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Q-1 - 13842899

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

CORRECT ANSWER: C

SOLUTION:

Cultivation of plants by placing the roots in the nutrient

solution (in complete absence of soil) is called hydroponics. It is necessary to aerate the solution to provide roots with adequate oxygen supply the result obtained from soil-less culture may then be used to determine deficiencies under field conditions.

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Q-2 - 17820135

Aeroponic is also called as

- (A) Soilless cultivation of plants
- (B) Parthenocarpy
- (C) Vivipary
- (D) Phytotron

CORRECT ANSWER: A

SOLUTION:

Aeroponic plants are grown with their roots bathed in nutrient mist. This method had been successfully used in growing Citrus and olive plants

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Q-3 - 17820138

Which one of the following scientists used the nutrient culture solution in hydroponic cultures

- (A) Sachs
- (B) Webster
- (C) Wallace
- (D) Knop

SOLUTION:

The nutrient solution composition proposed by Knop (1865) and Arnon and Hoagland's (1940) are commonly used.

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Q-4 - 13842939

Necrosis refers to

- (A) Inhibition of cell division
- (B) delay in flowering
- (C) death of tissues
- (D) falling of leaves.

CORRECT ANSWER: C

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Inorganic nutrients are presents in the soil in the form of

- (A) Molecules
 - (B) Atoms
 - (C) Electrically charged ions
 - (D) Parasite
-

CORRECT ANSWER: C

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Select the option that contains micronutrients only

- (A) Mn, Mo, Zn

(B) C, H, N

(C) N, P, O

(D) Mn, K, S

CORRECT ANSWER: A

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Q-7 - 17820268

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

(A) Glutamate

(B) NO_2^-

(C) Ammonia

(D) NO_3^-

CORRECT ANSWER: C

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Q-8 - 17820144

In which of the following forms is iron absorbed by plants

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

CORRECT ANSWER: A

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Q-9 - 17820367

An example of a parasitic plant that is also strictly epiphytic is

(A) Cuscuta(dodder)

(B) Viscum(mistletoe)

(C) Refflesia

(D) Orobanche

CORRECT ANSWER: B

SOLUTION:

Viscum is a partial stem parasite with edible berries
having sticky pulp

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Q-10 - 17820210

Gray speck disease in oats takes place by the distance deficiency of

(A) Zinc

(B) Copper

(C) Potassium

(D) Manganese

CORRECT ANSWER: D

SOLUTION:

"Grey speck disease" in oat appears due to the deficiency of manganese, which leads to total failure of crop.

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Q-11 - 13842931

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

CORRECT ANSWER: A

SOLUTION:

Major function of magnesium (Mg^{2+}) is formation of chlorophyll, carotenoids and nucleic acids, growth, metabolism and nodule formation in legumes Ca^{2+} is involved in the organisation of mitotic spindle.

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Q-12 - 40377997

What happens when we inoculate Rhizobium in wheat field?

(A) No increase in production (nitrogen content of soil

remains same)

(B) A lot of increase in production (nitrogen content of soil increase)

(C) Fertility of soil decreases

(D) Fertility of soil increases

CORRECT ANSWER: A

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Q-13 - 17820157

The possible resource of phosphorus ions and nitrogen ions in soil generally get depleted because they are usually found as

(A) Positively charged ions

(B) Negatively charged ions

(C) A disproportionate mixture of negatively charged

ions

(D) Particles carrying no charge

SOLUTION:

Phosphorus is absorbed by the plants from the soil in the form of phosphate ions $H_2PO_4^-$ and HPO_4^{2-} and nitrogen is absorbed by the plants in the form of nitrate ions (NO_3^-)

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Q-14 - 13842959

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

(A) P

(B) N

(C) K

(D) S

CORRECT ANSWER: B

SOLUTION:

Nitrogen is the constituent of proteins, protoplasm, nucleic acids, vitamins, hormones, etc. Nitrogen is required by all parts of a plant, particularly the meristematic tissues and the metabolically active cells.

