BIOLOGY

BOOKS - AAKASH SERIES

MINERAL NUTRITION

Exercise I

1. 17.6 gram of unknown solute is dissolved in 100 gram of a solvent $\left(K_b = 2 \text{ K molality}^{-1}\right)$ to prepare a

solution. Boiling point of pure solvent is $225^{\circ}C$ where as boiling point of this solution is $229^{\circ}C$. Predict molecular formula of solute if it contains 54.54% C and 9.09% H (by weight).

A. Only organic substance

B. Only minerals

C. water

D. both (1) and (2) correct

Answer: B

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2. Number of essential elements are

A. 60

B. 20

C. 17

D. 9

Answer: C

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3. The criteria for essentiality of elements was given by

A. Woodward

B. Arnon & Stout

C. De Saussure

D. None of these

Answer: B

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4. Which is the criterion, on the basis of which, you will determine that particular element I essential ?

A. In its absence, plant is unable to complete its life cycle

B. Element is specific

C. It has direct role in metabolism

D. All of the above

Answer: D

5. Plastocyanin' (PC) contains :

A. Mo

B. Mn

C. Fe

D. Cu

Answer: D

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6. Chlorophyll is formed in presence of

A. Cu and Fe

B. Mo and Cl

C. Mg

D. Fe and Mg

Answer: D

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7. which elements are required for photolysis of H_2O ?

A. Zn and Mn

B. Mn and Cl

C. Cl and Mg

D. Fe and Mn

Answer: B

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8. Which element facilitates translocation of sugars in plants ?

A. Zn

B. K

C. B

D. Mo

Answer: C

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9. Which of the following elements is essential for synthesis of IAA ?

A. Fe

B. Zn

C. B

D. Mn

Answer: B

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10. Khaira disease of rice is due to

A. Fungus

B. Bateria

C. Zn deficiency

D. Mo deficiency

Answer: C

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11. Nitrogen fixation is facilitated by :

A. Cu

B. Bateria

C. Zn

D. Mo

Answer: D

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12. Critical elements :

A. Which are in more concentration in soil

B. Which are commonly deficient in soil

C. Whch are absent in soil

D. None of the above

Answer: B

13. Protein lecithin theory of mineral salt absorption was put forward by :

A. Lundegardh and Burstrom

B. Bennet Clark

C. Vanden Honert

D. None of the above

Answer: B

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14. The Ion involved in stomatal movement is:

A. Iron

B. Magnesium

C. Zinc

D. Potassium

Answer: D

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15. Anthocyanin pigment synthesis in leaves is encouraged by deficiency of :

A. N_2

B. C

C. Mg

D. Cl

Answer: A

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16. In legumes, root nodules formation is inhibited by deficiency of :

A. Mo

B. B

C. Cu

D. Mn

Answer: A

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17. Synthesis of chlorophyll and cytochrome system is affected by deficiency of :

A. Fe

B. N

C. P

D. B

Answer: A

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18. Transcription and translation, both affected by deficiency of :

A. Mg ions

B. K ions

C. Calcium

D. Boron

Answer: A

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19. Catalytic functions are controlled by elements like :

A. Ca, Mg, K , Na

B. Cu, Fe, Mg, Mn, Mo

C. C, H, O, N, S, F

D. None of these

Answer: B

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20. Necrosis means :

A. Over growth

B. Undergrowth

C. Death of cells, tissues of organs

D. Yellowing

Answer: C

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21. Deficiency of iron causes :

A. Decreases in protein synthesis

B. Reduced leaves and stunted growth

C. Interveinal chlorosis first on young leaves

D. Bending of leaf tip

Answer: C

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22. Hydroponics helps

A. perfect growth and development of all types of vegetables

B. Treatment of plants suffering from Fungal disease

C. To identify the essential elements

D. To understand the growth pattern

Answer: C

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

A. Brinjal, Asparagus and Cucumber

B. Tomato, Cucumber and Lettuce

C. Spinach, Big Bean and grapes

D. Potato, Chillis and Apple

Answer: B

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24. The number of macro essential mineral elements required by all plants are

A. 9

B. 6

C. 8

D. 17

Answer: B

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25. The micro essential mineral element which has been reported recently is

A. Chlorine

B. Nickel

C. Selenium

D. Cobalt

Answer: B

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26. C, H, O and N are called structural elements

A. They are essential to all plants

B. They are required in all biochemical reactions in plants

C. They are invariably present in all biomolecules

D. They associate with prosthetic group of enzymes, catalysing synthesis of biomolecules.

Answer: C

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27. Elements mainly involved in cell membrane synthesis (or) in normal functioning of the cell membrane are

A. K, Ca and Mg

B. P, Ca only

C. N, P, K and Ca

D. N, P, K, B and Mn

Answer: C

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28. Find out the mismatch of the following

A. Copper - Plastocyanin

B. Nickel - Inducing disease resistance

C. Zinc - Synthesis of Cytochromes

D. Iron - Ferredoxin

Answer: C

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29. Find out the correct combination.

