAL NUTRITION

Example

1. What do you mean by hydroporics ?

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2. What are macronutrients ?

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3. What is the concentration of macronutrients found in plants ?

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4. Name the elements which form components of biomolecules.

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5. Which element activates alcohol dehydrogenase enzymes ?

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6. Where is nitrogen required in the body of plant ?

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7. Give the ionic form in which phosphorus is absorbed by plants.

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8. Which mineral activates ATPase and α - amylase ?

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9. Name the element which is a constituent of ring structure of chlorophyll.

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10. How do plants obtain iron from the soil ?

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11. How is manganese involved in photosynthesis?

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12. Give one physiological role of nickel.

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13. How is boron absorted by plants ?

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14. Name two plant parts where nickel is present.

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15. What is critical concentration ?

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16. Name two elements which are mobile in plants.

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17. What is influx ?

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18. Give one example of free -living N_2 fixing bacteria.

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19. Write the reaction involved in N_2- fixation

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20. Write the two most important amides that are found in plants

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Try Yourself

1. Name two vegetables that have been commercially produced by the technique of Hydroponics.

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2. The technique of hydroponics was first demonstated by

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3. How many micronutrients are known ? Name them

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4. What is the concentration of microutrients found in plants ?

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5. Is sodium an essential element ?

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6. Give two examples of beneficial elements other than sodium.

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7. Which enzyme is activated by Molybdenum ?

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8. Which macronutrient helps in opening and closing of stomata ?

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9. Which mineral ion is responsible for activating enzymes involved in carbon fixation during photosynthesis ?

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10. Name the mineral element that is component of ATP molecules.

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11. What is the main absobtion form of nitrogen ?

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12. Which mineral element helps in maintaining turgidy of the cells ?

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13. How is calcium essential for cell division ?

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14. Which substance mainly occus in the middle lamella of adjacent cells ?

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15. Potassium helps in maintaining the _____ balance in cells.

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16. Give one physiological role of phosphorus.

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17. Where is manganese required in the body of plants ?

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18. Is iron essential for the formation of chlorophyll pigment ?

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19. Which element is required for binding of ribosome subunits during protein synthesis ?

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20. Name two amino acids which contain sulphur.

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21. State one function of Mn besides activation of enzymes.

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22. State one physiological function of zinc.

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23. Which micronutrient is involved in pollen germination ?

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24. Which mineral is responsible for determining solute concentration is cell along with Na^+ and K^+ ?

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25. Why is molybdenum required by plants ?

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26. Which trace element is absorbed as monovalent anion ?

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27. Which element is a component of urease enzyme?

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28. Give one function of boron in plants.

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29. What do you mean by necrosis ?

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30. Name the elements whose deficiency leads to delay in flowering.

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31. Which mineral toxicity results in reduction in uptake of Mg and Fe ?

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32. List two deficiency symtoms observed in plants.

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33. Give two important roles of soil for plants.

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34. State true or false :

(i) In the initial phase of absorbation of elements the ions are absorbed passively.

(ii) Deficiency of manganese leads to inhibition of Ca translocation to shoot apex.

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35. What is ammonification?

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36. Name one bacterium involved in dentrification.

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37. Which enzyme converts atmospheric nitrogen into ammonia ?

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38. Complete the following w.r.t. microorganisms involved.

$$2NO_2^- + O_2 \xrightarrow{??} 2NO_3^- + \text{Energy}$$

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39. Name the pink pigment found in the root nodules of a legume.

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40. Name one reducing agent that is a source of H^+ atoms during N_2 - fixation.

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Exercise

1. Mark the correct option w.r.t. hydroponics

A. It can avoid problem of soil borne pathogens

B. It avoids problem of weeding

C. Out of season vegetables and flowers can be obtained

D. All of these

Answer: D

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2. All given statements are corrects w.r.t criteria of essentiality of minerals, except.

A. The element must be absolutely necessary or normal growth and reproduction

B. The element must be replaceable by another element

C. Absence of a specific element causes deficiency in the plant which is corrected only by adding the specific mineral in the soil

D. The element plays a direct role in plant metabolism

Answer: B

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3. (a) Essential elements are components of energy related compounds

(b) Essential elements are components of structural elements of cells.

(c) Mn^{2+} is an activator of alcohol dehydrogenase

A. All are correct

B. Only (a) is incorrect

C. Only (b) is incorrect

D. Only (c) is incorrect

Answer: D

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4. Which of the following mineral element is required by plants in the greatest amount ?

A. Phosphorus

B. Sulphur

C. Nitrogen

D. Potassium

Answer: C

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5. Which of the given is not a beneficial element ?

A. Co

B. Na

C. Si

D. Ni

Answer: D

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6. Select the incorrect match

A. Mn - Photolysis of water

B. Fe - Carbohydrate and water transiocation

C. S - Constituent of coenzyme A

D. Ca. - Synthesis of middle lamella

Answer: B

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7. Lack of low level of _____ causes an inhibition of cell division. `

A. Ca, Mg, Cu, K

B. N, K, S, Mo

C. N, K, Mg, S, Fe

D. Zn, Mo, Mn

Answer: B

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8. Deficiency of which set of minerals first appear in older leaves ?