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Q-15 - 17820320

EDTA is much used in tissue cultures, it is a

(A) Hormone

(B) Vitamin

(C) Buffer

(D) Nutrient

CORRECT ANSWER: C

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Q-16 - 13843042

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

- | | |
|----------------------|---|
| <i>A.</i> Boron | <i>(i).</i> Splitting of H_2O
to liberate O_2 during |
| <i>B.</i> Manganese | <i>(ii)</i>
.
Needed for synthesis of auxins |
| <i>C.</i> Molybdenum | <i>(iii)</i>
.
component of nitrogenase |
| <i>D.</i> Zinc | <i>(iv).</i> Pollen germination |
| <i>E.</i> Iron | <i>(v)</i>
.
Component of ferredoxin |

(A) A-(i),B-(ii),C-(iii),D-(iv),E-(v)

(B) A-(iv),B-(i),C-(iii),D-(ii),E-(v)

(C) A-(iii),B-(ii),C-(iv),D-(v),E-(i)

(D) A-(ii),B-(iii),C-(v),D-(i),E-(iv)

CORRECT ANSWER: B

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Q-17 - 17820194

In a Citrus plantation, all the plants were found to be suffering from the die-back, spraying of fungicides was of no help. This problem was due to the deficiency of

(A) Copper

(B) Gibberellic acid

(C) Zinc

(D) Auxins

SOLUTION:

Cu deficiency causes necrosis of the tip of the young leaves (e.g., Citrus). The disease is called 'die block'

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Q-18 - 13842945

Premature leaf fall is due to deficiency of

(A) sodium

(B) potassium

(C) zinc

(D) phosphorus.

CORRECT ANSWER: D

SOLUTION:

Phosphorus (P) deficiency causes premature leaf fall.

Dead necrotic areas develop on leaves or fruits, and leaves turn dark to blue- green in colour. It also causes delay in seed germination.

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Q-19 - 17820169

The major role of phosphorus in plant metabolism is

- (A) To generate metabolic energy
- (B) To evolve oxygen during photosynthesis
- (C) To evolve carbon dioxide during respiration
- (D) To create anaerobic conditions

SOLUTION:

Phosphorus plays an indispensable role in energy

metabolism e.e., hydrolysis of pyrophosphate and various organic phosphate bonds being used to drive chemical reactions. Thus it is required for all phosphorylation reactions.

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Q-20 - 40377999

Which of the following is a trace element ?

(A) S

(B) Mg

(C) Cu

(D) P

CORRECT ANSWER: C

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Deficiency symptoms of readily mobilised essential elements will first appear in_____

(A) younger tissues

(B) older tissues

(C) roots

(D) shoots

CORRECT ANSWER: B

SOLUTION:

For elements that are actively mobilised within the plants and exported to young developing tissues, the deficiency symptoms tend to appear first in the older tissues e.g., the deficiency symptoms of nitrogen (N), potassium (K)

and magnesium (Mg) are visible first in the senescent leaves. In the older leaves, biomolecules containing these elements are broken down, making these elements available for mobilising to younger leaves.

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Q-22 - 40377949

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

CORRECT ANSWER: D

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Higher plants obtain nitrogen from soil that has

(A) Six forms

$(NO_3, NO_2, N_2, N_2O, N_2OH, NH_3)$

of nitrogen with oxidation number ranging from $+5 \rightarrow -3$

(B) Six forms

$(NO_3, NO_2, N_2O_2, N_2, NH_2OH, NH_3)$

of nitrogen with oxidation number ranging from $+6 \rightarrow -3$

(C) Five forms

$(NO_3, NO_2, N_2, NH_2OH, NH_3)$

of nitrogen with oxidation number ranging from $+5 \rightarrow -3$

(D) Five forms

$(NO_3, NO_2, N_2,$
 $NH_2OH, NH_3)$

of nitrogen with oxidation number ranging from
 $+6 \rightarrow -3$

CORRECT ANSWER: C

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Q-24 - 40377955

Cell division in root nodules is promoted by _____ secreted by
plant and _____ secreted by bacteria.

