BIOLOGY

BOOKS - MTG BIOLOGY (ENGLISH)

MINERAL NUTRITION

Mcq S

1. The technique of hydroponics was first demonstated by

A. M. Calvin (1961)

B. Julium von sachs (1860)

C. Arnon (1940)

D. Hoagland (1940)

Answer: B

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2. The technique of growing plants in a nutrients solution, in complete absence of soil is called as

A. aeroponics

B. water culture

C. hydroponics

D. soil culture

Answer: C

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3. Hydroponics or soilless culture helps in knowing

A. essentiality of an element

B. deficiency symptoms caused by an element

C. toxicity caused by an element

D. all of these

Answer: D

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4. The technique of hydroponics is bieng employed for the commercial production of vegetables like

A. tomato

B. cucumber

C. lettuce

D. all of these

Answer: D

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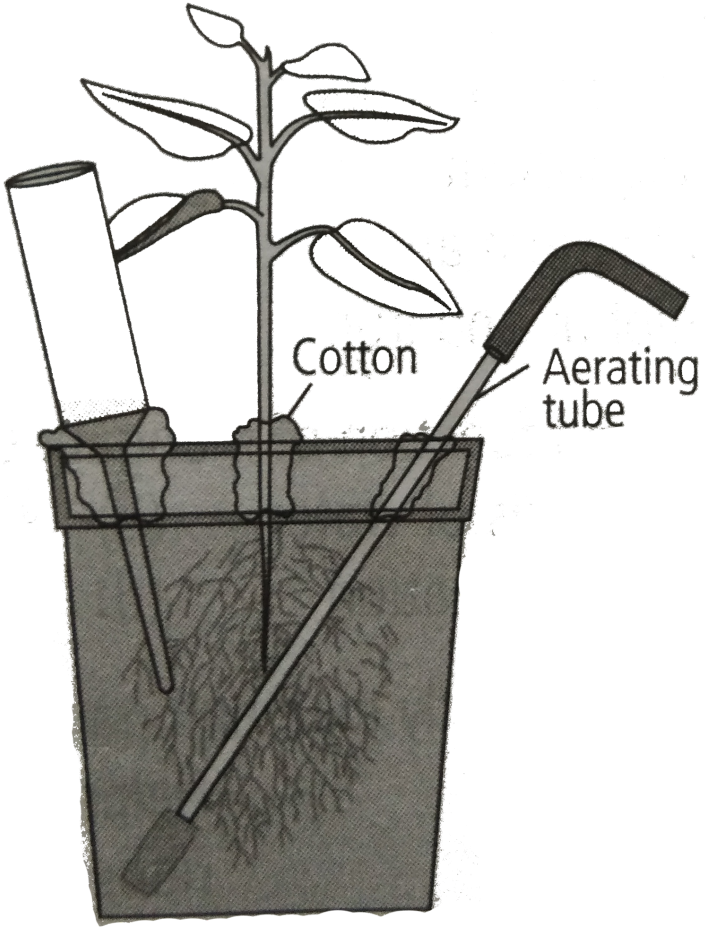

5.

The given experimental set-up is used

A. to show that CO_2 is required during photosynthesis

B. to show that O_2 is evolved during photosynthesis

C. for nutrients solution culture

D. to measure growth of a plant

Answer: C

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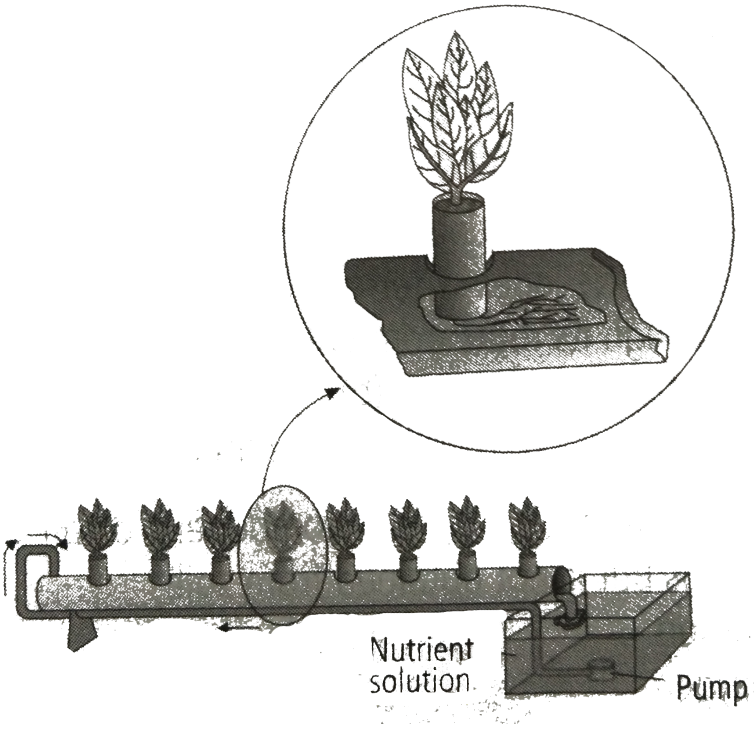
6.



Refer to the given figure and select the incorrect option regarding it

A. it shows hydroponic plant production

B. plants are grown in a tube or though placed on a slight incline

C. The solution flows down the tube and returns to the reservoir due to the suction pressure created by pump

D. the roots in this set-up, are continously bathed in aerated nutrients solution.

Answer: C

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7. Select the correct statement (s) regarding the solution culture techniques.

A. successful hydroponic culture required a large volume of nutrients solution or frequency adjustment of the nutrients solution of prevent roots from producing radical changes in nutrients concentration and pH of the medium.

B. In nutrient film growth system, plant roots lie on the surface of a trough, and nutrients solution flow in a thin layer along the trough over the roots.

C. In aeroponics technique, plants are grown with their roots suspended in air while being sprayed continously with a nutrient solution

D. all of these

Answer: D

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8. More than ___elements of the ___discovered so far are found in different plants.

A. 60,105

B. 105,60

C. 30,60

D. 4,105

Answer: A

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9. Which of the following is not criterion for essentiality of an element?

A. Requirement of the element is specific

B. Necessary for normal growth and reproduction

C. not replaceable by another element

D. indirectly involved in plant metabolism

Answer: D

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10. Essential elements are

A. only macronutrients

B. only micronutrients

C. Both macro and micronutrients

D. C, H, O and N only

Answer: C

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11. Which of the following are macronutrients?

A. Carbon, nitrogen

B. Oxygen, phosphorus

C. Potassium, sulphur

D. all of these

Answer: D

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12. Which of the four most abundant element in most plants (C, H, O and N), dows a terrestrial green plant procure mainly through its roots from the soil?

A. H and O

B. H and N

C. C and O

D. O and N

Answer: B

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13. The macronutrient_____is a component of all organic compounds but is not obtained from soil.

A. Carbon

B. hydrogen

C. oxygen

D. nitrogen

Answer: A

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14. Micronutrients are present in plant tissues in concentrations less than ____of dry matter.

A. 1 m mole Kg^{-1}

B. 10 m mole Kg^{-1}

C. 0.1 m mole Kg^{-1}

D. 2 m mole Kg^{-1}

Answer: B

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15. Select the option that contains micronutrients only

A. Mn, Mo, Zn

B. C, H, N

C. N, P, O

D. Mn, K, S

Answer: A

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16. Match column I with column II and select the correct option from the codes given below

Column I (Activator element)		Column II (Enzyme)
A	Mg^{2+},	(i) Nitrate reductase
$B.$	Zn^{2+}	$(ii).$ RuBisCO, PEPCase
$C.$	Mo	$(iii).$ Alcohol dehydrogenase

A. A-(ii),B-(iii),C-(i)

B. A-(iii),B-(ii),C-(i)

C. A-(i),B-(iii),C-(ii)

D. A-(ii),B-(i),(C)-(iii)

Answer: A

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17. Monovalents (e.g., Na^2, K^+)____membrane permeability while divalents (e.g., Ca^{2+})____the same.

A. increase, decrease

B. decrease, increase

C. increase, increase

D. decrease, decrease

Answer: A

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18. The inorganic essential elements which are obtained from the soil are called as

A. mineral elements

B. non-mineral elements

C. non-essential elements

D. both b and c

Answer: A

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19. The non-mineral elements are

A. C, H, O

B. N, Ca, Mg

C. Fe, Co, Mn

D. Cu, Mo, N

Answer: A

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20. Phosphorus (P) is a structural element of

A. cell membranes

B. proteins

C. nucleic acids

D. all of these

Answer: D

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21. Which of the following essential elements plays an important role in opening and closing of stomata?

A. Mg

B. K

C. Mn

D. P

Answer: B

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22. Which of the following is not one of the three plants macronutrietns included in most fertilisers?

A. O

B. N

C. P

D. K

Answer: A

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

A. Cl and K

B. K and Fe

C. Methionine

D. both b and c

Answer: A

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24. Sulphur is a constituents of which of the following amino acids?

A. Threonine

B. Cysteine

C. Methionine

D. both b and c

Answer: D

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25. 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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26. Some fundtion of a nutrients element are given below

(i). Important constituents of proteins involved in ETS

(ii). Activator of catalase

(iii). Important constituent of cytoshrome

(iv). Essential for chlorophyll systhesis

the concerned nutrient is_____

A. Cu

B. Fe

C. Ca

D. Mo

Answer: B

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27. Which of the following minerals activate the enzymes involved in respiration?

A. Nitrogen and phosphorus

B. Magnesium and manganese

C. potassium aned calcium

D. Sulphur

Answer: B

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28. 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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29. Select the correctly matched pair

A. Zinc-Helps to maintain the ribosome structure

B. Magnesium-needed during the formation of mitotic spindle

C. Calcium -Plays a role in the opening and closing of stomata

D. Manganese-needed in the splitting of water to liberate oxygen during photosynthesis

Answer: D

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30. Minerals associated with redox reaction are

A. Na,Cu

B. N,Cu

C. Fe,Cu

D. Ca,Fe

Answer: C

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31. Select the incorrectly matched pair.

A. Magnesium (Mg)-Formation of mitotic spindle

B. Iron (Fe)-Formation of chlorophyll

C. Chlorine (Cl)-Anion cation balance in the cell

D. Sulphur(S)-Component of vitamins

Answer: A

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32. The two elements responsible for splitting of H_2O to liberate O_2 during photosynthesis are

A. Mn and Mo

B. Ca and Mg

C. Mn and Cl

D. Mg and Cl.

Answer: C

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33. Deficiency symptoms of readily mobilised essential elements will first appear in____

A. (a) younger tissues

B. (b) older tissues

C. (c) roots

D. (d) shoots

Answer: B

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34. Read the given statements and select the correct option

Statement-1: Deficiency symptoms of N, K ad Mg are first visible in the senescent leaves

Statement-2: Biomolecules containing these elements are broken available for mobilising to younger leaves.

A. both statements 1 and 2 are correct.

B. Statement 1 is correct but statement 2 is incorrect

C. Statement 1 is incorrect but statement 2 in correct.

D. Both statements 1 and 2 are incorrect.

Answer: A

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35. Deficiency symptoms tend to appear first in____whenever the essential elements are relatively immobile and are not transported out of the mature organs.