A. N, K, Mg

B. N, Mg, Ca

C. S, B, Mg

D. Mg, Ca, Fe

Answer: A

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9. Primary sympton of maganese toxicity is

A. Appearance of brown spots surrounded by chlorotic veins

B. Loss of apical dominance

C. Little leaf disease

D. Reclamation disease

Answer: A

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10. (a) Soil is reservoir of all mineral elements that are essential for the essential for the proper growth and development of plants.

(b) Initial uptake of minerals into the symplast is slow.

(c) Uptake of minerals in inner space is rapid.

A. All are correct

B. Only (a) is incorrect

C. (b) & (c) are incorrect

D. Only (c) is incorrect

Answer: C

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11. Nitrosomonas, Nitrococcus and Nitrocystis are involved in the process of

A. Ammonification

B. Nitrate assimilation

C. Nitrification

D. Denitrification

Answer: C

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12. In ecosystem , denitrification is carried by bacteria

A. Nitrobacter

B. Thiobacillus

C. Nitrosomonas

D. Nitrocystis

Answer: B

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13. Decomposition of organic nitrogen of dead plant and animals into ammonia is called :

A. Ammonification

B. N_2 fixation

C. Nitrate assimilation

D. Denitrification

Answer: A

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14. Which of the following is a free living nitrogen fixing bacteria ?

A. Rhizobium

B. Azotobacter

C. Nitrococcus

D. Both (1) & (2)

Answer: B

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15. Which of the following plants do not contain Rhizobium in their root nodules ?

A. Alfalfa and sweet clover

B. Sweet pea and lentils

C. Alnus and Casuarina

D. Garden pea & broad bean

Answer: C

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16. Select an incorrect match

A. Rhodospirillum - Photosynthetic nitrogen fixer

B. Bacillus - Symbiotic N_2 fixer

C. Alnus - Frankia

D. Azotobacter - Free living, aerobic N_2 fixer

Answer: B

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17. Rhizobium and Frankia

A. Are free living in soil, but as symbionts for atmospheric nitrogen fixation

B. Produce nodules on the roots of leguminous plants

C. Are strictly anaerobic

D. More than one option is correct

Answer: A

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18. Find a correct setm of requirements to fix a molecule of atmospheric nitrogen (N_2)

A. $8e^-, 8H^+, 8ATP$

B. $16e^-, 16H^+, 16ATP$

C. $8e^-, 8H^+, 16ATP$

D. $16e^-, 16H^+, 8ATP$

Answer: C

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19. Enzyme nitrogenase is

A. Cu - Fe protein

B. Found in prokaryotes only

C. An O_2 requiring enzyme

D. Essectial to convert NH_3 to N_2

Answer: B

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20. All given statements are correct w.r.t fate of ammonia, except

A. Glutamine and asparagine are two most important amides in plants.

B. α - Ketoglutaric acid provides carbon skeleton for the process and reductive amination process

C. Amides and transported through sieve tubes

D. Glutamic acid is the main amino acid that provides NH_2 group during transamination process.

Answer: C

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Assignment Section A

1. Hydroponincs refers to growing plants in

A. Macronutrients culture medium

B. Water

C. Solution of mineral nutrients

D. Soil

Answer: C

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2. Select the incorrect statement w.r.t criteria of essentiality of minerals

A. Element must be necessary for normal growth and reproduction

B. Element must be rplaceable by another element

C. Disorders caused by the absence/ deficiency of an element can be corrected only by adding that specific element.

D. Element must be directly involved in plant metabolism

Answer: B

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3. How many elements have been found to be essential for plants ?

A. 8

B. 60

C. 17

D. 9

Answer: C

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4. The concentration of elements such as carbon and nitrogen in plants is

A. Above 10 millimole kg^{-1} of dry matter

B. Less than 10 millimole kg^{-1} of dry matter

C. Equal to 10 millimole kg^{-1} of dry matter.

D. Between 1 - 10 millimole g^{-1} of dry matter.

Answer: A

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5. Which of the following is not essential for all plants ?

A. Mg

B. Co

C. Mo

D. Ni

Answer: B

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6. A macronutrient is

A. Manganese

B. Zinc

C. Iron

D. Magnesium

Answer: D

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7. Select the odd one out from the following w.r.t macronutrient.

A. Nitrogen

B. Phosphorus

C. Iron

D. Sulphur

Answer: C

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8. Which of the following is a micronutrient ?

A. Ca

B. Mg

C. K

D. Ni

Answer: D

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9. Which of the following is not a beneficial element ?

A. Na

B. Co

C. K

D. Si

Answer: C

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10. Select incorrect statement w.r.t micronutrients.