- (A) Auxin, Cytokinin
 - (B) Cytokinin, Auxin
 - (C) Auxin, Leghemoglobin
 - (D) Nitrogenase, Leg hemoglobin
-

CORRECT ANSWER: A

Q-25 - 17820357

The ability of the venus fly trap of capture insects is due to

- (A) Chemical stimulation by the prey
- (B) A passive process requiring no special ability on the part of the plant
- (C) Specialized muscle-like cells
- (D) Rapid turgor pressure changes

CORRECT ANSWER: D

SOLUTION:

In *Dionaea* (Venus fly trap) an insect that happens to alight over the lamina and touch a sensitive spine twice in quick succession causes the folding of the lamina the

curved marginal spines get interlocked and the insect gets trapped

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Q-26 - 13842928

Best defined function of manganese in green plants is

- (A) photolysis of water
- (B) Calvin cycle
- (C) Nitrogen fixation
- (D) water absorption.

CORRECT ANSWER: A

SOLUTION:

Manganese is absorbed in the form of manganous ions

(Mn^{2+}) . The best defined function of manganese is in the splitting of water to liberate oxygen during photosynthesis.

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Q-27 - 17820252

Which one of the following can fix atmospheric nitrogen directly

- (A) Pea
- (B) Brassica
- (C) Castor
- (D) Petunia

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Q-28 - 40377928

Which of the following groups of elements are mobile?

(A) Fe, Ca, B

(B) N, P, K

(C) B, K, Ca

(D) Ca and K

CORRECT ANSWER: B

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Q-29 - 17820282

Drosera catches insects by means of

(A) Bladder

(B) Pitcher

(C) Tentacles secreting shining liquid

(D) Adhesive disc

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Q-30 - 17820137

Who gave the criteria of essentiality

(A) R. Hill

(B) F.F. Blackman

(C) M.P. Kaushik

(D) D.L. Arnon

SOLUTION:

Criteria for essentiality of elements were first of all given by Arnon.

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

(A) Mg

(B) K

(C) Mn

(D) P

CORRECT ANSWER: B

SOLUTION:

Potassium (K) helps to determine anion-cation balance in cells, and is involved in protein synthesis, opening and closing of stomata, activation of enzymes, and maintenance of turgidity of cells. It is absorbed as K^+

ion by plants from the soil

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Q-32 - 40377931

Which one of the following is a sulfur - containing amino acid?

(A) Valine

(B) Methionine

(C) Tryptophan

(D) Phenylalanine

CORRECT ANSWER: B

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Q-33 - 13842927

Which of the following minerals activate the enzymes involved in

respiration?

- (A) Nitrogen and phosphorus
 - (B) Magnesium and manganese
 - (C) potassium and calcium
 - (D) Sulphur
-

CORRECT ANSWER: B

SOLUTION:

Magnesium activates the enzymes of respiration, photosynthesis and is involved in the synthesis of DNA and RNA. Manganese activates many enzymes which are involved in photosynthesis, respiration and nitrogen metabolism.

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Cuscuta is an example of

- (A) Ectoparasitism
- (B) Brood parasitism
- (C) Predation
- (D) Endoparasitism

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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

CORRECT ANSWER: D

SOLUTION:

Chlorosis is non-development or loss of chlorophyll, that leads to yellowing of leaves. Chlorosis is caused due to deficiency of N, K, Mg, S, Fe, Mn, Zn and Mo.