A. younger tissues

B. older tissues

C. roots

D. shoots

Answer: A

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36. While in N, K and Mg deficiency, chlorosis appears first in ___leaves, in S and Ca deficiency,____lveaves are the first to be affected

A. young, old

B. old, young

C. old, old

D. young, young

Answer: B

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37. Chlorosis, i.e., loss of chlorophyll leading to yellowing in leaves, is caused by the deficiency of

A. N, K, Mg

B. S, Fe, Zn

C. Mn, Mo, Mg

D. all of these

Answer: D

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38. Necrosis refers to

A. (a) inhibition of cell division

B. (b) delay in flowering

C. (c) death of tissues

D. (d) falling of leaves

Answer: C

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39. Necrosis mainly occurs by the deficlency of

A. Ca, Mg

B. N, S

C. Mn, Mo

D. Fe, Mn

Answer: A

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40. Deficiency of which of the following elements delay flowering in plants?

A. Fe, Mn, Mo

B. N, S, Mo

C. Ca, Mg, K

D. N, K, S

Answer: B

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41. Which of the following is not a deficiency symptoms of minerals?

A. Internode shortening

B. Necrosis

C. Chlorosis

D. Etiolation

Answer: D

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42. Premature leaf fall is due to deficiency of

A. sodium

B. potassium

C. zinc

D. phosphorus.

Answer: D

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43. Yellowish edges appear in leaves deficient in

A. potassium

B. calcium

C. magnesium

D. phosphorus.

Answer: A

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44. Mineral ion concentration in tissues that reduces the dry weight of tissues by about 10% is considered as

A. critical concentration

B. toxic concentration

C. optimum concentration

D. beneficial concentration

Answer: B

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45. Select the correct statement regarding manganese toxicity.

A. Appearance of brown spots surrounded by chlorotic veins

B. inhibition of Ca translocation in shoot apex

C. induction deficiencies of Mg and Fe

D. all of these

Answer: D

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46. Minerals are absorbed in the form of

A. (a) molecules

B. (b) ions

C. (c) compounds

D. (d) mixtures

Answer: B

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47. With reference of absorption of minerals, the term 'outer space' represents____while 'inner space' represents____.

A. Intercellular space and cell wall, space and cell wall

B. cytoplasm and vacuole, intercellular space and cell wall

C. intercellular space, vacuole

D. cytoplasm, vacuole

Answer: A

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48. Which of the following statements about minerals absorption in plants is correct?

A. in the initial phase rapid uptake of ions into the outer space of cells- the apoplast, is a passive process.

B. in the final phase, ions are taken in slowly into the inner space-the symplast of cells, and is an active process.

C. passive movement of ions into the apoplast occurs through ion-channels, transmembrane proteins which act as selective pores.

D. all of these

Answer: D

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49. Mineral salts are translocated through (i) along with the (ii) stream of water, which is pulled up through the plant by the transpirational pull. Fill up the blanks in the given statement and select the correct option

A. (a) (i) xylem (ii) ascending

B. (b) (i) xylem (ii) descending

C. (c) (i) phloem (ii) ascending

D. (d) (i) phloem (ii) descending

Answer: A

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50. Mineral nutrients absorbed by roots, move to leaves through

A. xylem

B. phloem

C. sleve tube

D. companion cell

Answer: A

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51. Read the given statement and select the correct option. Statement-1: Soil serves as a reservoir of essential elements.

Statement-2: Soil develops, over the years, through physical and chemical weathering of rocks.

A. both statements 1 and 2 are correct.

B. Statement 1 is correct but statement 2 is incorrect

C. Statement 1 is incorrect but statement 2 in correct.

D. Both statements 1 and 2 are incorrect.

Answer: A

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52. Which one is the major constituent of proteins, nucleic acids, vitamins and hormones?

A. (a) P

B. (b) N

C. (c) K

D. (d) S

Answer: B

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53. Nitrogen is a limiting nutrient for

A. natural ecosystem

B. aquatic acosystem

C. agricultural ecosystem

D. both a and c

Answer: D

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54. One example of a nutrient in its reduced form is

A. (a) carbon in CO_2

B. (b) hydrogen in H_2O

C. (c) nitrogen in NH_3

D. (d) sulphur in sulphate

Answer: C

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55. The process of conversion of atmospheric free N_2 gas to nitrogenous compounds like NH_3 is termed as

A. nitrification

B. nitrate reduction

C. N_2 fixation

D. ammonification

Answer: C

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56. Nitrogen and hydrogen combine to form ammonia under high temperature and pressure conditions. This is an example of

A. (a) biological N_2 fixation

B. (b) natural N_2 fixation

C. (c) industrial N_2 fixation

D. (d) electrical N_2 fixation

Answer: C

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57. Decomposition of organic nitrogen of dead plants and animals into ammonia is called_____.

A. (a) nitrification

B. (b) nitrate reduction

C. (c) N_2 fixation

D. (d) ammonification

Answer: D

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58. Nitrite is oxidised to nitrate with the help of

A. (a) Nitrosomonas

B. (b) Nitrococcus

C. (c) Nitrobacter

D. (d) Thiobacillus

Answer: C

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59. Nitrifying bacteria

A. oxidise ammonia to nitrates

B. convert free nitrogen to nitrogen compounds

C. convert proteins into ammonia

D. reduce nitrates to free nitrogen

Answer: A

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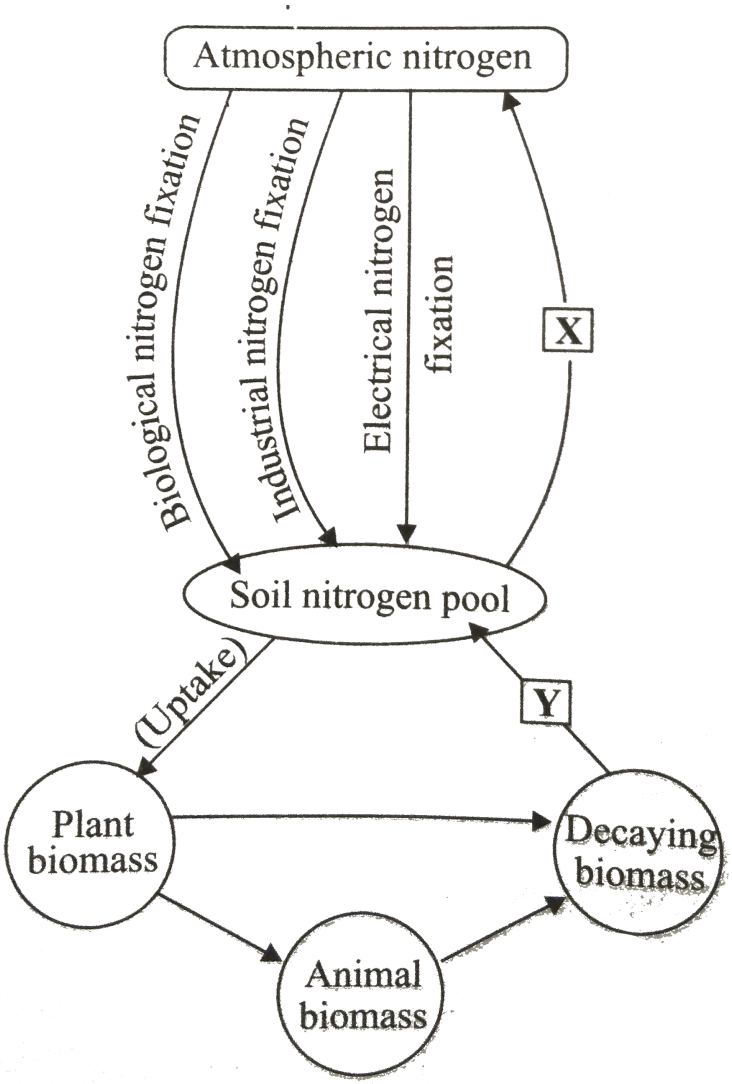

60.

Identify the labels X and Y in the given outline of N_2 cycle and select the correct option.

A.

	X	Y
$(a).$	Denitrification	Ammonification

B. X Y
$(b).$ N_2 fixation Ammonification

C. X Y
$(c).$ Ammonification denification

D. X Y
$(d).$ Nitrification denification

Answer: A

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61. Nitrogen is absorbed by plants in form of

A. NO_3^-

B. NH_3

C. NO_2^-

D. both a and c

Answer: D

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62. The process of conversion of soil nitrates into free N_2 is called (I) and is carried out by bacteria (II).

A. a) $\begin{matrix}(\mathrm{I}) & (\mathrm{II}) \\ \text{nitrification} & \text{Nitrosomonas}\end{matrix}$

B. b) $\begin{matrix}(\mathrm{I}) & (\mathrm{II}) \\ \text{denitrification} & \text{Nitrobacter}\end{matrix}$

C. c) $\begin{matrix}(\mathrm{I}) & (\mathrm{II}) \\ \text{denitrification} & \text{Thiobacillus}\end{matrix}$

D. d) $\begin{matrix}(\mathrm{I}) & (\mathrm{II}) \\ N_2 \text{ fixation} & \text{Nitrosomonas}\end{matrix}$

Answer: C

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63. The process that is the opposite of nitrogen fixation is

A. (a) Nitrification

B. (b) Denitrification

C. (c) Ammonification

D. (d) Nitrate reduction

Answer: B

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64. Match column I with column II and select the correct option from the given codes:

Column I	Column II
A Nitrosomonas, Nitrococcus	(i) Ammonia to Nitrite
B Nitrobacter, Nitrocystis	(ii) Nitrite to Nitrate
C Pseudomonas	(iii) Nitrate to N_2

A. (a) A-(i), B-(ii), C-(iii)

B. (b) A-(i), B-(iii), C-(ii)

C. (c) A-(ii), B-(i), C-(iii)

D. (d) A-(ii), B-(iii), C-(i)

Answer: A

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65. Which one of the following is a free-living obligate anaerobic bacterium?

A. (a) Clostridium

B. (b) Rhodospirillum

C. (c) Azotobacter

D. (d) Bacillus subtilis

Answer: A

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66. The limiting factor in nitrogen fixation of soil is

A. soil nature (pH)

B. light

C. temperature

D. air

Answer: A

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67. All N_2 fixers belong to

A. Eubacteria

B. algae

C. plantae

D. protista

Answer: A

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68. The largest resevoir of nitrogen on earth is

A. soil natrure (pH)

B. air

C. ocean

D. rocks

Answer: B

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

A. (a) fixation of nitrogen in legumes

B. (b) conversion of nitrate into nitrogen

C. (c) conversion from nitrate to nitrite in legumes

D. (d) conversion from ammonium to nitrate in soil

Answer: A

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70. A farmer adds Azotobacter culture to soil before sowing maize. Which mineral element will be replenished by doing so?

A. N

B. P

C. K

D. S

Answer: A

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71. _____is a free-living N_2-fixing aerobic bacterium.

A. Rhodospirillum

B. Azotobacter

C. Clostridium

D. Rhizobium

Answer: B

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72. Which of the following is a non-symbiotic nitrogen fixing prokaryote?