A. PEP carboxylase $-Mn^{2+}$

B. Cytochrome C-Oxidase - Zinc

C. Nitrate reductase - Mg^{2+}

D. Carboxylase - Zinc

Answer: D

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30. Essential elements required for uptake and utilisation of Ca^{2+},cell differentiation and carbohydrate translocation

A. Boron

B. Iron

C. Copper

D. Maganese

Answer: A

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31. Excess of maganese induce the deficiency of

A. Ca, Fe, MO

B. Fe, Mg, Ca

C. Ca, CU, B

D. P, S, Ca

Answer: B

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32. Root nodules in Alnus is formed by

A. Rhizobium

B. Azospirillum

C. Frankia

D. Clostridium

Answer: C

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33. Cytochrome oxidase contain

A. Zinc

B. Copper

C. Molybdenum

D. Magnesium

Answer: B

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34. Sulphur is needed for

A. Ferredoxin, Plastoquinone, Hexokinase

B. Plastocyanin, Plastoquinone, Vitamin- K

C. Ferredoxin, Coenzyme-A, Biotin and Cysteine

D. PEP carboxylase, RUBISCO and Catalase

Answer: C

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35. Nitrosomonas and Nitrosococcus promote

A. Oxidation of nitrates into nitrites

B. Reduction of Nirates to nitrities

C. Oxidation of ammonia into nitrites

D. Reduction of nitrates of ammonia

Answer: C

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36. One of the following statements is correct

A. Asparagine and glutamine are most important amino acids

B. Asparagine and glutamine are transported to other parts of the plant via xylem vessels

C. In soybean root nodules, the fixed nitrogen is imported as ureides.

D. Ureides has high carbon to nitrogen ratio

Answer: B

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37. Molybdenum plays a major role in

A. Nitrogen fixation

B. promote flowering

C. Chromosome condensation

D. Spindle fibre formation

Answer: A

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38. Gray spots of oat are caused due to deficiency of

A. Cu

B. Zn

C. Mn

D. Fe

Answer: C

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39. One of the following elements is an activator of carbonic anhydrase.

A. Cu

B. Zn

C. Fe

D. Mn

Answer: B

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40. Heart rot of beet root is caused by the deficiency of :

A. Mn

B. Mo

C. B

D. Cl

Answer: C

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41. One of the following is a non essential element which counteract the toxicity of copper and stimulate plant growth

A. Silica

B. Aluminium

C. Sodium

D. Nickel

Answer: B

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42. One of the following is not a correct match

A. Potassium - root rot of tomato

B. Molybdenum - whiptail in cauliflower

C. Zinc - White bud in mustard

D. Boron - Water core in turnip

Answer: C

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43. One of the following is an untrue statement

A. Ca^{++} is required by plants for cell division

B. K^{+} never enters into structural composition of any compound in plants

C. Copper is an activator for alcohol dehydrogenase

D. Manganese toxicity in plants inhibit calcium translocation in shoot apex

Answer: C

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44. Ca, Mg, Cu and K deficiency leads to

A. Chlorosis in leaf tissue

B. Necrosis or death of host tissue

C. Delayed flowering

D. Stunted growth

Answer: B

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45. N, S, Mo deficiency leads to

A. Early flowering

B. Delayed flowering

C. Seed dormancy

D. Premature leaf fall

Answer: B

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46. Mouse ear' in pecan is due to the deficiency of

A. Ca

B. Ni

C. Cu

D. Mn

Answer: B

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Exercise Ii

1. Cytochrome oxidase contain

A. Mg

B. Fe

C. Hg

D. CO

Answer: B

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2. Micronutrients are

A. Are as important as macronutrients

B. Are less important than macronutrients

C. Are called 'micro' as they play only a mirror role in plant nutrition

D. May be omitted from culture media without any detrimental effect on the plant

Answer: A

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3. Presence of phosphorus in a plant :