A. Become toxic in excess.

B. Involved in activation of enzyme

C. Involved in building of protoplastic constituents

D. Concentration is less then 10 millimole kg^{-1} of dry matter.

Answer: C

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11. Plants require minor elements in small quantities, their major role is to act as

A. Constituent of hormones

B. Constituent of amino acids

C. Constituent of chlorophyll

D. Cofactor of enzymes

Answer: D

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12. Select the incorrect match .

A. Mn - Photolysis of water

B. Ca - Synthesis of middle lamella

C. P - Component of ATP

D. Zn - Constituent of coenzyme A

Answer: D

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13. An element present in middle lamella is

A. Zn

B. Cu

C. Ca

D. S

Answer: C

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14. An element which helps in joining the subunits of ribosomes is

A. Ethylene

B. Magnesium

C. Ferredoxin

D. Auxin

Answer: B

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15. Plants which are deficient in zinc will show reduction in the biosynthesis of

A. Ethylene

B. Coenzyme A

C. Ferredoxin

D. Auxin

Answer: D

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16. Which of the following groups of elements are mobile?

A. N, P, K

B. Ca, Mg, S

C. Ca, S, Fe

D. Ca, N, P

Answer: A

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17. The anion - cation balance in plant cells is due to essential element like

A. Potassium

B. Calcium

C. Sodium

D. Iron

Answer: A

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18. Which enzyme is activated by zinc ?

A. Nitrate reductase

B. Nitrogenase

C. Alcohol dahydrogenase

D. Catalase

Answer: C

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19. A macronutrient which is component of all organic compounds but is not obtained from soil is

A. Fe

B. P

C. Mg

D. C

Answer: D

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20. Component of nitrogenase and nitrate reduction is

A. Mo

B. Mn

C. Co

D. N

Answer: A

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21. An immobile element present in plant tissue is

A. N

B. P

C. Ca

D. K

Answer: C

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22. The essential element that activates enzymes rubisco and pepco, also

A. Needed in the activity of pyruvic and decarboxyiase

B. Helps in carbohydrate transiocation

C. Essential for water splitting reactions

D. Forms constituents of phytol tail fo chlorophyll

Answer: A

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23. All are the elements whose deficiency symptoms first appear in the older tissues, except

A. Nitrogen

B. Calcium

C. Potassium

D. Magnesium

Answer: B

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24. Amino acids like methionine and cysteince contain

A. Zn

B. S

C. B

D. Cl

Answer: B

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25. Which of the following is not a physiological role of potassium ?

A. Maintain anion - cation balance in cells

B. Maintain turgidity of cells

C. Help in opening and closing of stromata

D. Synthesize auxins

Answer: D

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26. An element involved in metabolism of urea is

A. Na

B. Si

C. Ni

D. Zn

Answer: C

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27. 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. Ca

B. Mg

C. N

D. K

Answer: A

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28. Plants absorb zinc as

A. Zn

B. $ZnSO_4$

C. Zn^{2+}

D. $Zn(NO_3)_2$

Answer: C

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29. Mineral present in cytochrome is commonly

A. Fe

B. Mn

C. Mo

D. Mg

Answer: A

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30. An element essential for nitrogen metabolism is

A. K

B. Mo

C. Mg

D. Mn

Answer: B

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31. Boron takes part in

A. Photosynthesis

B. Activation of enzymes involved in respiration

C. Transport of carbohydrates through phloem

D. Nitrogen metabolism

Answer: C

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32. Mark the correct sequence of steps for the development of root nodules in legumes

A. Formation of infection thread

B. Division of cortical and pericyclic cells.

C. Curing of root hairs.

D. Leghaemoglobin synthesis.

Answer: D

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33. Which group of three micronutrient elements is required for both photosynthesis and mitochondrial

electron transport ?

A. Ca, K, Na

B. Cu, Fe

C. Co, Ni

D. N, P, K

Answer: B

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34. Match the following and choose the correct combination from the options given.

	Column I		Column II
$a.$	Potassium	(i)	Germination of pollen grains
$b.$	Molybdenum	(ii)	Involved in synthesis of auxin
$c.$	Boron	(iii)	Involved in protein synthesis
$d.$	Zinc	(iv)	Constituent of ferredoxin
$e.$	Sulphur	(v)	Component of nitrate reductase

A. a (iii), b(iv), c(ii), d(i), e(v)

B. a(iii), b(v), c(i), d(ii), e(iv)

C. a(i), b(ii), c(iii), d(iv), e (v)

D. a(ii), b(iii), c (v), d (i), e (iv)

Answer: B

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35. Death of leaf tissues in plants is caused by deficiency of

A. Ca and Mg

B. Zn and S

C. Mo and S

D. Mo and C

Answer: A

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36. Deficiency of which group of elements can cacuse inhibition of cell division in plants ?