A. Azotobacter

B. Clostridium

C. Beijerinckia

D. all of these

Answer: D

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73. Which of the following is a free-living nitrogen fixing cyanobacteria?

A. (a) Cylindrospermum

B. (b) Nostoc

C. (c) Rhodospirillum

D. (d) both a and b

Answer: D

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74. Symbiotic bacteria are found in the root nodules of members family

A. Solanaceae

B. Asteraceae

C. Leguminosae

D. Malvaceae

Answer: C

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75. The bacterium____belonging to group Actinomycetes, produces N_2 – fixing nodules on the roots of non-leguminous plants (e.g., Alnus)

A. (a) Frankia

B. (b) Rhizobium

C. (c) Rhodospirillum

D. (d) Clostridium

Answer: A

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76. Select the mismatched pair.

A. Symbiotic bacteria-Rhizobium, Frankia

B. Symbiotic cyanobacteria-Frankia, Aulosira

C. Free-living bacteria-Beijerinckia, Azotobacter

D. none of these

Answer: B

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77. Certain non-leguminous plants also form nodules to fix N_2. Example of such plants is

A. Alnus

B. Casuarina

C. Myrica

D. all of these

Answer: D

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78. N_2-fixing blue-green alga Anabaena which is extensively used in rice cultivation, forms symbiotic association with

A. Cycas roots

B. Azolla

C. Anthoceros

D. Alnus

Answer: B

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79. The nodules present in the leguminous plants appear pink in colour due to the presence of

A. RBCs

B. leghaemoglobin

C. nitrogenase enzyme

D. bacterial secretion.

Answer: B

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80. During nodule formation in leguminous plants, an infection thread is produced carrying the __(i)__ into the __(ii)__ of the root, where they initiate the nodule formation in the __(iii)__ of the root. Fill up the blanks by choosing the correct option.

A.

(i)	(ii)	(iii)
Cyanobacteria	pericycle	cortex

B.

(i)	(ii)	(iii)
bacteria	cortex	cortex

C.

(i)	(ii)	(iii)
Cyanobacteria	cortex	pericycle

D.

(i)	(ii)	(iii)
bacteria	pericycle	pericycle

Answer: B

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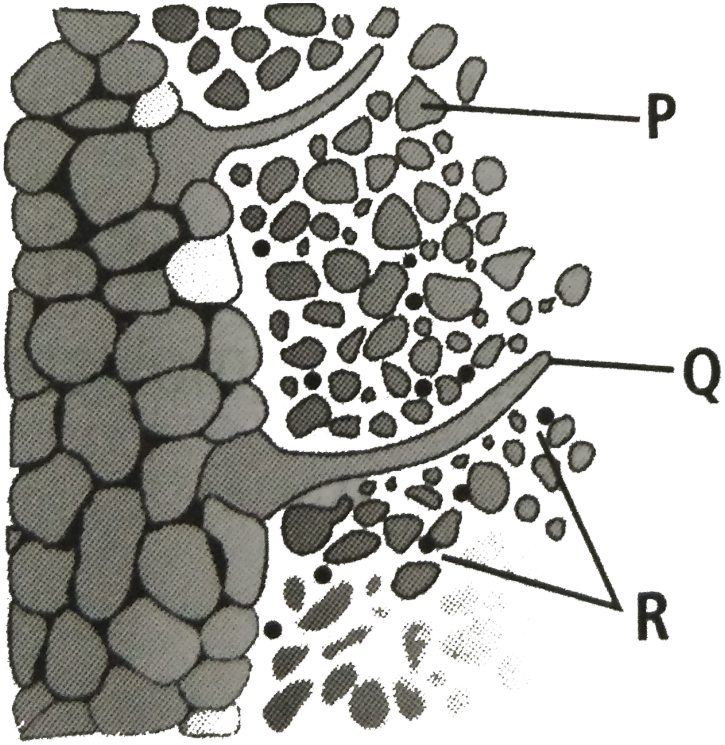
81.



Refer to the given figure and select the correct option.

A. a)

P	Q	R
Soil particles	root hairs	bacteria

B. b)

P	Q	R
Bacteria	Hook	Soil particle

C. c)

P	Q	R
Nodule	Infection thread	Bacteria

D. d)

P	Q	R
Bacteria	Infection thread	Root hair

Answer: A

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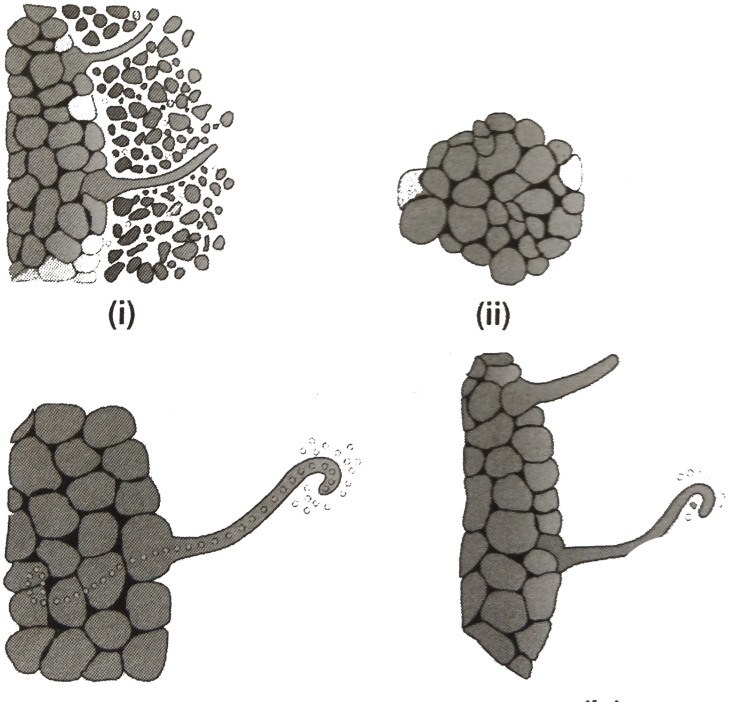
82.



Study the given figures carefully showing the development of root nodules and arrange them in a correct sequence.

A. (i),(ii),(iii),(iv)

B. (ii),(iii),(i),(iv)

C. (i),(iv),(iii),(ii)

D. (iv),(i),(ii),(iii)

Answer: C

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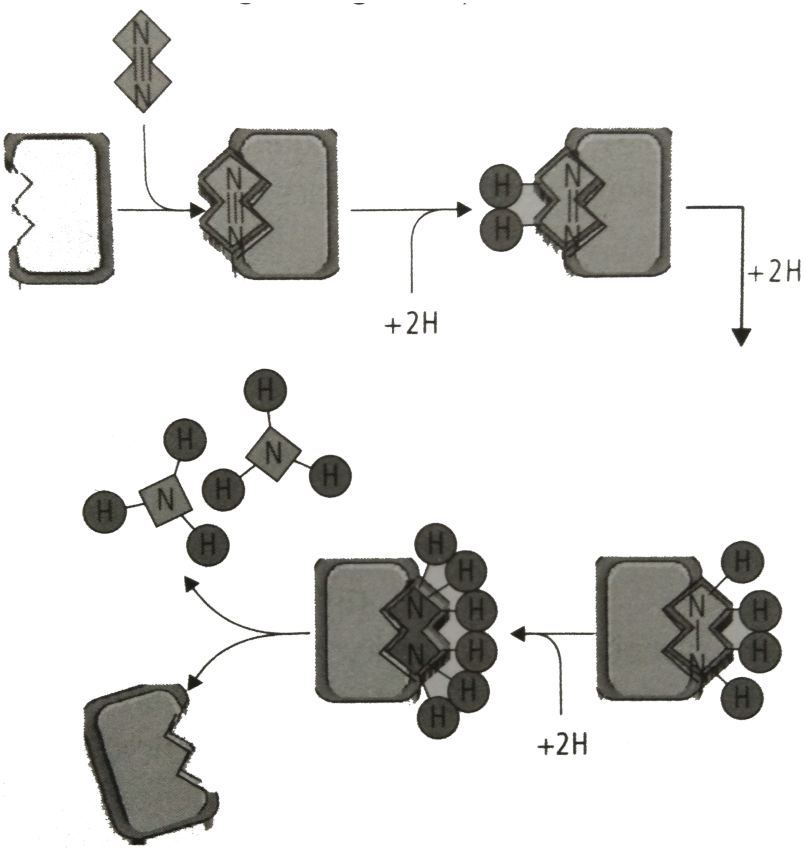
83.



What does the given figure represent?

A. Nitrogen fixation

B. Denitrification

C. Ammonification

D. Nitrification

Answer: A

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84. During N_2 fixation, reduction of one molecule of nitrogen into 2 molecules of NH_3 consumes ____molecules of ATP.

A. 4

B. 16

C. 56

D. 38

Answer: B

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85. Which one is the correct equation of nitrogen fixation?

A. $N_2 + 8e^- + 8H^+ + 8ATP \rightarrow NH_3 + H_2 + 16ADP + 16P_i$

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

C. $2NH_3 + 4O_2 \rightarrow 2H^+ + 2H_2O + 2NO_3^-$

D. $2NH_3 + 3O_2 \rightarrow 2NO_2^- + 2H^+ + 2N_2O$

Answer: B

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86. The cafactor of nitrate reductase is

A. Cu

B. Zn

C. Ca

D. Mo

Answer: D

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87. Leghaemoglobin is produced in response to

A. respiration

B. fatty acid oxidation

C. photosynthesis

D. N_2-fixation.

Answer: D

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88. Which of the following statements is incorrect about leghaemoglobin?

A. in acts as O_2 scavenger

B. it imparts pink or red colour to the nodules

C. it combines with O_2 and protects nitrogenase.

D. It is a Mo-Fe

Answer: D

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89. _____conditions are created by lagnaemoglobin in the root nodule of a legume.

A. Aerobic

B. Anaerobic

C. acidic

D. alkaline

Answer: B

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90. Read the following statements and select the correct answer.

(i). Rhizobium leguminosarum is also known as Bacillus radicicola.

(ii). Nitrifying bacteria (Nitrosomonas, etc.) are chemoautotrops.

(iii). Enzyme nitrogenase fixes N_2 under aerobic condition.

(iv). Leghaemoglobin creates aerobic conditions for the enzyme nitrogenase.

A. Statements (i), (ii) and (iii) are correct

B. Statement (i) and (ii) are correct

C. Statement (iii) and (iv) are correct

D. All statement are correct

Answer: B

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91. Ammonia synthesis by nitrogenase requires

A. high input of energy

B. super oxygen radical

C. Mn^{2+}

D. none of these

Answer: A

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92. Read the following statements and select the incorrect ones.

(i) The co-ordinated activities of the legume and Rhizobium bacteria depend on chemical interactions between the symbiotic partners.

(ii) Leguminous roots secrete chemical attractants that attract Rhizobium bacteria living nearby.

(iii) N, P and K usually do not get deficient in soil due to their low plant requirement

(iv) Nitrogen cycle is regular circulation of nitrogen amongst living organisms with its reservoir pool in lithosphere and cycling pool in atmosphere.