A. Brings about healthy root growth

B. Promotes fruit ripening

C. Retards protein formation

D. None of the above

Answer: A

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4. The four elements that make up 99% of all elements found in a living system are

(a) CHOS

(b) CHOP

(c) CHON

(d) CNOP

A. H,O, C, N

B. C, H, O, S

C. C, H, O , P

D. C, N, O, P

Answer: A

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5. A red pigment leghaemoglobin in root nodules a legumes is helpful in nitrogen fixation by :

A. Providing oxygen

B. Helping all aerobic respiration

C. Removal of oxygen

D. None of the above

Answer: C

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6. Hunger sign's in plants are :

A. Symptoms due to lesser water absorption in plants

B. Symptoms due to poor photosyntheis in plants

C. Deficiency symptoms of particular mineral nutrients

D. None of the above

Answer: C

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7. In absence of essential mineral elements, leaves of many plants turn yellow due to

A. Plasmolysis

B. Chlorisis

C. Necrosis

D. Etiolation

Answer: B

Watch Video Solution

8. Permeability of protoplasm is accelerated by

:

A. K

B. Na

C. Ca

D. P

Answer: A

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9. In fruit trees a disease 'exanthema' is caused by the deficiency of :

A. Na

B. Ca

C. Cu

D. P

Answer: C

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10. Salt respiration is

A. Increase in respiration during mineral absorption

B. Decrease in respiration during salt absorption

C. Linking ion movement with respiratory chain

D. Secretion of salt through respiratory channels

Answer: A

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11. Non-symbiotic nitrogen fixing prokaryote is

A. Frankia

B. Azotobacter

C. Rhizobium

D. Nostoc

Answer: B

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12. Main role of minor elements is to act as

A. Constituent of hormones

B. Binder of cell structure

C. Cofactor of enzymes

D. Constituent of amino acids

Answer: C

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13. In nitrification, ammonia is first oxidised to nitrite by

A. Nitrosomonas

B. Nitrobacter

C. Nitrosococcus

D. 1 & 3

Answer: D

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14. Which of the following is not the function of iron as nutrient in plant ?

A. Constituent of ferridoxin and cyto-chromes

B. Synthesis of chloroplast protein

C. Activates the enzyme catalase

D. Activates the enzyme carboxylase

Answer: D

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15. Electron donor to the enzyme nitrogenase in nitrogen metabolism and to NADP+ in non cyclic electron transport in light reaction is

A. Plastoquinone

B. Ferredoxin

C. Phenophytin

D. Quinone

Answer: B

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16. Match the following columns

Column - I	Column - II
a) Denitrification	i) *Nitrosococcus*
b) Prokaryotes	ii) Nitrogenase
c) Sachs	iii) Magnesium
d) Macronutrients	iv) Hydroponics
e) Nitrification	v) *Thiobacillus*
f) Micronutrients	vi) Copper

A. a-v, b - ii, c-iv, d-iii, e-i, f-vi

B. a-iv, b-iii, c - ii, d-i, e-vi, f-v

C. a-iii, b-vi, c-v, d-iv, e-i, f-ii

D. a-vi, b-iv, c-iii, d-v, e-i, f-ii

Answer: A

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17. Oxygen evolving and nitrogen fixing organisms is

A. Azotobacter

B. Nostoc

C. Frankia

D. Clostridium

Answer: B

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18. Root nodules with Rhizobium and without leghaemoglobin are found in

A. Glycine

B. Parasponia

C. Alnus

D. Gunnera

Answer: B

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19. Which saprophytic prokaryote becomes an endosymbiotic diazotroph ?

A. Rhizobium

B. Clostridium

C. Nostoc

D. Azotobacter

Answer: A

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20. Number of carbon atoms present in citric acid, oxaloacetic acid and pyruvic acid are respectively

A. Ferredoxin and Dinitrogen

B. Dinitrogen and Ferreodoxin

C. Dinitrogen

D. Ferredoxin and Dinitrogenase

Answer: D

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21. In the root nodules of Myrica, symbiotic nitrogen fixing organism is

A. Rhizobium

B. Nostoc

C. Frankia

D. Anabaena

Answer: C

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22. Which of the following can fix the atmospheric nitrogen both in symbiotic and non-symbiotic manner ?