A. N, K, S

B. Mg, Cu, P

C. Ca, Mg, Cu

D. N, K, Ca

Answer: A

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37. A prokaryote responsible for converting ammonia to nitrites is

A. Nitosomonas

B. Nitrobacter

C. Nitrocystis

D. Rhizobium

Answer: A

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38. Conversion of $NH_3 \rightarrow NO_2^- \rightarrow NO_3^-$ is called

A. Ammonification

B. Nitrification

C. Denitification

D. Biological N_2 - fixation

Answer: B

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39. The free living , aerobic and saprotrophic N_2 - fixing microbe is

A. Azotobacter

B. Rhodospirillum

C. Rhizobium

D. Anabaena

Answer: A

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40. Reaction carried out by N_2 fixing microbes include

$2NH_3 + 3O_2 \rightarrow 2NO_2^- + 2H^+ + 2H_2O$ ...(i)

$2NO_2^- + O_2 \rightarrow 2NO_3^-$ ....(ii) 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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41. How many ATP are required for the formation of one molecule of NH_3 by the nitrogenase enzyme ?

A. Six

B. Eight

C. Twelv

D. Sixteen

Answer: B

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42. Non - symbiotic nitrogen fixing prokaryote is

A. Frankia

B. Azotobacter

C. Acetobacter

D. Rhizobium

Answer: B

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43. Amides are transported to the other parts of plant through

A. Phloem

B. Xylem

C. Parenchyma

D. Cyclosis and active transport

Answer: B

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44. Enzyme nitrogenase is

A. A Cu - Fe protein

B. Found in prokaryotes only

C. An O_2 requiring enzyme

D. Essential to convert NO_2^- to NO_3^-

Answer: B

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45. Function of leghaemoglobin during N_2 - fixation is

A. To convert N_2 to NH_3

B. To convert NH_3 to N_2

C. To supply O_2 for nitrogenase activity

D. To protect nitrogenase from oxygen

Answer: D

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46. The given equation refers to

$$N_2 + 8e^- + 16ATP \rightarrow 2NH_3 + H_2 + 16ADP + 16P_i$$

A. Ammonification

B. Nitrification

C. Denitification

D. Nitrogen fixation

Answer: D

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47. Pigment leghaeoglobin is present in the roots of

A. Maize

B. Rice

C. Alfalfa

D. Potato

Answer: C

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48. Select the incorrect statement with respect to the biological nitrogen fixation by Rhizobium

A. Nitrogenase may require oxygen for its functioning

B. Nitrogenase is Mo - Fe protein

C. Leg - haemoglobin is a pink - coloured pigment

D. Nitrogenase helps to convert N_2 gas into two molecules of ammonia

Answer: A

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49. The function of amides is all, except

A. Part of functional proteins

B. Structural part of plant proteins

C. Storage of excess nitrogen

D. Transport of nitrogen

Answer: A

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50. Which of the following is an amide involved in nitrogen metabolism by plants ?

A. Glutamate

B. Cysteine

C. Serine

D. Asparagine

Answer: D

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Assignment Section B

1. Growing plants in a nutrient solution

A. Involves use of chelating agent Na - EDTA to keep iron unavailable to plants

B. Was first demonstrated by Arnon and Hoagland

C. Also allows growth of algae in containers

D. Requires prevention of reaction of light with roots

Answer: D

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2. Which is not a criteria for essentiality of a mineral ?

A. Direct role in metabolism

B. Requirement is specific

C. Deficiency causes hunger signs

D. Dispensible for growth

Answer: D

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3. Which is not a true statement regarding macronutrients ?

A. Forms plant structure

B. Usually become toxic in excess

C. No role in electron transfer

D. Develop osmotic potential

Answer: B

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4. Choose correct statement regarding micronutrients

A. Become toxic in excess.

B. Little role in protoplasmic structure

C. No role in enzyme activation

D. Both (1) & (2)

Answer: D

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5. The deficiency of which element causes the deficiency of nitrogen?

A. Mo

B. K

C. Mn

D. S

Answer: A

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6. Minerals associated with redox reaction are

A. N, Cu

B. Fe, Cu

C. Fe, K

D. Mn, Mo

Answer: B

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7. Minerals which maintain cation-anion balance in cells are

A. Cl, K

B. Fe, Cu

C. K, P

D. Ca, Fe

Answer: A

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8. Which of the following groups of elements are mobile ?

A. Fe, Ca, B

B. Cl, K

C. B, K, N

D. Ca, Mg, P

Answer: B

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9. Which of the following elements are required for chlorophyll synthesis?

A. Fe and Mg

B. Mo and Ca

C. Cu and Ca

D. Ca and K

Answer: A

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10. The core metal of chlorophyll is

Or

Which element is left when chlorophyll is burnt

A. Magnesium

B. Manganese

C. Iron

D. Sulphur

Answer: A

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11. Which is not a trace element ?

A. Mn

B. Cu

C. Mo

D. K

Answer: D

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12. Find the odd one (w.t.r critical element).