A. (a) (i) and (ii)

B. (b) (ii) and (iii)

C. (c) (iii) and (iv)

D. (d) (ii), (iii) and (iv)

Answer: C

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93. Refer to the given reaction

α-Ketoglutaric acid $+NH_4^+ + NADPH \xrightarrow[\text{dehydrogenase}]{\text{Glutamate}} \text{Glutamate} + H_2O + NADP$ is represents

A. oxidative amination

B. reductive amination

C. transamination

D. deamination

Answer: B

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94. Select the option which completes the given equation for reductive amination

$$\xrightarrow{(I)} + NH_4^+ + NAD(P)H \xrightarrow{(II)} \text{Glutamate} + H_2O + NAD(P)$$

A. (a) $\begin{matrix} (\text{I}) & (\text{II}) \\ \alpha - \text{ketoglutaric acid} & \text{Transaminase} \end{matrix}$

B. (b) $\begin{matrix} (\text{I}) & (\text{II}) \\ \alpha - \text{ketoglutaric acid} & \text{Glutamate dehydrogenase} \end{matrix}$

C. (c) $\begin{matrix} (\text{I}) & (\text{II}) \\ \alpha - \text{Asparagine} & \text{Glutamate dehydrogenase} \end{matrix}$

D. (d) $\begin{matrix} (\text{I}) & (\text{II}) \\ \alpha - \text{Glutamine} & \text{Transaminase} \end{matrix}$

Answer: B

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95. The process of transfer of amino group from one amino acid to the keto group of a keto acid is called as _____

A. oxidative amination

B. reductive amination

C. transamination

D. deamination

Answer: C

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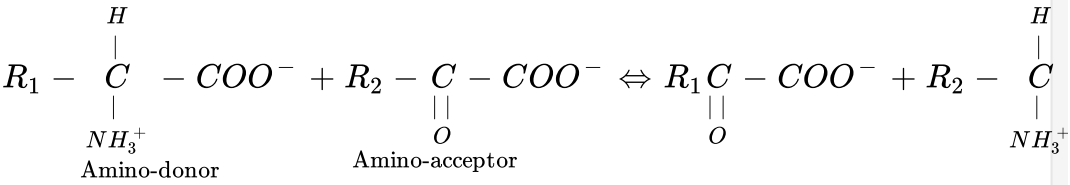
96. Refer to the given reacton, what does it depict?



A. oxidative amination

B. reductive amination

C. transamination

D. deamination

Answer: C

Watch Video Solution

97. From_____acid, more than 17 amino acids are formed through transamination

A. aspartic

B. glutamic

C. acetic

D. pyruvic

Answer: B

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98. Amides are different from amino acids as they contain more

A. (a) hydrogen

B. (b) oxygen

C. (c) nitrogen

D. (d) carbon

Answer: C

Watch Video Solution

99. Amides are transported to the other parts of the plant via

A. (a) phloem parenchyma

B. (b) phloem companion cells

C. (c) xylem vessels

D. (d) phloem fibre

Answer: C

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100. Nodules in soybeam plant export the fixed nitrogen in the form of

A. ureides

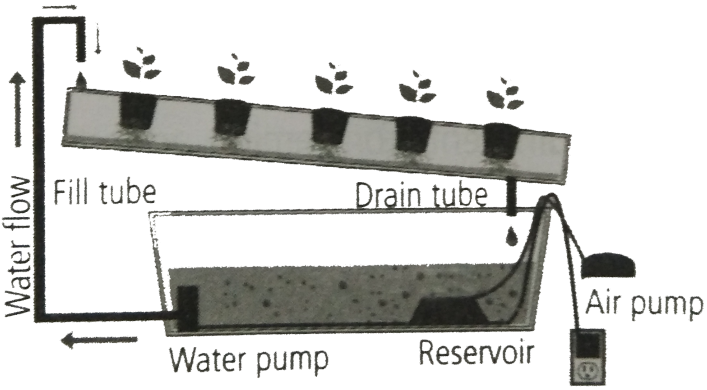
B. amides

C. amino acids

D. both b and c

Answer: A

Watch Video Solution



101.

Identify the given type of hydroponic technique and select the correct option.

A. (a) A very shallow stream of water containing dissolved nutrients is recirculated past the roots of plants in a watertight channel.

B. (b) The nutrient solution flows in a thin film over the roots ensuring that the upper part of the roots gets sufficient supply of oxygen.

C. (c) Roots keep suspended in the air over the nutrient solution which is provided in the form of a nutrient mist.

D. (d) Both a and b

Answer: D

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102. According to carbonic acid exchange theory of mineral salt absorption by roots, which of the following is incorrect?

A. (a) CO_2 released by the respiration of roots combines with soil H_2O to form H_2CO_3

B. (b) H_2CO_3 dissociates into H^+ and HCO_3^- ions in soil solution.

C. (c) H^+ ions may be exchanged for cations adsorbed on clay particles.

D. (d) Cations thus released into soil solution are adsorbed on root cells in exchange for anions (e.g., Cl^- ions.)

Answer: D

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103. Consider the following steps involved in nodule formation in the root of a legume.

(i). Bacteria release chemicals and enzymes.

(ii). Bacteria stop dividing and form bacteroides.

(iii). Roots secrete chemical atractants.

(iv). Formation of infection thread.

(v). Formation of nodules.

(v). Formation of nodulues.

(vi). Division of infected cortical cells.

(vii) Curlinig of root hair and degradation of their cell wall.

(viii). Infection thread grows along with multiplication of bacteria.

Arrange the steps in the right sequence and mark the correct option

A. (iii).(i),(vii),(iv),(viii),(vi),(v),(ii)

B. (iii),(iv),(viii),(i),(vi),(vii),(ii),(v)

C. (i),(iv),(iii),(vi),(v),(vii),(viii),(ii)

D. (i),(iii),(vi),(iv),(viii),(ii),(v),(vii)

Answer: A

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104. Which of the following statements will not hold true if a plant is grown in only sand (S), only clay (C) and only humus (H)?

A. water availability to the roots will be more in (C) and (H) as compared to (S)

B. Ability of roots to penetrate (S) and (H) will be low as compared to (C).

C. Nutrient availability to roots will be less in (S) as compared to (C) and (H).

D. Oxygen availability to roots will be low in (C) as compared to (S) and (H).

Answer: B

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105. In the initial phase of mineral ion absorption, there is a rapid uptake of ions into _____space of cells. Ions aborbed in this phase are _____exchangeable. It is _____uptake as it _____the expenditure of metabolic energy.

A. inner, not freely, active, requires

B. inner, freely, passive, requires

C. outer, freely, passive, does not require

D. outer, not freely, active, requires

Answer: C

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106. Following observations are made for a plant grown under different conditions

I. Chloride and magnesium in soil $+$ light $\rightarrow$ green plant

II. Chloride and magnesium in soil+light $\rightarrow$ etiolated plant

III. Magnesium +light $\rightarrow$ green plant

VI. Intermittent light flashes +chloride $\rightarrow$ etiolated plant From the above observations, it is concluded that the factors necessary for the green colour in plants are

A. chloride and light

B. chloride, magnesium and light

C. magnesium and light

D. flash of light with chloride.

Answer: C

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107. You observe that a plant's younger leaves, not the older ones, are yellowing. You recall that the cause of plant sickness can be diagnosed by

which leaves are yellowing. What is the most likely cause of your plant's blight?

A. Too much shade

B. Lack of nitrogen-fixing Rhizobium bacteria

C. A deficiency in a mobile mineral nutrient

D. A deficiency in a non-mobile mineral nutrient

Answer: D

View Text Solution

108. 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 or inhibition of enzymes

Answer: B

View Text Solution

109. 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 enhanced

C. Essential element concentration below which plant remains in the vegetative phase

D. none of the above

Answer: A

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110. 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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111. 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 spots surrounded by chlorotic veins.

D. none of the above

Answer: B

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112. 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 Nitrosococcus.

B. Step (ii) is carried out by Nitrobacter

C. Both steps (i) and (ii) can be called nitrofication

D. bacteria carrying out thse steps are usually photoautotrophs.

Answer: D

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

A. Nitrogenase may require oxygen for its functioning

B. nitrogenase is Mo-Fe protein

C. Leghaemoglobin is a pink coloured pigment

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

Answer: A

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114. 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 photos
$B.$	Manganese	$(ii).$ Needed for synthesis of auxins
$C.$	Molybdenum	$(iii).$ component of nitrogenase
$D.$	Zinc	$(iv).$ Pollen germination
$E.$	Iron	$(v).$ Component of feredoxin

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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115. 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: D

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Assertion Reason

1. Assertion: The technique of growing plants in a nutrient solution is known as hydroponics

Reason: Hydroponics is used for commercial production of vegetables such as tomato, seedless cucumber and lettuce.

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

Watch Video Solution

2. Assertion: Some essential elements are called structural element of cells

Reason: These essential elements are the components of certain biomolecules.

A. If both assertio 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

Watch Video Solution

3. Assertion: Plants absorb calcium from soil in the form of calcium ions (Ca^{2+})

Reason: Calcium is required by meristematic and differentiating tissues.

A. If both assertio 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

Watch Video Solution

4. Assertion: Sulphur is the main constituent of several coenzymes, vitamins and ferredoxin.

Reason: Sulphur is present in two amino acids- valine and cysteine.

A. If both assertio 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: Plants obtain molybdenum in the form of molybdate ions $\left(MoO_4^{2+}\right)$

Reason: Molybdenum is a component of pollen germination, cell elongation and cell differentiation.

A. (a) Both assertion and reason are true and reason is the correct explanation of assertion

B. (b) Both assertion and reason are true but reason is not the correct explanation of assertion

C. (c) Assertion is true but reason is false

D. (d) Both assertion and reason are false

Answer: D

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6. Assertion: Deficiency symptoms appear when the availability of the essential nutrients falls below the critical concentration.

Reason: Critical concentration is that limited concentration of the essential element below which growth of the plant is reduced.

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: Necrosis occurs due to deficiency of Ca, Mg, Cu and K.

Reason: Necrosis is the death of tissue, particularly leaf tissue.

A. If both assertio 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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8. Assertion: The prominent symptom of manganese toxicity is the appearance of brown spots surrounded by chlorotic veins.

Reason: Excess of maganese may induce deficiencies of iron, magnesium and calcium.

A. If both assertio 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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9. Assertion: The movement of ions into or out of the cells is usually called flux.

Reason: The entry or exit of ions to and from the symplast, is an active process.

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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10. Assertion: As per carbonic acid exchange theory of mineral salt absorption, CO_2 released during respiration of roots forms 'H_(2)CO_(3) 'when dissolved in soil water Reason:H_2CO_3 dissociates into H^+ and HCO_3 ions, where H^+ ions exchange with anions adsorbed on clay particles.

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: Ammonia is converted into nitrate by soil bacteria like Nitrosomonas and Nitrobacter

Reason: Denitrification is carried by bacteria Pseudomonas and Azotobacter.