A. Clostridium

B. Anabaena

C. Azotobacter

D. Rhizobium

Answer: B

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Exercise Iii

1. Select the mismatch :

A. Frankia - Alnus

B. Rhodospirillum - Mycorrhiza

C. Anabaena - Nitrogen fixed

D. Rhizobium - Alfalfa

Answer: B

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

A. Zn

B. Fe

C. Ca

D. Mn

Answer: C

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3. In which of the following , all three are macronutrients ?

A. Boron, zinc, manganese

B. Iron, copper, molybdenum

C. Molybdenum, magnesium, manganese

D. Nitrogen, calcium, phosphorous

Answer: D

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

A. Magnesium, Sulphur, Iron, zinc

B. Phosphorus, potassium, sulphur, Copper

C. Calcium, Magnesium, Maganese, Copper

D. Potassium, Phosphorous, Selenium , Boron

Answer: B

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5. Deficiency symptoms of nitrogen and potassium are visible first in

A. Young leaves

B. Roots

C. Buds

D. Senescent leaves

Answer: D

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6. The most abundant intracellular cation is :

A. Na^+

B. Ca^+

C. H^+

D. K^+

Answer: D

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7. Natural reservoir of phosphorus is

A. Sea water

B. Animal bones

C. Rock

D. Fossils

Answer: C

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8. For its activity, carboxypeptidase requires

A. Copper

B. Zinc

C. Iron

D. Niacin

Answer: B

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9. For its action, nitrogenase requires

A. Super oxygen radicals

B. High input of energy

C. Light

D. Molybdenum

Answer: D

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

A. Oxygen removal

B. Nodule differentiation

C. Expression of nif gene

D. Inhibition of nitrogenase activity

Answer: A

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11. Nitrifying bacteria

A. Convert free nitrogen to nitrogen compounds

B. Convert proteins into ammonia

C. Reduce nitrates to free nitrogen

D. Oxidize ammonia to nitrates

Answer: D

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12. Which one of the following elements in plants is not remobilised?

A. Calcium

B. Potassium

C. Sulphur

D. Phosphorous

Answer: A

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13. An element playing important role in nitrogen fixation is

A. Molybdenum

B. Copper

C. Manganese

D. Zinc

Answer: A

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14. Which one of the following is not a micronutrient?

A. Molybdenum

B. Manganese

C. Zinc

D. Boron

Answer: B

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15. Manganese is required in

A. Nucleic acid synthesis

B. Plant cell wall formation

C. Photolysis of water during photosynthesis

D. Chlorophyll synthesis

Answer: C

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16. Which of the following is symbiotic nitrogen fixer ?

A. Glomus

B. Azotobacter

C. Frankia

D. Azolla

Answer: C

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17. Nitrogen fixation in root nodules of Alnus is brought about by

A. Bradyrhizobium

B. Clostridium

C. Frankia

D. Azorhizobium

Answer: C

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

A. Casuarina equisetifolia

B. Crotalaria juncea

C. Cycas revoluta

D. Cicer arietinum

Answer: A

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

A. Mn

B. Zn

C. Cu

D. Ca

Answer: D

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20. A plant requires magnesium for :

A. Holding cells together

B. Protein synthesis

C. Chlorophyll synthesis

D. Cell wall development

Answer: C

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21. 98% of living organism is formed of six elements-carbon, hydrogen, nitrogen, oxygen and

A. Phosphorus and sulphur

B. Sulphur and magnesium

C. Magnesium and sodium

D. Calcium and phosphorus

Answer: A

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22. The translocation of organic solutes in sieve tube members is supported by

A. P-proteins

B. Mass flow involving a carrier and ATP

C. Cytoplasmic streaming

D. Root pressure and transpiration pull

Answer: B

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

A. Pulse crops

B. Cereals

C. Fibre crops

D. Oil seed crops

Answer: A

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24. The deficiencies of micronutrients not only affects the growtth of plants but also vital functions such as photosynthetic and mitochondrial electron flow. Among the list given below, which group of three elements shall affect the most both photosynthetic and mitochondrial electron transport ?