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Q-36 - 40378040

Which of the following is a flowering plant with nodules containing filamentous nitrogen-fixing microorganism

(A) *Cicer arietinum*

(B) *Casuarina equisetifolia*

(C) *Crotalaria juncea*

(D) *Cycas revolute*

CORRECT ANSWER: B

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Q-37 - 13843009

Which of the following statements is incorrect about leghaemoglobin?

(A) it 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

CORRECT ANSWER: D

SOLUTION:

It is the enzyme nitrogenase which is a Mo-Fe protein not leghaemoglobin.

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Q-38 - 40378064

The function of leghaemoglobin in the root nodules of legumes is:-

- (A) expression of nif gene
- (B) Inhibition of nitrogenase activity
- (C) oxygen removal
- (D) nodule differentiation

CORRECT ANSWER: C

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Assertion : Exanthema disease occurs due to deficiency of manganese.

Reason : Reclamation is a disease of cereals

- (A) If both the assertion and the reason are true and the reason is a correct explanation of the assertion
- (B) If both the assertion and reason are true but the reason is not a correct explanation of the assertion
- (C) If the assertion is true but the reason is false
- (D) If the assertion is false but reason is true

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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

CORRECT ANSWER: B

SOLUTION:

Nitrogen deficiency causes yellowing of older leaves (chlorosis). Deficiency of nitrogen also causes dormancy of lateral buds, late flowering, purple colouration and wrinkling of cereal grains molybdenum deficiency causes chlorotic interveinal mottling of the older leaves, flower formation is inhibited and also causes whip tail disease in cauliflower plants. sulphur deficiency causes yellowing

of leaves and delay in flowering.

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Q-41 - 40378015

"Reclamation" and "Little leaf" disease, caused by deficiency of

(A) Zn and Mo

(B) Cu and Zn

(C) Cu and B

(D) Mn and Cu

CORRECT ANSWER: B

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Q-42 - 13843054

Assertion: As per carbonic acid exchange theory of mineral salt

absorption, CO_2 released during respiration of roots forms H_2SO_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

CORRECT ANSWER: C

SOLUTION:

According to carbonic acid exchange theory, CO_2 released during respiration of roots combines with soil water to produce carbonic acid (H_2CO_3). Carbonic acid

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

These H^+ ions may be exchanged for cations

adsorbed on clay particles. the cations thus released into soil solution from the clay particles, may be adsorbed on root cells in exchanges for H^+ ions.

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Q-43 - 40378056

The common nitrogen-fixer in paddy fields is

- (A) Oscillatoria
- (B) Frankia
- (C) Rhizobium
- (D) Azospirillum

CORRECT ANSWER: D

Q-44 - 13842974

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

Column I

A

nitrosomonas Nitrosococcus

B Nitrobacter, Nitrocystis

C Pseudomonas

Column II

(i). Ammonia to nitrite

(ii). Nitrite to nitrate

(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)

CORRECT ANSWER: A

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

(A) Internode shortening

(B) Necrosis

(C) Chlorosis

(D) Etiolation

CORRECT ANSWER: D

SOLUTION:

Etiolation is the abnormal form of growth observed when plants grow in darkness or severely reduced lights.

Such plants characteristically have branched leaves and shoots, excessively long shoots, and reduced leaves and shoots, excessively long shoots, and reduced

leaves and roots systems.

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Q-46 - 40377918

Excess of manganese may induce the deficiencies of

- (A) Iron
- (B) Calcium
- (C) Magnesium
- (D) All of these

CORRECT ANSWER: D

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Q-47 - 40377953

Which of the following is/are diazotrophs?

(A) Rhizobium and Azotobacter

(B) Frankia and Klebsiella

(C) Anabaena and Nostoc

(D) All of these

CORRECT ANSWER: D

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Q-48 - 13842976

The limiting factor in nitrogen fixation of soil is

(A) soil nature (pH)

(B) light

(C) temperature

(D) air

CORRECT ANSWER: A

SOLUTION:

Extreme of soil pH affects nodulation by reducing the colonisation of soil and the legume rhizosphere by rhizobia. Highly acidic soils ($pH < 4.0$) frequently have low levels of phosphorus, calcium and molybdenum and high concentration of toxic elements while highly alkaline soils ($pH > 8.0$) tend to be high in sodium chloride, bicarbonate and borate, and are often associated with high salinity which reduce nitrogen fixation.