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

Watch Video Solution

12. Assertion: Nitrate present in the soil is reduced to nitrogen by the process of denitrification

Reason: Denitrification is carried by bacteria Pseudomonas and Azotobacter.

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

Watch Video Solution

13. Assertion: Reduction of nitrogen to ammonia by living organisms is called nitrification.

Reason: Example of free-living nitrogen fixing anaerobic microbes are Azotobacter and Bijerinckia.

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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14. Assertion: The enzyme nitrogenase is a Mo-Fe protein and catalyses the conversion of atmospheric nitrogen to ammonia.

Reason: The enzyme nitrogenase is highly sensitive to the molecular 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: B

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15. Assertion: Reductive amination involves the transfer of amino group from one amino acid to the keto group of a keto acid.

Reason: In reductive amination, transfer of NH_2 from glutamic acid takes place.

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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1. The technique of hydroponics was first demonstated by

A. M. Calvin (1961)

B. Julium von sachs (1860)

C. Arnon (1940)

D. Hoagland (1940)

Answer: B

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2. The technique of growing plants in a nutrients solution, in complete absence of soil is called as

A. aeroponics

B. water culture

C. hydroponics

D. soil culture

Answer: C

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3. Hydroponics or soilless culture helps in knowing

A. essentiality of an element

B. deficiency symptoms caused by an element

C. toxicity caused by an element

D. all of these

Answer: D

Watch Video Solution

4. The technique of hydroponics is bieng employed for the commercial production of vegetables like

A. tomato

B. cucumber

C. lettuce

D. all of these

Answer: D

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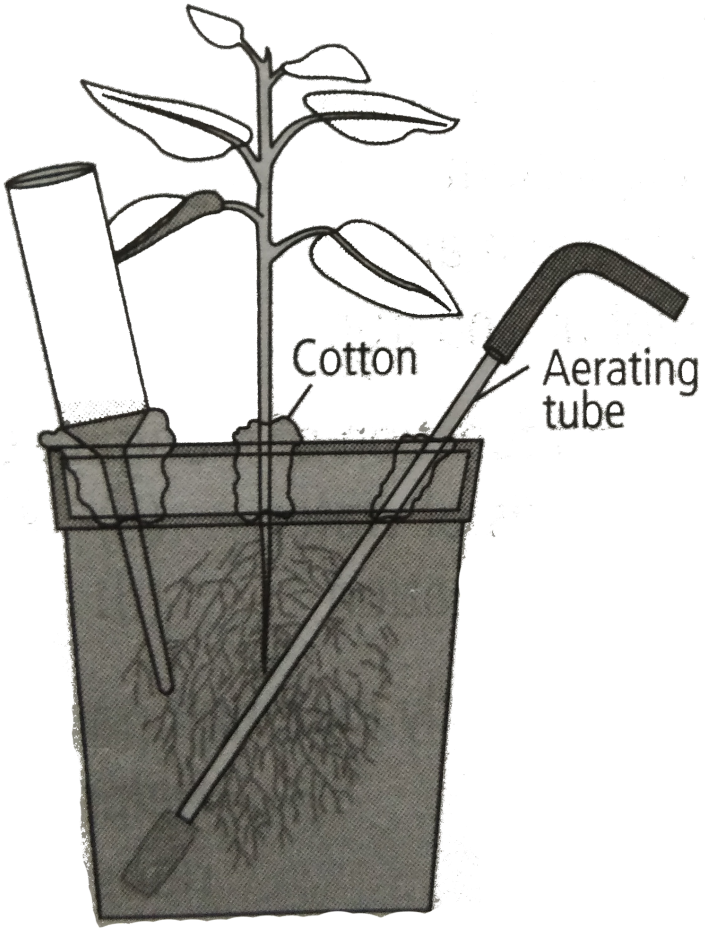

5.

The given experimental set-up is used

A. to show that CO_2 is required during photosynthesis

B. to show that O_2 is evolved during photosynthesis

C. for nutrients solution culture

D. to measure growth of a plant

Answer: C

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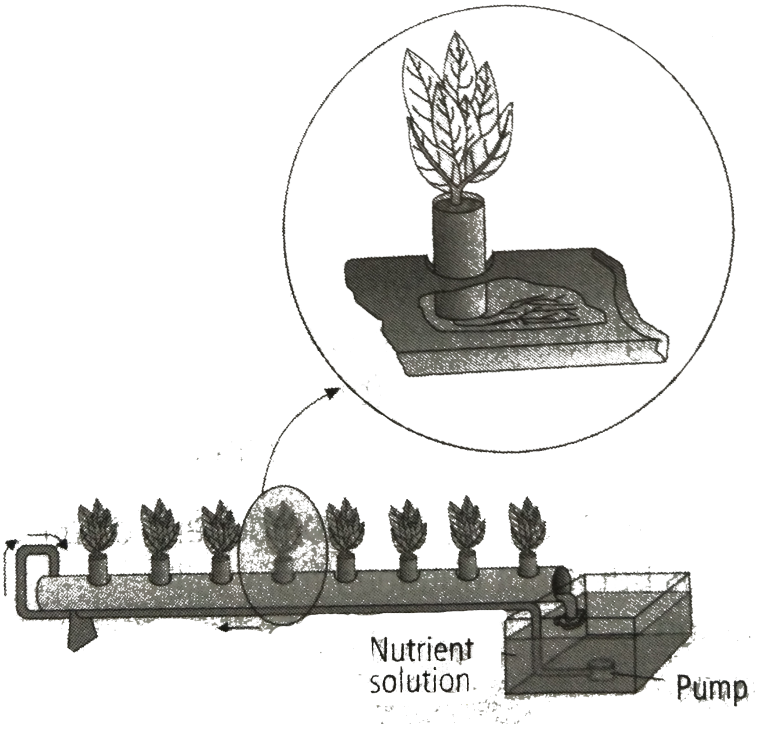
6.



Refer to the given figure and select the incorrect option regarding it

A. it shows hydroponic plant production

B. plants are grown in a tube or though placed on a slight incline

C. The solution flows down the tube and returns to the reservoir due to the suction pressure created by pump

D. the roots in this set-up, are continously bathed in aerated nutrients solution.

Answer: C

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7. Select the correct statement (s) regarding the solution culture techniques.

A. successful hydroponic culture required a large volume of nutrients solution or frequency adjustment of the nutrients solution of prevent roots from producing radical changes in nutrients concentration and pH of the medium.

B. In nutrient film growth system, plant roots lie on the surface of a trough, and nutrients solution flow in a thin layer along the trough over the roots.

C. In aeroponics technique, plants are grown with their roots suspended in air while being sprayed continously with a nutrient solution

D. all of these

Answer: D

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8. More than ___elements of the ___discovered so far are found in different plants.

A. 60105

B. 105,60

C. 30,60

D. 4105

Answer: A

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9. Which of the following is not criterion for essentiality of an element?

A. Requirement of the element is specific

B. Necessary for normal growth and reproduction

C. not replaceable by another element

D. indirectly involved in plant metabolism

Answer: D

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10. Essential elements are

A. only macronutrients

B. only micronutrients

C. Both macro and micronutrients

D. C, H, O and N only

Answer: C

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11. Which of the following are macronutrients?

A. Carbon, nitrogen

B. Oxygen, phosphorus

C. Potassium, sulphur

D. all of these

Answer: D

Watch Video Solution

12. Which of the four most abundant element in most plants (C, H, O and N), dows a terrestrial green plant procure mainly through its roots from the soil?

A. H and O

B. H and N

C. C and O

D. O and N

Answer: B

Watch Video Solution

13. The macronutrient_____is a component of all organic compounds but is not obtained from soil.

A. Carbon, nitrogen

B. hydrogen

C. oxygen

D. nitrogen

Answer: A

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14. Micronutrients are present in plant tissues in concentrations less than ____of dry matter.

A. 1 m mole Kg^{-1}

B. 10 m mole Kg^{-1}

C. 0.1 m mole Kg^{-1}

D. 2 m mole Kg^{-1}

Answer: B

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15. Select the option that contains micronutrients only

A. Mn, Mo, Zn

B. C, H, N

C. N, P, O

D. Mn, K, S

Answer: A

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16. Match column I with column II and select the correct option from the codes given below

Column I (Activator element)		Column II (Enzyme)
A	Mg^{2+},	(i) Nitrate reductase
$B.$	Zn^{2+}	$(ii).$ RuBisCO, PEPCase
$C.$	Mo	$(iii).$ Alcohol dehydrogenase

A. A-(ii),B-(iii),C-(i)

B. A-(iii),B-(ii),C-(i)

C. A-(i),B-(iii),C-(ii)

D. A-(ii),B-(i),(C)-(iii)

Answer: A

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17. Monovalents (e.g., Na^2, K^+)____membrane permeability while divalents (e.g., Ca^{2+})____the same.

A. increase, decrease

B. decrease, increase

C. increase, increase

D. decrease, decrease

Answer: A

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18. The inorganic essential elements which are obtained from the soil are called as

A. mineral elements

B. non-mineral elements

C. non-essential elements

D. both b and c

Answer: A

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19. The non-mineral elements are

A. C, H, O

B. N, Ca, Mg

C. Fe, Co, Mn

D. Cu, Mo, N

Answer: A

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20. Phosphorus (P) is a structural element of

A. cell membranes

B. proteins

C. nucleic acids

D. all of these

Answer: D

Watch Video Solution

21. Which of the following essential elements plays an important role in opening and closing of stomata?

A. Mg

B. K

C. Mn

D. P

Answer: B

Watch Video Solution

22. Which of the following is not one of the three plants macronutrietns included in most fertilisers?

A. O

B. N

C. P

D. K

Answer: A

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

A. Cl and K

B. K and Fe

C. Methionine

D. both b and c

Answer: A

Watch Video Solution

24. Sulphur is a constituents of which of the following amino acids?

A. Threonine

B. Cysteine

C. Methionine

D. both b and c

Answer: D

Watch Video Solution

25. 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

Watch Video Solution

26. Some fundtion of a nutrients element are given below

(i). Important constituents of proteins involved in ETS

(ii). Activator of catalase

(iii). Important constituent of cytoshrome

(iv). Essential for chlorophyll systhesis

the concerned nutrient is_____

A. Cu

B. Fe

C. Ca

D. Mo

Answer: B

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27. Which of the following minerals activate the enzymes involved in respiration?

A. Nitrogen and phosphorus

B. Magnesium and manganese

C. potassium aned calcium

D. Sulphur

Answer: B

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28. 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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29. Select the correctly matched pair

A. Zinc-Helps to maintain the ribosome structure

B. Magnesium-needed during the formation of mitotic spindle

C. Calcium -Plays a role in the opening and closing of stomata

D. Manganese-needed in the splitting of water to liberate oxygen during photosynthesis

Answer: D

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30. Minerals associated with redox reaction are

A. Na,Cu

B. N,Cu

C. Fe,Cu

D. Ca,Fe

Answer: C

Watch Video Solution

31. Select the incorrectly matched pair.

A. Magnesium (Mg)-Formation of mitotic spindle

B. Iron (Fe)-Formation of chlorophyll

C. Chlorine (Cl)-Anion cation balance in the cell

D. Sulphur(S)-Component of vitamins

Answer: A

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32. The two elements responsible for splitting of H_2O to liberate O_2 during photosynthesis are

A. Mn and Mo

B. Ca and Mg

C. Mn and Cl

D. Mg and Cl.

Answer: C

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33. Deficiency symptoms of readily mobilised essential elements will first appear in____

A. younger tissues

B. older tissues

C. roots

D. shoots

Answer: B

Watch Video Solution

34. Read the given statements and select the correct option

Statement-1: Deficiency symptoms of N, K ad Mg are first visible in the senescent leaves

Statement-2: Biomolecules containing these elements are broken available for mobilising to younger leaves.