A. Nitrogen

B. Potassium

C. Nickel

D. Phosphorus

Answer: C

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13. Sillicon, Cobalt, Sodium and Selenium are

A. Essential minerals

B. Beneficial elements

C. Macronutrients

D. Trace elements

Answer: B

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14. Tryptophan synthesis, carboxylase activity and little lea of plants are all associated with

A. Zn

B. B

C. Ca

D. Cu

Answer: A

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15. Mineral which is part of CoA, Fd, thiamine and lipoic acid is :

A. Mn

B. Fe

C. S

D. Ca

Answer: C

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16. Huner signs in plants are

A. Symptoms due to lesser water absorption in plants

B. Symptoms due to poor photosynthesis in plants

C. Deficiency symptoms of mineral nutrients

D. Symptoms due to excess water absorption in plants.

Answer: C

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17. (a) Moderate decrease of increase on micronutrients causes deficiency and toxicaity symptoms respectively.

(b) Excess of manganese causes toxicity of iron calcium and molybdenum.

(c) A macronutrients said to be toxic when present below a critical concentration.

A. Only (a) is correct

B. Only (b) is correct

C. (b) & (c) are correct

D. (a) & (c) are correct

Answer: A

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18. Movement of electrolytes through the roots is generally

A. Against electrochemical gradient and require energy

B. Along electro chemical gradient and does not require energy

C. A passive process

D. Dependent on aquaporins

Answer: A

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19. Initial phase of ion uptake

A. Is passive and apoplastic

B. Occurs through symplast

C. Is active process

D. More than one option is correct

Answer: A

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20. The translocation of solute is

A. Equal to the rate of translocation of water

B. Dependent on transpiration pull

C. Through xylem vessel

D. All of these

Answer: D

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21. The process of conversion of $2NO_3^- \rightarrow 2NO_3^- \rightarrow 2NO \rightarrow N_2O \rightarrow N_2$ is called _____ and is done by

A. Nitrification, Nitrosomonas

B. Denitrification, Pseudomonas

C. Nitrate assimilation, Rhizobium

D. Ammonification, Bacillus

Answer: B

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22. Process of nitrification and nitrate assimilation are

A. Oxidation and reduction respectively

B. Reduction and oxidation respectively

C. Both and oxidation

D. Both are reduction

Answer: A

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23. Conversion of $NO_3 \rightarrow NO_2 \rightarrow NH_4$ is called _____ and is catalysed by

A. Nitrate assimilation, nitrate and nitrite reductase

B. Nitrification, nitrate and nitrite reductase

C. Ammonification, glutarmate dehydrogenase

D. Denitrification, transaminase

Answer: A

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24. Most common form of nitrogen uptake and usable forms for plants are respectively.

A. NO_3^- , NO_2^-

B. NH_3, NO_3^-

C. NO_3^- , NH_3

D. NH_3, NO_2^-

Answer: C

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25. Which of the following is/are diazotrophs ?

A. Rhizobium and Azotobacter

B. Frankia and Nostoc

C. Anabaena and Nostoc

D. All of these

Answer: D

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26. Which is not true for nitrogenase enzyme in root nodules in legumes?

A. Synthesized by nif genes of Rhizobium

B. Site of reduction of N_2 into NH_3

C. It is a Mo - Fe protein

D. Resistant to O_2 conc.

Answer: D

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27. Leghemoglobin is found in which one of the following organisms ?

A. Anthoceros

B. Aulosira

C. Nostoc

D. Groundnut

Answer: D

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28. How many electron and protons are required to fix a dinitrogen ?

A. 32 each

B. 8 each

C. 16 each

D. 4 each

Answer: B

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29. Cycas and Azolla plants are associated with

A. Bacillus

B. Klebsiella

C. Anabaena

D. Rhizobium

Answer: C

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30. Select the correct statements from the given

(a) Nitrogenae is heterodimeric protein.

(b) Root hairs curl by action of nitrogenase and plant not factors.

(c) During sumbiotic N_2 fixation ATP is provided by legumes plant.

A. (b) & (c)

B. (a) & (c)

C. Only (c)

D. (a) & (b)

Answer: B

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31. Nitrogenase enzyme found in root nodules in legumes contains

A. Mo, Mn, S

B. Co, Mo, Ca

C. Mo, Fe , S

D. Mo, B, S

Answer: C

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32. The amino acid which plays a central role in nitrogen metabolism is/are

A. Glutamic acid

B. α - Ketoglutaric acid

C. Aspartic acid

D. Double aminated keto acids.

Answer: A

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33. Transported and storage form of nitrogen in plants are

A. Amides

B. Polypeptides

C. Amino acids

D. α - ketoglutaric acids

Answer: A

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34. Ureides are preferred forms for storage and transport of nitrogen in