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Q-49 - 13842963

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

CORRECT ANSWER: C

SOLUTION:

Nitrogen fixation is the conversion of inert atmospheric nitrogen or dinitrogen (N_2) into utilisable compounds of nitrogen like nitrate, ammonia, amino acids. Nitrogen fixation can be atmospheric, industrial or biological.

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Q-50 - 17820257

Knot like bodies known as nodules found in the roots of groundnut

plant are produced by

(A) Azospirillum

(B) Azotobacter

(C) Pseudomonas

(D) Rhizobium

SOLUTION:

d

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Q-51 - 40378031

Potometer works on the principle of

(A) Amount of water absorbed equals the amount
transpired

(B) Osmotic pressure

(C) Root pressure

(D) Potential difference between the tip of the tube and that of the plant

CORRECT ANSWER: A

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Q-52 - 13842975

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

(A) Clostridium

(B) Rhodospirillum

(C) Azotobacter

(D) Bacillus subtilis

CORRECT ANSWER: A

SOLUTION:

Clostridium is a free-living obligate anaerobic bacteria.

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Q-53 - 40378044

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

- (A) *Frankia*
 - (B) *Azorhizobium*
 - (C) *Bradyrhizobium*
 - (D) *Clostridium*
-

CORRECT ANSWER: A

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Thiobacillus is group of bacteria helpful in carrying out:

- (A) Denitrification
 - (B) Nitrogen fixation
 - (C) Chemoautotrophic fixation
 - (D) Nitrification
-

CORRECT ANSWER: A

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which statement is incorrect for ion-channels

- (A) They are proteins

(B) Movement through them is simple diffusion

(C) Movement through them is from high to low concentration

(D) All ions pass through the same type of channel

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Q-56 - 17820363

The association between ants and members of family rubiaceae is

(A) Ornithophily

(B) Entomophily

(C) Myrmecophily

(D) Anemophily

CORRECT ANSWER: C

SOLUTION:

The ants obtain food and shelter from the plant and they protect the plant from the plant and they protect the plant from other animals

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Q-57 - 17820272

Plants which are unable to manufacture their food wholly or partially are

- (A) Autophytes
- (B) Heterophytes
- (C) Halophytes
- (D) Holophytes

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Decomposition of organic nitrogen of dead plants and animals into ammonia is called._____

- (A) nitrification
- (B) nitrate reduction
- (C) N_2 fixation
- (D) ammonification

CORRECT ANSWER: D

SOLUTION:

Decomposition of organic nitrogen of dead plants and animals into ammonia is called ammonification some of this ammonia produced volatilises and re-enters the atmosphere but most of it is converted into nitrate by soil

bacteria.

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Q-59 - 17820223

Active transport from outside to inside of molecules across a membrane requires

- (A) Cyclic AMP
- (B) Acetyl chlorine
- (C) ATP
- (D) Phloroglucinol

CORRECT ANSWER: C

SOLUTION:

The use of energy of ATP in transferring solutes across

membrane may be through an ATP ase which creates a pH gradient across the membrane.

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Q-60 - 13843060

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

CORRECT ANSWER: D

SOLUTION:

In reductive amination in the presence of enzyme glutamate dehydrogenase and a reduced coenzyme (NADH or NADPH), ammonia can directly combine with α -ketoglutaric acid to form an amino acid. On the other hand, transamination is transfer of amino group ($-NH_2$) of one amino acid with the keto group (gt $C=O$) of keto acid. In transaminase, transfer of NH_2 from glutamic acid takes place. The enzyme required is transaminase or aminotransferase.