A. both statements 1 and 2 are correct.

B. Statement 1 is correct but statement 2 is incorrect

C. Statement 1 is incorrect but statement 2 in correct.

D. Both statements 1 and 2 are incorrect.

Answer: A

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35. Deficiency symptoms tend to appear first in____whenever the essential elements are relatively immobile and are not transported out of the mature organs.

A. younger tissues

B. older tissues

C. roots

D. shoots

Answer: A

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36. While in N, K and Mg deficiency, chlorosis appears first in ___leaves, in S and Ca deficiency,____lveaves are the first to be affected

A. young, old

B. old, young

C. old, old

D. young, young

Answer: B

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37. Chlorosis, i.e., loss of chlorophyll leading to yellowing in leaves, is caused by the deficiency of

A. N, K, Mg

B. S, Fe, Zn

C. Mn, Mo, Mg

D. all of these

Answer: D

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38. Necrosis refers to

A. Inhibition of cell division

B. delay in flowering

C. death of tissues

D. falling of leaves.

Answer: C

Watch Video Solution

39. Necrosis mainly occurs by the deficiency of

A. Ca, Mg

B. N, S

C. Mn, Mo

D. Fe, Mn

Answer: A

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40. Deficiency of which of the following elements delay flowering in plants?

A. Fe, Mn, Mo

B. N, S, Mo

C. Ca, Mg, K

D. N, K, S

Answer: B

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41. Which of the following is not a deficiency symptoms of minerals?

A. Internode shortening

B. Necrosis

C. Chlrosis

D. Etiolation

Answer: D

Watch Video Solution

42. Premature leaf fall is due to deficiency of

A. sodium

B. potassium

C. zinc

D. phosphorus.

Answer: D

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43. Yellowish edges appear in leaves deficient in

A. potassium

B. calcium

C. magnesium

D. phosphorus.

Answer: A

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44. Mineral ion concentration in tissues that reduces the dry weight of tissues by about 10% is considered as

A. critical concentration

B. toxic concentration

C. optimum concentration

D. beneficial concentration

Answer: B

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45. Select the correct statement regarding manganese toxicity.

A. Appearance of brown spots surrounded by chlorotic veins

B. inhibition of Ca translocation in shoot apex

C. induction deficiencies of Mg and Fe

D. all of these

Answer: D

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46. Minerals are absorbed in the form of

A. Molecules

B. ions

C. compounds

D. mixtures

Answer: B

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47. With reference of absorption of minerals, the term 'outer space' represents____while 'inner space' represents____.

A. Intercellular space and cell wall, space and cell wall

B. cytoplasm and vacuole, intercellular space and cell wall

C. intercellular space, vacuole

D. cytoplasm, vacuole

Answer: A

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48. Which of the following statements about minerals absorption in plants is correct?

A. in the initial phase rapid uptake of ions into the outer space of cells- the apoplast, is a passive process.

B. in the final phase, ions are taken in slowly into the inner space-the symplast of cells, and is an active process.

C. passive movement of ions into the apoplast occurs through ion-channels, transmembrane proteins which act as selective pores.

D. all of these

Answer: D

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49. Mineral salts are translocated through (i) along with the (ii) stream of water, which is pulled up through the plant by the transpirational pull. Fill up the blanks in the given statement and select the correct option

A. (i) xylem (ii) ascending

B. (i) xylem (ii) descending

C. (i) phloem (ii) ascending

D. (i) phloem (ii) descending

Answer: A

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50. Mineral nutrients absorbed by roots, move to leaves through

A. xylem

B. phloem

C. sleve tube

D. companion cell

Answer: A

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51. Read the given statement and select the correct option. Statement-1: Soil serves as a reservoir of essential elements.

Statement-2: Soil develops, over the years, through physical and chemical weathering of rocks.

A. both statements 1 and 2 are correct.

B. Statement 1 is correct but statement 2 is incorrect

C. Statement 1 is incorrect but statement 2 in correct.

D. Both statements 1 and 2 are incorrect.

Answer: A

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52. Which one is the major constituent of proteins, nucleic acids, vitamins and hormones?

A. P

B. N

C. K

D. S

Answer: B

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53. Nitrogen is a limiting nutrient for

A. natural ecosystem

B. aquatic acosystem

C. agricultural ecosystem

D. both a and c

Answer: D

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54. One example of a nutrient in its reduced form is

A. carbo in CO_2

B. hydrogen in H_2O

C. nitrogen in NH_3

D. sulphur in sulphate

Answer: C

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55. The process of conversion of atmospheric free N_2 gas to nitrogenous compounds like NH_3 is termed as

A. nitrification

B. nitrate reduction

C. N_2 fixation

D. ammonification

Answer: C

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56. Nitrogen and hydrogen combine to form ammonia under high temperature and pressure conditions. This is an example of

A. biological N_2 fixation

B. natural N_2 fixation

C. industrial N_2 fixation

D. electrical N_2 fixation

Answer: C

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57. Decomposition of organic nitrogen of dead plants and animals into ammonia is called_____.

A. nitrification

B. nitrate reduction

C. N_2 fixation

D. ammonification

Answer: D

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58. Nitrite is oxidised to nitrate with the help of

A. nitrosomonas

B. nitrococcus

C. nitrobacter

D. Thiobacillus

Answer: C

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59. Nitrifying bacteria

A. oxidise ammonia to nitrates

B. convert free nitrogen to nitrogen compounds

C. convert proteins into ammonia

D. reduce nitrates to free nitrogen

Answer: A

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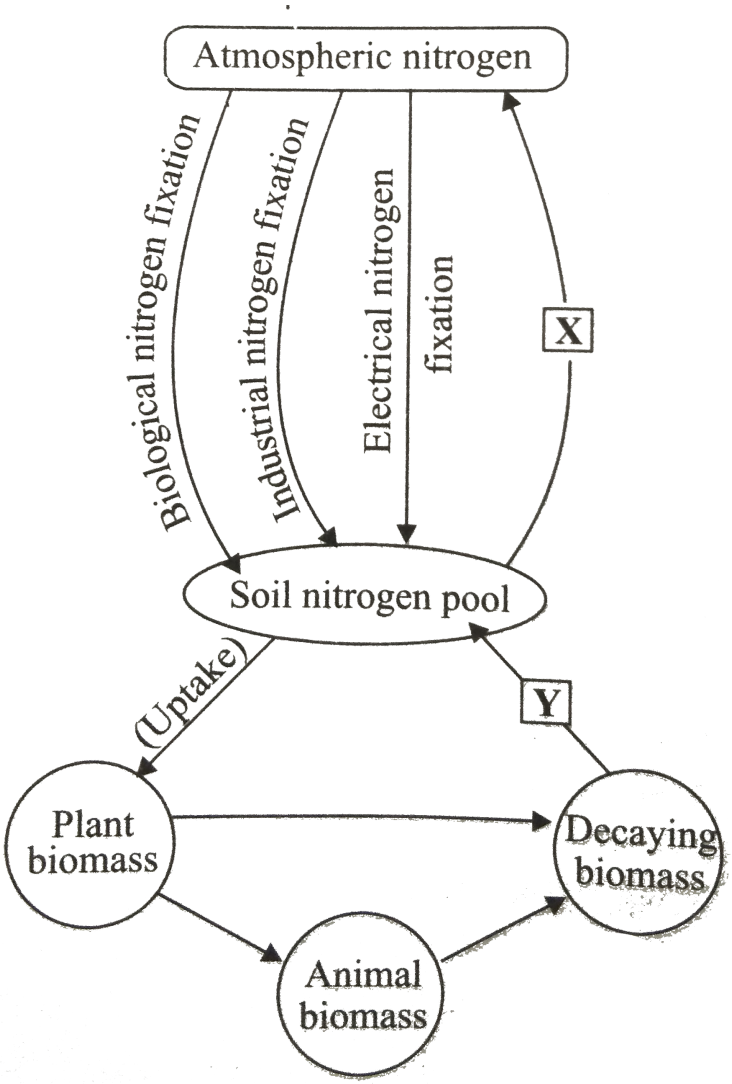

60.

Identify the labels X and Y in the given outline of N_2 cycle and select the correct option.

A.

	X	Y
(a).	Denitrification	Ammonification

B.
	X	Y
$(a).$	N_2 fixation	Ammonification

C.
	X	Y
$(a).$	Ammonification	denification

D.
	X	Y
$(a).$	Nitrification	denification

Answer: A

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61. Nitrogen is absorbed by plants in form of

A. NO_3^-

B. NH_3

C. NO_2^-

D. both a and c

Answer: D

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62. The process of conversion of soil nitrates into free N_2 is called (I) and is carried out by bacteria (II).

A. (I) nitrification (II) Nitrosomonas

B. (I) denitrification (II) Nitrobacter

C. (I) denitrification (II) Thiobacillus

D. (I) N_2 fixation (II) Nitrosomonas

Answer: C

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63. The process that is the opposite of nitrogen fixation is

A. nitrification

B. denitrification

C. ammonification

D. nitrate reduction

Answer: B

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64. Match column I with column II and select the correct option from the given codes:

Column I	Column II
A Nitrosomonas, Nitrococcus	(i) Ammonia to Nitrite
B Nitrobacter, Nitrocystis	(ii) Nitrite to Nitrate
C Pseudomonas	(iii) Nitrate to N_2

A. A-(i),B-(ii),C-(iii)

B. A-(i),B-(iii),C-(ii)

C. A-(ii),B-(i),C-(iii)

D. A-(ii),B-(iii),C-(i)

Answer: A

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65. Which one of the following is a free-living obligate anaerobic bacterium?

A. Clostridium

B. Rhodospirillum

C. Azotobacter

D. Bacillus subtilis

Answer: A

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66. The limiting factor in nitrogen fixation of soil is

A. soil natrure (pH)

B. light

C. temperature

D. air

Answer: A

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67. All N_2 fixers belong to

A. Eubacteria

B. algae

C. plantae

D. protista

Answer: A

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68. The largest resevoir of nitrogen on earth is

A. soil natrure (pH)

B. air

C. ocean

D. rocks

Answer: B

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

A. fixation of nitrogen in legumes

B. conversion on nitrate into nitrogen

C. conversion from nitrate to nitrite in legumes

D. conversion from ammonium to nitrate in soil

Answer: A

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70. A farmer adds Azotobacter culture to soil before sowing maize. Which mineral element will be replenished by doing so?

A. N

B. P

C. K

D. S

Answer: A

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71. _____is a free-living N_2-fixing aerobic bacterium.