A. Co, Ni, Mo

B. Ca, K, Na

C. Mn, Co, Ca

D. Cu, Mn, Fe

Answer: D

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25. Dough kept overnight in warm weather becomes soft and spongy because of

A. Absorption of carbon dioxide from atmosphere

B. Fermentation

C. Cohesion

D. Osmosis

Answer: B

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

A. Tolypothrix

B. Chlorella

C. Nostoc

D. Anabaena

Answer: D

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27. A nutritionally wild type organism, which does not require any additional growth supplement is known as :-

A. Phenotype

B. Holotype

C. Auxotroph

D. Prototroph

Answer: D

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28. The major role of minor elements inside living organisms is to act as

A. Binder of cell structure

B. Co-factors of enzymes

C. Building blocks of important amino acids

D. Constituent of hormones

Answer: B

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29. Name the element that plays an important role in biological nitrogen fixation

A. Molybdenum

B. Copper

C. Manganese

D. Zinc

Answer: A

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30. Stomata of a plant open due to : -

A. Influx of calcium ions

B. Influx of potassium ions

C. Efflux of potassium ions

D. Influx of hydrogen ions

Answer: B

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31. In green plants, Boron assists

A. Sugar transport

B. Activation of enzymes

C. Acting as enzyme cofactor

D. Photosynthesis

Answer: A

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32. Gray spots of oat are caused due to deficiency of

A. Fe

B. Cu

C. Zn

D. Mn

Answer: D

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

A. Carbon, hydrogen and oxygen

B. Nitrogen, phosphorus and potassium

C. Calcium, magnesium and sulphur

D. Carbon, nitrogen and hydrogen

Answer: A

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34. Choose the correct match

A. Nepenthes, Dionea, Drosera

B. Nepenthes, Utricularia, Vanda

C. Utricularia, Drosera, Dionea

D. Dionea, Trapa, Vanda

Answer: C

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

A. Deep green foliage

B. Early flowering

C. Yellowing of leaves

D. Loss of pigments in petals

Answer: C

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36. Passive absorption of minerals depends on

A. Temperature

B. Temperature and metabolic inhibitor

C. Metabolic inhibitor

D. Humidity

Answer: A

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37. Element involved in nitrogen -fixation is

A. Nitrogenase

B. Nitrate reductase

C. Transferase

D. Transaminase

Answer: A

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38. In plants, inulin and pectin are

A. Reserved food material

B. Wastes

C. Secretory material

D. Insect attracting material

Answer: A

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39. Which aquatic fern performs nitrogen fixation :

A. Azolla

B. Nostoc

C. Salvia

D. Salvinia

Answer: A

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40. Zinc as a nutrient is used by the plants in the form of

A. Zn

B. Zn^{2+}

C. ZnO

D. $ZnSO_4$

Answer: B

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41. Which of the following is free living aerobic , non-photosynthetic nitrogen fixing bacterium ?

A. Rhizobium

B. Azotobacter

C. Azospirillum

D. Nostoc

Answer: B

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42. Chlorophyll is

A. Iron

B. Magnesium

C. Nickel

D. Copper

Answer: B

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43. Which of the following is not caused by deficiency of mineral?

A. Necrosis

B. Chlorosis

C. Etiolation

D. Shortening of internodes

Answer: C

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44. Bidirection translocation of minerals takes place in

A. Xylem

B. Phloem

C. Parenchyma

D. Cambium

Answer: A

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45. Which of the following is not non-essential element for plants?

A. Potassium

B. Iron

C. Iodine

D. Zinc

Answer: C

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46. Which one of the following is not a micronutrient?

A. Calcium

B. Magnesium

C. Manganese

D. Nitrogen

Answer: C

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47. Mycorrhiza is a symbiotic association between

A. Virus

B. Fungi

C. Bacteria

D. Blue-green algae

Answer: B

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48. Which of the following can fix atmospheric nitrogen?

A. Albugo

B. Cystopus

C. Saprolegnia

D. Anabaena

Answer: D

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49. Blue-green algae are

A. Lichens

B. Symbiosis

C. Cannibism

D. Mycorrhiza

Answer: A

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50. Amino acids are mostly synthesized from

A. Mineral salts

B. Fatty acids

C. Volatile acids

D. α - ketoglutaric acid

Answer: D

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51. Phosphorus and nitrogen ions generally get depleted in soil because they usually occur as

A. Neural ions

B. Negatively charged ions

C. Positively charged ions

D. Both positively and negatively charged but disproportionate mixture

Answer: B

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52. Minerals absorbed by roots move to the leaf through

A. Xylem

B. Phleom

C. Sieve tubes

D. None of these

Answer: A

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