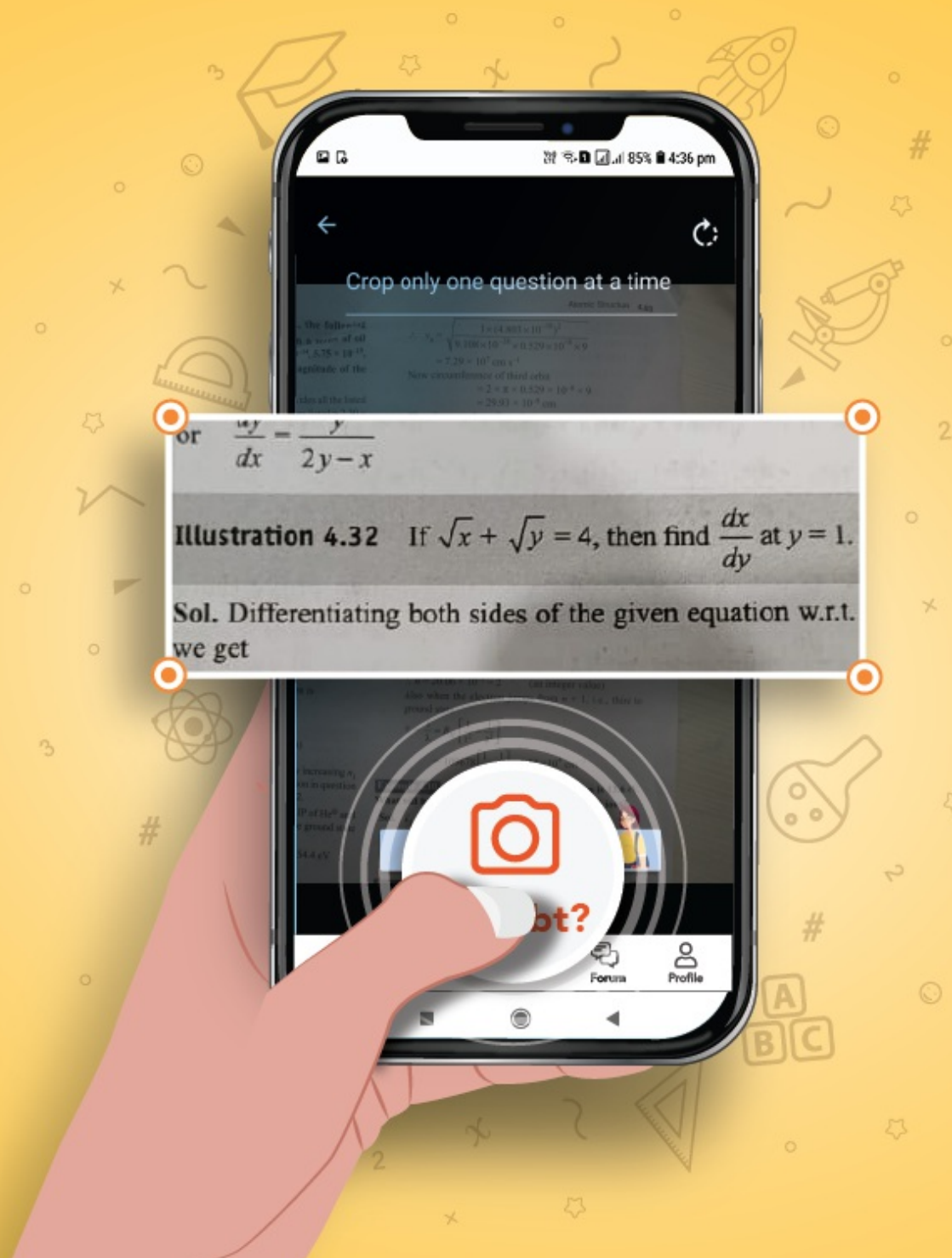
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