A. Rhodospirillum

B. Azotobacter

C. Clostridium

D. Rhizobium

Answer: B

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72. Which of the following is a non-symbiotic nitrogen fixing prokaryote?

A. Azotobacter

B. Clostridium

C. Beijerinckia

D. all of these

Answer: D

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73. Which of the following is a free-living nitrogen fixing cyanobacteria?

A. Clindrospermum

B. Nostoc

C. Rhodospirillum

D. both a and b

Answer: D

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74. Symbiotic bacteria are found in the root nodules of members family

A. Solanaceae

B. Asteraceae

C. Leguminosae

D. Malvaceae

Answer: C

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75. The bacterium____belonging to group Actinomycetes, produces N_2 – fixing nodules on the roots of non-leguminous plants (e.g., Alnus)

A. Frankia

B. Rhizobium

C. Rhodospirillum

D. Clostridium

Answer: A

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76. Select the mismatched pair.

A. Symbiotic bacteria-Rhizobium, Frankia

B. Symbiotic cyanobacteria-Frankia, Aulosira

C. Free-living bacteria-Beijerinckia, Azotobacter

D. none of these

Answer: B

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77. Certain non-leguminous plants also form nodules to fix N_2. Example of such plants is

A. Alnus

B. Casuarina

C. Myrica

D. all of these

Answer: D

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78. N_2-fixing blue-green alga Anabaena which is extensively used in rice cultivation, forms symbiotic association with

A. Cycas roots

B. Azolla

C. Anthoceros

D. Alnus

Answer: B

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79. The nodules present in the leguminous plants appear pink in colour due to the presence of

A. RBCs

B. leghaemoglobin

C. nitrogenase enzyme

D. bacterial secretion.

Answer: B

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80. During nodule formation in leguminous plants, an infection thread is produced carrying the __(i)__ into the __(ii)__ of the root, where they initiate the nodule formation in the __(iii)__ of the root. Fill up the blanks by choosing the correct option.

A.

(i)	(ii)	(iii)
Cyanobacteria	pericycle	cortex

B.

(i)	(ii)	(iii)
bacteria	cortex	cortex

C.

(i)	(ii)	(iii)
Cyanobacteria	cortex	pericycle

D.

(i)	(ii)	(iii)
bacteria	pericycle	pericycle

Answer: B

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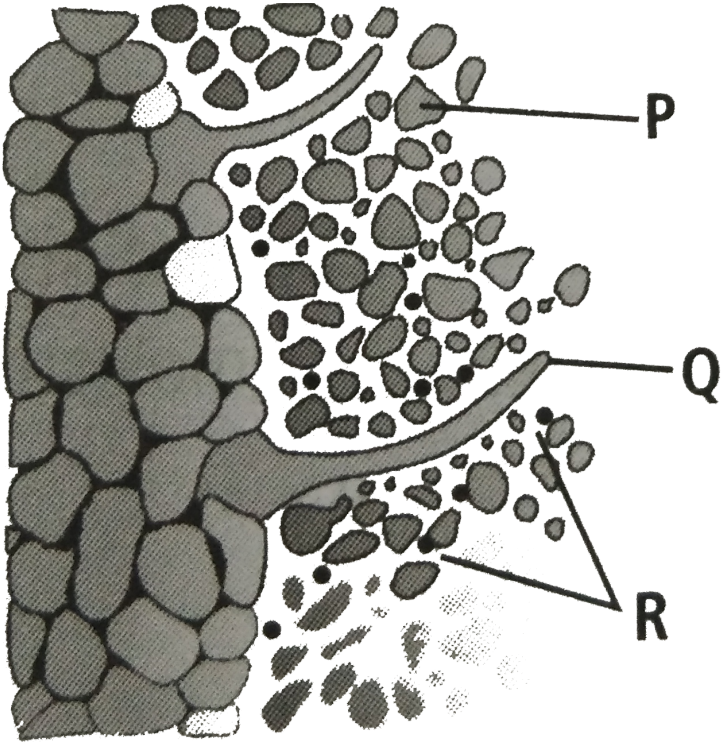
81. 

Refer to the given figure and select the correct option.

A. P Soil particles Q Hook R Soil particle

B. P Bacteria Q Hook R Soil particle

C. P Nodule Q Infection thread R Bacteria

D. P Bacteria Q Infection thread R Root hair

Answer: A

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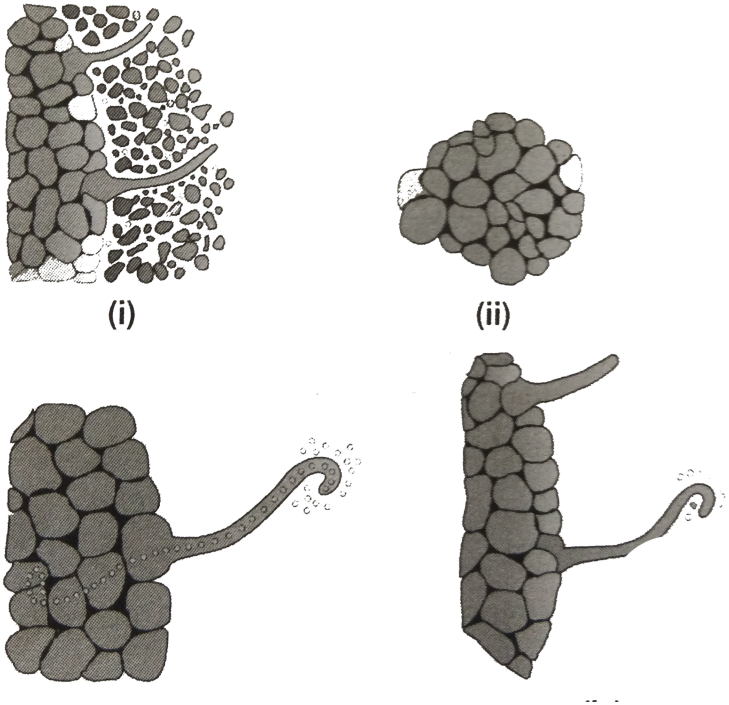
82.



Study the given figures carefully showing the development of root nodules and arrange them in a correct sequence.

A. (i),(ii),(iii),(iv)

B. (ii),(iii),(i),(iv)

C. (i),(iv),(iii),(ii)

D. (iv),(i),(ii),(iii)

Answer: C

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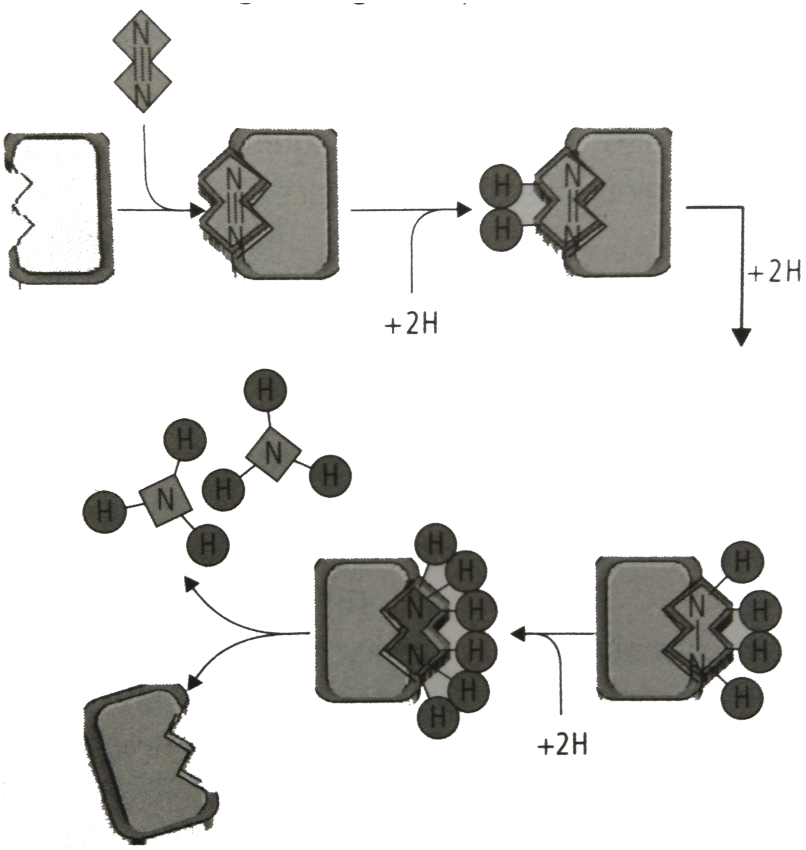
83.



What does the given figure represent?

A. Nitrogen fixation

B. Denitrification

C. Ammonification

D. Nitrification

Answer: A

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84. During N_2 fixation, reduction of one molecule of nitrogen into 2 molecules of NH_3 consumes ____molecules of ATP.

A. 4

B. 16

C. 56

D. 38

Answer: B

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85. Which one is the correct equation of nitrogen fixation?

A. $N_2 + 8e^- + 8H^+ + 8ATP \rightarrow NH_3 + H_2 + 16ADP + 16P_i$

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

C. $2NH_3 + 4O_2 \rightarrow 2H^+ + 2H_2O + 2NO_3^-$

D. $2NH_3 + 3O_2 \rightarrow 2NO_2^- + 2H^+ + 2N_2O$

Answer: B

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86. The cafactor of nitrate reductase is

A. Cu

B. Zn

C. Ca

D. Mo

Answer: D

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87. Leghaemoglobin is produced in response to

A. respiration

B. fatty acid oxidation

C. photosynthesis

D. N_2-fixation.

Answer: D

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88. Which of the following statements is incorrect about leghaemoglobin?

A. in acts as O_2 scavenger

B. it imparts pink or red colour to the nodules

C. it combines with O_2 and protects nitrogenase.

D. It is a Mo-Fe

Answer: D

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89. _____conditions are created by lagnaemoglobin in the root nodule of a legume.

A. Aerobic

B. Anaerobic

C. acidic

D. alkaline

Answer: B

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90. Read the following statements and select the correct answer.

(i). Rhizobium leguminosarum is also known as Bacillus radicicola.

(ii). Nitrifying bacteria (Nitrosomonas, etc.) are chemoautotrops.

(iii). Enzyme nitrogenase fixes N_2 under aerobic condition.

(iv). Leghaemoglobin creates aerobic conditions for the enzyme nitrogenase.

A. Statements (i), (ii) and (iii) are correct

B. Statement (i) and (ii) are correct

C. Statement (iii) and (iv) are correct

D. All statement are correct

Answer: B

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91. Ammonia synthesis by nitrogenase requires

A. high input of energy

B. super oxygen radical

C. Mn^{2+}

D. none of these

Answer: A

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92. Read the following statements and select the incorrect ones.

(i) The co-ordinated activities of the legume and Rhizobium bacteria depend on chemical interactions between the symbiotic partners.

(ii) Leguminous roots secrete chemical attractants that attract Rhizobium bacteria living nearby.

(iii) N, P and K usually do not get deficient in soil due to their low plant requirement

(iv) Nitrogen cycle is regular circulation of nitrogen amongst living organisms with its reservoir pool in lithosphere and cycling pool in atmosphere.