A. Triticum aestivum

B. Solanum nigrum

C. Glycine max

D. Allium cepa

Answer: C

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35. Essential elements are

A. Only micronutrients

B. Only macronutrients

C. C, H, O & N only

D. Both macro and micronutrients

Answer: D

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Assignment Section C

1. Which is essential for the growth of root tip ?

A. Zn

B. Fe

C. Ca

D. Mn

Answer: C

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

A. Nitrogen, sulphur, phosphorus

B. Boron, zinc, manganese

C. Iron, copper, molybdenum

D. Molybdenum, magnesium, maganese

Answer: A

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

A. Cytochrome

B. Leghaemoglobin

C. Xanthophyll

D. Carotene

Answer: B

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4. Minerals known to be required in large amounts for plant growth include

A. Magnesium, sulphur, iron, zinc

B. Phosphorus, potassium, manganese, copper

C. Calcium, magnesium, manganese, copper

D. Potassium, phosphorus, selenium, boron

Answer: B

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5. 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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6. 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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7. Which one of the following is wrong statement ?

A. Phosphorus is a constituent of cell membranes, certain nucleic acids and all proteins.

B. Nitrosomonas and Nitrobacter are chemoautotrophs

C. Anabaena and Nostoc are capable of fixing nitrogen in free - living state also.

D. Root nodule forming nitrogen fixers live as aerobes under free - living conditions.

Answer: A

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8. Which one of the following is correctly matched ?

A. Potassium - Readily mobilization

B. Bakane of rice seedings - F.Skoog

C. Passive transport of nutrients - ATP

D. Apoplast - Plasmodesmata

Answer: A

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9. 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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10. Best defined function of manganese in green plants is

A. Nitrogen fixation

B. Water absorbtion

C. Photolysis of water

D. Calvin cycle

Answer: C

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11. Nitrifying bacteria:-

A. Reduce nitrates to free nitrogen

B. Oxidize ammonia to nitrates

C. Convert free nitrogen to nitrogen compounds

D. Convert proteins into ammonia

Answer: B

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

A. Expression of nif gene

B. Inhibition of the nitrogenase activity

C. Oxygen removal

D. Nodule differentiation

Answer: C

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

A. Sulphur

B. Phosphorus

C. Calcium

D. Potassium

Answer: C

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14. A prokaryotic autotrophic nitrogen fixing symbiont is found in

A. Pisum

B. Alnus

C. Cycas

D. Cicer

Answer: C

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15. which one of the following helps in asbsorption of phosphorus from soil by plants?

A. Anabaena

B. Glomus

C. Rhizobium

D. Frankia

Answer: B

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16. Which one of the following ions is essential for photolysis of water?

A. Copper

B. Boron

C. Manganese

D. Zinc

Answer: C

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

A. Cadmium

B. Phosphorus

C. Iron

D. Maganese

Answer: A

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18. Leguminous plants are able to fix atmospheric nitrogen through the process of symbiotic nitrogen fixation. Which one of the following statements is not correct for this process of nitrogen fixation ?

A. Leghaemoglobin scavenges oxygen and is pinkish in colour

B. Nodules act as sites for nitrogen fixation

C. The enzyme ntirogenase catalyses the conversion of atmospheric N_2 to NH_3

D. Nitrogenase is insensitive to oxygen

Answer: D

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19. An element playing important role in nitrogen fixation is

A. Molybdenum

B. Copper

C. Manganese

D. Zinc

Answer: A

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20. The common nitrogen-fixer in paddy fields is

A. Frankia

B. Rhizobium

C. Azospirillum

D. Oscillatoria

Answer: C

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21. Which one of the following is not a micronutrient

A. Boron

B. Molybdenum

C. Magnesium

D. Zinc

Answer: C

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22. One of the free-living, anaerobic nitrogen-fixer is

Or

which of the following is a photoautotrophic bacterium

A. Azotobacter

B. Beijernickia

C. Rhodospirillum

D. Rhizobium

Answer: C

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23. Manganes 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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24. Nitrogen fixation in root nodules of Alnus is brought about by

A. Azorhizobium

B. Bradyhizobium

C. Clostridium

D. Frankia

Answer: D

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25. Which of the following is a flowering plant with nidules containing filamentous nitrogen-fixing microorganism

A. Cicer arietinum

B. Casuarina equisetifolia

C. Crotalaria juncea

D. Cycas revolute

Answer: B

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

A. Ca

B. Mn

C. Zn

D. Cu

Answer: A

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27. Which one of the following statements is correct ?

A. At present it is not possible to grow maize without chemical fertilizers.

B. Extensive use of chemical fertilizers may lead to eutrophication of nearby water bodies.

C. Both Azotobacter and Rhizobium fix atmospheric nitrogen in root nodules of plants

D. Cyanobacteria such as Anabaena and Nostoc are important mobilizers of phosphates and potassium for plant nutrition in soil.

