1. A trace elements is an element which
(a) Is a radioactive and can be traced by Geiger counter
(b) Draws other element out of protoplasm
(c) Is required in very minute amounts
(d) Was one of the first to be discovered in protoplasm

2. 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 with out essential nutrients.

3. With reference to absorption of minerals, the term 'outer space' represents___ while 'inner space' represents___
(a) Cytoplasmand vacuole; intercellular space and cell wall
(b) Intercellular space; vacuole
(c) Intercellular space and cell wall; cytoplasm and vacuole
(d) Cytoplasm; vacuole

4. Which of the following statements about mineral 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, trans – membrane proteins which act as selective pores.
(d) All of these.

5. 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

6. Which of the following statements best characterizes micronutrients?
(a) They include elements such as C, H, O
(b) The occur in such small amounts that they are not necessary for life
(c) They are essential elements required in very small amounts
(d) They are needed by all organisms in the same quantity

7. Partial mineral element is –
(a) N (b) P (c) K (d) Fe

8. Deficiency of which mineral causes deficiency of N –
(a) Mo (b) K (c) Mn (d) S

9. Micronutrients are needed in very small amounts because –
(a) Most of them are mobile in the plants
(b) The mainly function as cofactors of enzyme
(c) They play minor role in plant health
(d) Only meristems need these nutrients

10. A mineral deficiency is likely to affect older leaves more than younger leaves if the –
(a) Mineral is a micronutrient
(b) Deficiency persists for a long time
(c) Mineral is very mobile within the plant
(d) Older leaves are in direct contact of sunlight

11. It is necessary to study all the symptoms of the plant to identify the deficiency of an element because of –
(a) The deficiency of an element may cause multiple symptoms
(b) The same symptoms may be caused by the deficiency of more than element
(c) Both
(d) An element has only one role in plants health

12. All N_2 fixers belong to –
(a) Eubacteria (b) Eubacteria and Plantae

(c) Plantae (d) Protista

13. Nodules that are actively fixing nitrogen are pink, demonstrating the presence of –
(a) Fe (b) Chlorophyll
(c) Leg-haemoglobin (d) Anthocyanin

14. Root nodules on plants of the legume family contain –
(a) Cyanobacteria (b) Nitrococcus
(c) Rhizobium (d) Nitrobacter

15. Which of the following statements about the chemical process of N_2 fixation in cells is true –
(a) It is enhanced by high O_2 concentrations
(b) Very little energy in the form of ATP is needed
(c) All three bonds between nitrogen atoms are broken simultaneously
(d) Hydrogen atoms are added to nitrogen to form NH_3 molecules

16. Nitrate reduction –
(a) Is performed by plants
(b) Takes place in mitochondria
(c) Is catalysed by nitrogenase
(d) Performed by specialized plant cells located in the root

17. Which of the following groups of micro-organisms do not include the representatives that can fix N_2 -
(a) Free-living Rhizobium
(b) Nodule-inhabiting Rhizobium
(c) Cyanobacteria
(d) Azotobacter

18. Nitrogen fixation by organisms requires conditions that are –
(a) Highly alkaline (b) Anaerobic
(c) Saturated with sunlight (d) Free of water

19. The conversion of ammonia to ammonium occurs –
(a) On the ribosomes of cyanobacteria
(b) On the endoplasmic reticulum of green algae
(c) Spontaneously when ammonia is in water
(d) On the dry surface of soil particles

20. Plants that have mutualistic relations with nitrogen-fixing bacteria provide the bacteria with -
(a) N_2 (b) Enzymes (c) Sugars (d) Nitrite

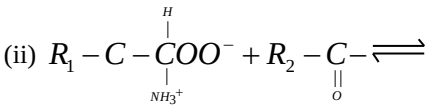
21. Which one is the correct summary equation for the nitrogen fixation –
(a) $N_2 + 8e^- + 8H^+ + 8ATP \rightarrow NH_3 + H_2 + 16ADP + 16Pi$
(b) $N_2 + 8e + 8H^+ + 16ATP \rightarrow 2\ NH_3 + H_2 + 16ADP + 16Pi$
(c) $2NH_3 + 4O_2 \rightarrow 2H^+ + 2H_2O + 2NO_3^-$
(d) $2NH_3 + 3O_2 \rightarrow 2NO_2^- + 2H^+ + 2H_2O$

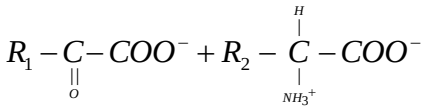
22. Source (s) of nitrogen oxides is –
(a) Industrial combustion (b) Forest fibre, automobile
(c) Power-generating stations (d) All

23. Which of the following represents the abiological mode of adding nitrogen to the soil
(a) Ammonification (b) Nitrification
(c) Lightning (d) Nodule formation

24. NH_4^+ is used to synthesise amino acids in plants. For it there are 2 main ways –
(i) α-Ketoglutaric acid + NH_4^+ + NADPH

$$\xrightarrow[\text{Dehydrogenase}]{\text{Glutamate}} \text{glutamate} + H_2O + NADP$$

(ii) 



(a) Both (i) and (ii) are reductive amination
(b) Both (i) and (ii) are transamination
(c) (i) Is transamination and (ii) is reductive amination
(d) (i) Is reductive amination and (ii) is transamination

25. The amino acids which pays a central role in nitrogen metabolism is / are –
(a) Glutamic acid
(b) α-ketoglutaric acid
(c) Aspartic acid
(d) Double aminated keto acids

26. Transported and storage form of nitrogen in plants are –
(a) Amides (b) Polypeptides
(c) Amino acids (d) α-ketoglutaric acids

27. Nitrite reductase enzyme is used to convert –
(a) Nitrate into nitrite ion
(b) Nitrogen of atmosphere into ammonia
(c) Ammonia into nitrates
(d) Nitrite to ammonium ion

28. During ionic flux, the uptake of ions into inner space is –
(a) Passive process (b) Active process
(c) Energy dependent (d) Both b and c

29. Outer space / free space includes –
(a) Inter cellular spaces (b) Cell wall
(c) Apoplast (d) All

30. Inner space consists of –
(a) Cytoplasm (b) Vacuole
(c) Apoplast, vacuole (d) Cytoplasm and vacuole

1. (c)

2. (d)

3. (c)

4. (d)

5. (a)

6. (c)

7. (b)

8. (a)

9. (a)

10. (b)

11. (c)

12. (c)

13. (b)

14. (b)

15. (c)

16. (d)

17. (a)

18. (a)

19. (b)

20. (a)

21. (c)

22. (d)

23. (c)

24. (a)

25. (d)

26. (a)

27. (d)

28. (d)

29. (c)

30. (d)