A. (i) and (ii)

B. (ii) and (iii)

C. (iii) and (iv)

D. (ii), (iii) and (iv)

Answer: C

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93. Refer to the given reaction

α-Ketoglutaric acid $+NH_4^+ + NADPH \xrightarrow[\text{dehydrogenase}]{\text{Glutamate}} \text{Glutamate} + H_2O + NADP$ is represents

A. oxidative amination

B. reductive amination

C. transamination

D. deamination

Answer: B

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94. Select the option which completes the given equation for reductive amination

$$\xrightarrow{(I)} + NH_4^+ + NAD(P)H \xrightarrow{(II)} \text{Glutamate} + H_2O + NAD(P)$$

A.
(I)	(II)
$\alpha-$ ketoglutaric acid	Transaminiase

B.
(I)	(II)
$\alpha-$ ketoglutaric acid	Glutamate dehydrogenase

C.
(I)	(II)
$\alpha-$ Asparagine	Glutamate dehydrogenase

D.
(I)	(II)
$\alpha-$ Glutamine	Transaminiase

Answer: B

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95. The process of transfer of amino group from one amino acid to the keto group of a keto acid is called as _____

A. oxidative amination

B. reductive amination

C. transamination

D. deamination

Answer: C

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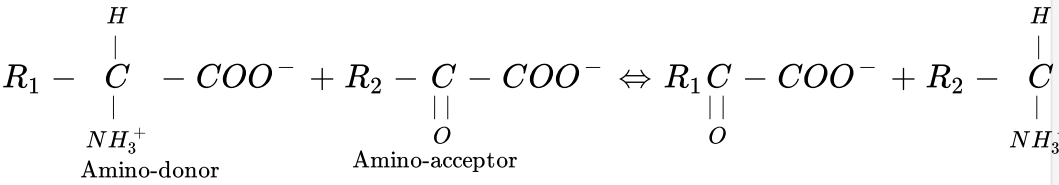
96. Refer to the given reacton, what does it depict?



A. oxidative amination

B. reductive amination

C. transamination

D. deamination

Answer: C

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97. From_____acid, more than 17 amino acids are formed through transamination

A. aspartic

B. glutamic

C. acetic

D. pyruvic

Answer: B

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98. Amides are different from amino acids as they contain more

A. hydrogen

B. oxygen

C. nitrogen

D. carbon

Answer: C

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99. Amides are transported to the other parts of the plant via

A. phloem parenchyma

B. phloem companion cells

C. xylem vessels

D. phloem fibre

Answer: C

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100. Nodules in soybeam plant export the fixed nitrogen in the form of

A. ureides

B. amides

C. amino acids

D. both b and c

Answer: A

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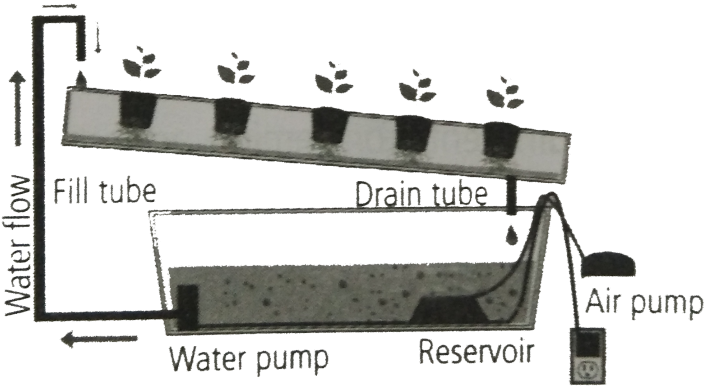

101.

Identify the given type of hydroponic technique and select the correct option.

A. A very shallow stream of water containing dissolved nutrients is recirculated past the roots of plants in a watertight channel

B. The nutrient solution flows in a thin film over the roots ensuring that the upper part of the roots gets sufficient supply of oxygen.

C. Roots keep suspended in the air over the nutrient solution which is provided in the form of a nutrient mist.

D. Both a and b

Answer: D

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102. According to carbonic acid exchange theory of mineral salt absorption by roots, which of the following is incorrect?

A. CO_2 released by the respiration of roots combines with soil H_2O to form H_2CO_3

B. H_2CO_3 dissociates into H^+ and HCO_3^- ions in soil solution.

C. H^+ ions may be exchanged for cations adsorbed on clay particles.

D. Cations thus released into soil solution are adsorbed on root cells in exchange for anions (e.g., Cl^- ions.)

Answer: D

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103. Consider the following steps involved in nodule formation in the root of a legume.

(i). Bacteria release chemicals and enzymes.

(ii). Bacteria stop dividing and form bacteroides.

(iii). Roots secrete chemical atractants.

(iv). Formation of infection thread.

(v). Formation of nodules.

(v). Formation of nodulues.

(vi). Division of infected cortical cells.

(vii) Curlinig of root hair and degradation of their cell wall.

(viii). Infection thread grows along with multiplication of bacteria.

Arrange the steps in the right sequence and mark the correct option

A. (iii).(i),(vii),(iv),(viii),(vi),(v),(ii)

B. (iii),(iv),(viii),(i),(vi),(vii),(ii),(v)

C. (i),(iv),(iii),(vi),(v),(vii),(viii),(ii)

D. (i),(iii),(vi),(iv),(viii),(ii),(v),(vii)

Answer: A

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104. Which of the following statements will not hold true if a plant is grown in only sand (S), only clay (C) and only humus (H)?

A. water availability to the roots will be more in (C) and (H) as compared to (S)

B. Ability of roots to penetrate (S) and (H) will be low as compared to (C).

C. Nutrient availability to roots will be less in (S) as compared to (C) and (H).

D. Oxygen availability to roots will be low in (C) as compared to (S) and (H).

Answer: B

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105. In the initial phase of mineral ion absorption, there is a rapid uptake of ions into ____space of cells. Ions aborbed in this phase are _____exchangeable. It is ____uptake as it ____the expenditure of metabolic energy.

A. inner, not freely, active, requires

B. inner, freely, passive, requires

C. outer, freely, passive, does not require

D. outer, not freely, active, requires

Answer: C

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106. Following observations are made for a plant grown under different conditions

I. Chloride and magnesium in soil $+\text{light} \rightarrow \text{green plant}$

II. Chloride and magnesium in soil+light $\rightarrow$ etiolated plant

III. Magnesium +light $\rightarrow$ green plant

VI. Intermittent light flashes +chloride $\rightarrow$ etiolated plant From the above observations, it is concluded that the factors necessary for the green colour in plants are

A. chloride and light

B. chloride, magnesium and light

C. magnesium and light

D. flash of light with chloride.

Answer: C

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107. You observe that a plant's younger leaves, not the older ones, are yellowing. You recall that the cause of plant sickness can be diagnosed by

which leaves are yellowing. What is the most likely cause of your plant's blight?

A. Too much shade

B. Lack of nitrogen-fixing Rhizobium bacteria

C. A deficiency in a mobile mineral nutrient

D. A deficiency in a non-mobile mineral nutrient

Answer: D

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108. 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 or inhibition of enzymes

Answer: B

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109. 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 enhanced

C. Essential element concentration below which plant remains in the vegetative phase

D. none of the above

Answer: A

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

A. Calcium translocation in shoot spex 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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112. 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 Nitrosococcus.

B. Step (ii) is carried out by Nitrobacter

C. Both steps (i) and (ii) can be called nitrofication

D. bacteria carrying out thse steps are usually photoautotrophs.

Answer: D

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

A. Nitrogenase may require oxygen for its functioning

B. nitrogenase is Mo-Fe protein

C. Leghaemoglobin is a pink coloured pigment

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

Answer: A

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114. 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 photos
$B.$	Manganese	$(ii).$ Needed for synthesis of auxins
$C.$	Molybdenum	$(iii).$ component of nitrogenase
$D.$	Zinc	$(iv).$ Pollen germination
$E.$	Iron	$(v).$ Component of feredoxin

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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115. 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: D

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116. Assertion: The technique of growing plants in a nutrient solution is known as hydroponics

Reason: Hydroponics is used for commercial production of vegetables such as tomato, seedless cucumber and lettuce.

A. If both assertio 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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117. Assertion: Some essential elements are called structural element of cells

Reason: These essential elements are the components of certain biomolecules.

A. If both assertio 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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118. Assertion: Plants absorb calcium from soil in the form of calcium ions (Ca^{2+})

Reason: Calcium is required by meristematic and differentiating tissues.

A. If both assertio 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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119. Assertion: Sulphur is the main constituent of several coenzymes, vitamins and ferredoxin.

Reason: Sulphur is present in two amino acids- valine and cysteine.

A. If both assertio 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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120. Assertion: Plants obtain molybdenum in the form of molybdate ions $\left(MoO_4^{2+}\right)$

Reason: Molybdenum is a component of pollen germination, cell elongation and cell differentiation.

A. If both assertio 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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121. Assertion: Deficiency symptoms appear when the availability of the essential nutrients falls below the critical concentration.

Reason: Critical concentration is that limited concentration of the essential element below which growth of the plant is reduced.

A. If both assertio 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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122. Assertion: Necrosis occurs due to deficiency of Ca, Mg, Cu and K.

Reason: Necrosis is the death of tissue, particularly leaf tissue.

A. If both assertio 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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123. Assertion: The prominent symptom of manganese toxicity is the appearance of brown spots surrounded by chlorotic veins.

Reason: Excess of maganese may induce deficiencies of iron, magnesium and calcium.

A. If both assertio 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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124. Assertion: The movement of ions into or out of the cells is usually called flux.

Reason: The entry or exit of ions to and from the symplast, is an active process.

A. If both assertio 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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125. Assertion: As per carbonic acid exchange theory of mineral salt absorption, CO_2 released during respiration of roots forms 'H_(2)CO_(3) 'when dissolved in soil water Reason:H_2CO_3 dissociates into H^+ and HCO_3 ions, where H^+ ions exchange with anions adsorbed on clay particles.

A. If both assertio 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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126. Assertion: Ammonia is converted into nitrate by soil bacteria like Nitrosomonas and Nitrobacter

Reason: Denitrification is carried by bacteria Pseudomonas and Azotobacter.

A. If both assertio 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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127. Assertion: Nitrate present in the soil is reduced to nitrogen by the process of denitrification

Reason: Denitrification is carried by bacteria Pseudomonas and Azotobacter.

A. If both assertio 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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128. Assertion: Reduction of nitrogen to ammonia by living organisms is called nitrification.

Reason: Example of free-living nitrogen fixing anaerobic microbes are Azotobacter and Bijerinckia.

A. If both assertio 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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129. Assertion: The enzyme nitrogenase is a Mo-Fe protein and catalyses the conversion of atmospheric nitrogen to ammonia.

Reason: The enzyme nitrogenase is highly sensitive to the molecular oxygen.

A. If both assertio 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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130. Assertion: Reductive amination involves the transfer of amino group from one amino acid to the keto group of a keto acid.

Reason: In reductive amination, transfer of NH_2 from glutamic acid takes place.

A. If both assertio 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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