Answer: B

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28. A plant requires magnesium for :

A. Cell wall development

B. Holding cells together

C. Protein synthesis

D. Chlorophyll synthesis

Answer: D

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29. About 98 percent of the mass of every living organism is composed of just six elements including carbon, hydrogen, nitrogen, oxygen and

A. Calcium and phosphorous

B. Phosphorus and sulphur

C. Sulphur and magnesium

D. Magnesium and sodium

Answer: A

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30. Sulphur is an important nutrient for optimum growth and productivity in

A. Pulse crops

B. Cereals

C. Fibre crops

D. Oil seed crops

Answer: D

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31. 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. Cu, Mn, Fe

B. Co, Ni, Mo

C. Mn, Co, Ca

D. Ca, X, Na

Answer: A

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32. Which of the following elements is a constituent of biotin

A. Sulphur

B. Magnesium

C. Calcium

D. Phosphorus

Answer: A

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33. Which one of the following elements is almost non - essential for plants ?

A. Zn

B. Na

C. Ca

D. Mo

Answer: B

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34. plants take zinc in form of :

A. $ZnSO_4$

B. Zn^{2+}

C. ZnO

D. Zn

Answer: B

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35. Element necessary for the middle lamella

A. Ca

B. Zn

C. K

D. Cu

Answer: A

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36. Boron in green plants assists in

A. Activation of enzymes

B. Acting as enzymes co - factor

C. Photosynthesis

D. Sugar transport

Answer: D

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37. The most abundant element present in the plants is

Or

Which of the following is not absorbed through soil

A. Carbon

B. Nitrogen

C. Manganese

D. Iron

Answer: A

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38. Necrosis, or death of tissue particularly leaf tissue, is due to the deficiency of

A. Ca, K, S and Mo

B. N, K, S and Mo

C. N, S, Fe and Zn

D. Mg, S, Mn and Ca

Answer: A

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39. Which of the following is not caused by deficiency of mineral nutrition

A. Etiolation

B. Shortening of internode

C. Necrosis

D. Chlorosis

Answer: A

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40. When the plants are grown in magnesium deficient but urea rich soil, the symptoms expressed are:

A. Yellowish leaves

B. Colourless petiole

C. Dark green leaves

D. Shoot apex die

Answer: A

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41. The major portion of the dry weight of plants comprised of

A. Nitrogen, phosphorus and potassium

B. Calcium, magnesium and sulphur

C. Carbon, nitrogen and hydrogen

D. Carbon, hydrogen and oxygen

Answer: D

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42. Gray spots of oat are caused by the deficiency of

A. Cu - Fe protein

B. Zn

C. Mn^-

D. Fe

Answer: C

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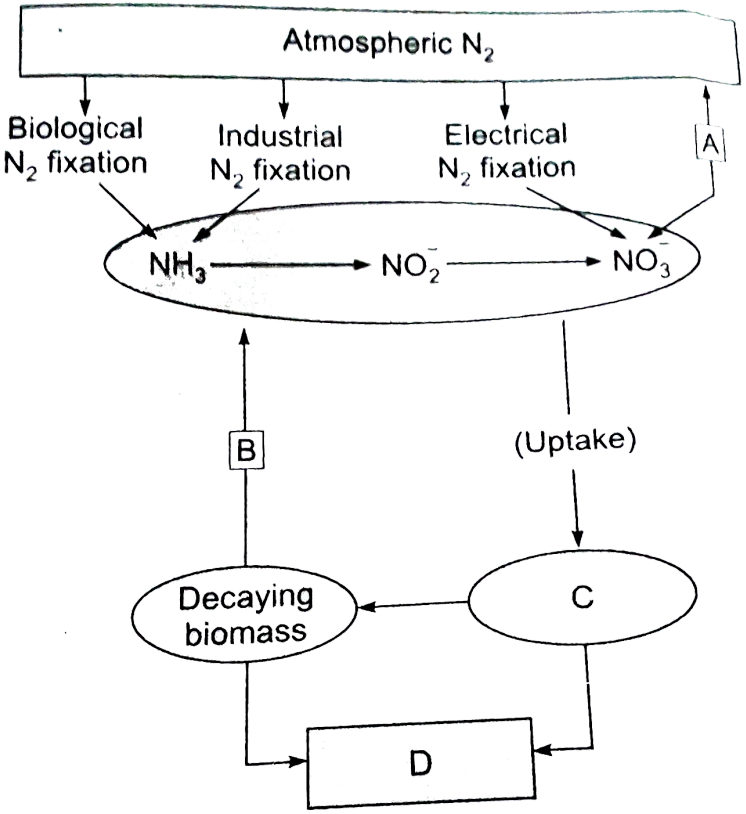
43. Study the cycle shown in Fig. 12.7 and select the option which gives correct words for all the four blanks A, B, C, and

D.



A. A - Nitrification B - Ammonification C - Animals

B. A - Denitrification B - Ammonification C - Plants D - Animals

C. A - Nitrification B - Denititrification C - Animals D - Plants

D. A - Denitrification B - Nitrification C - Plants D - Animals

Answer: B

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44. Which two distinct microbial processes are responsible for the release of fixed nitrogen as dinitrogen gas (N_2) to the atmosphere

A. Anaerobic ammonium oxidation, and denitrification

B. Aerobic nitrate oxidation, and nitrite reduction

C. Decomposition of organic nitrogen , and conversion of dinitrogen to ammonium compounds.

D. Enteric fermentation in cattle, and nitrogen fixation by Rhizobium in root nodules of legumes

Answer: A

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45. Nitrifying bacteria:-

A. Reduce nitrates to free nitrogen

B. Oxidize ammonia to free nitrogen

C. Convert free nitrogen to nitrogen compounds

D. Convert proteins into ammonia

Answer: B

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46. Passive obsorption of minerals depends on

A. Temperature

B. Temperature and metabolic inhibitor

C. Metabolic inhibtor

D. Auxin

Answer: A

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47. In root nodules of lengumes, leg-haemoglobin is important because

A. Transports oxygen to the root nodule

B. Acts as an oxygen scavenger

C. Provides energy to the nitrogen fixing bacterium

D. Acts as a catalyst in transamination

Answer: B

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48. Leghemoglobin is

A. An oxygen carrier in human blood

B. A protein used as food supplement

C. An oxygen scavenger in root nudules

D. A plant protein with high lysine content

Answer: C

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49. Which one of the following statements is correct ?

A. Legumes fix nitrogen only through the specialized bacteria that live in their roots

B. Legumes fix nitrogen independently of the specialized bacteria that live in their roots

C. Legumes fix nitrogen only through specilized bacteria that live in their leaves

D. Legumes are incapable of fixing nitrogen

Answer: A

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50. Enzyme first used for nitrogen fixation

A. Nitrogenase

B. Nitroreductase

C. Transferase

D. Transaminase

Answer: A

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51. 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. Copper

B. Manganese

C. Zinc

D. Molybdenum

Answer: D

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52. A free-living nitrogen-fixing cyanobacterium which can also form symbiotic association with the water fern Azolla is :

A. Tolypothrix

B. Chlorella

C. Nostoc

D. Anabaena

Answer: D

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53. If by radiation all nitrogenase enzyme are inactivated, then there will be no:-

A. Fixation of nitrogen in legumes

B. Fixation of atmospheric nitrogen

C. Conversion from nitrate to nitrite in legumes

D. Conversion from ammonium to nitrate in soil

Answer: A

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54. Root of which plant contains a red pigment that has affinity for oxygen ?

A. Carrot

B. Soyabean

C. Mustard

D. Radish

Answer: B

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Assignment Section D

1. Assertion: Some mineral nutrients are essential.

Reasoning: They can be synthesized by the plants.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion.

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

C. If Assertion is true statement but Reason is false.

D. If both Assertion and Reason are false statements.

Answer: C

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2. Write the role of Phosphorous in plants

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3. A : Chelating agents used in improving availability of some minerals in soil are actually electron acceptors.

R : They increase solubility of some minerals in acidic soils.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion.

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

C. If Assertion is true statement but Reason is false.

D. If both Assertion and Reason are false statements.

Answer: D

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4. Assertion: N, P, K are called critical elements.

Reasoning: They become deficient easily in soil due to leaching and higher requirement.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion.

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

C. If Assertion is true statement but Reason is false.

D. If both Assertion and Reason are false statements.

Answer: A

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5. A : Influx of ions into inner space of cells is an active process.

R : Ions are available for free exchange in free space.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion.

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

C. If Assertion is true statement but Reason is false.

D. If both Assertion and Reason are false statements.

Answer: B

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6. A : Maganese toxicity cause brown spots ,chlorotic veins and inhibintion of calcium translocation to shoot apex.

R : Toxic effects may be due to direct excess of micronutrients or its interference in the absorbtion and functioning of other nutrients.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion.

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

C. If Assertion is true statement but Reason is false.

D. If both Assertion and Reason are false statements.

Answer: A

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7. A : Jar for nutrient solution culture contains a split cover with holes which hold a bent tube for aeration.

R : Regular aeration of culture solution is necesaary for proper growth and activities of roots.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion.

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

C. If Assertion is true statement but Reason is false.

D. If both Assertion and Reason are false statements.

Answer: A

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8. A : All the diverse minerals element found in plants are not essential for them.

R : Some plants accumulate heavy and toxic minerals such as gold and selenium from the soil.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion.

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

C. If Assertion is true statement but Reason is false.

D. If both Assertion and Reason are false statements.

Answer: B

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9. A : Ammonia is oxidised first to nitrate then to nitrite by the action of Nitrosomonas and Nitrobacter respectively.

R : Nitrite thus formed is absorbed by leaves.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion.

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

C. If Assertion is true statement but Reason is false.

D. If both Assertion and Reason are false statements.

Answer: D

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10. A : Soyabean export the fixed nitrogen as ureides.

R : Amides contain excess nitrogen and they are transported via phloem sieve tubes.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion.

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

C. If Assertion is true statement but Reason is false.

D. If both Assertion and Reason are false statements.

Answer: C

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