

DPP - Daily Practice Problems

Chapter-wise Sheets

Date :

Start Time :

End Time :

BIOLOGY

CB12

SYLLABUS : Mineral Nutrition

Max. Marks : 180

Marking Scheme : + 4 for correct & (–1) for incorrect

Time : 60 min.

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

- Which of the following is a free living aerobic non-photosynthetic nitrogen-fixer?
(a) *Rhizobium* (b) *Azotobacter*
(c) *Azospirillum* (d) *Nostoc*
- Which element is located at the centre of the porphyrin ring in chlorophyll ?
(a) Manganese (b) Calcium
(c) Magnesium (d) Potassium
- Which one of the following mineral elements plays an important role in biological nitrogen fixation ?
(a) Molybdenum (b) Copper
(c) Manganese (d) Zinc
- Leghaemoglobin helps in
(a) nitrogen fixation
(b) protecting nitrogenase from O₂
(c) destroys bacteria
(d) transport of food in plants
- 'Whip-tail' disease in cauliflower is noted due to deficiency of
(a) manganese (b) magnesium
(c) molybdenum (d) nitrogen
- Which of the following is correct set of micronutrient for plants?
(a) Mg, Si, Fe, Cu, Ca (b) Cu, Fe, Zn, B, Mn
(c) Mg, Fe, Zn, B, Mn (d) Mo, Zn, Cl, Mg, Ca

RESPONSE
GRID

1. (a) (b) (c) (d)
6. (a) (b) (c) (d)

2. (a) (b) (c) (d)

3. (a) (b) (c) (d)

4. (a) (b) (c) (d)

5. (a) (b) (c) (d)

Space for Rough Work

7. Which of the following statements about nitrification is not true ?
 (a) *Nitrobacter* oxidizes nitrite to nitrate.
 (b) *Nitrosomonas* and *Nitrosococcus* convert ammonium ions to nitrite.
 (c) Nitrification reactions are energy-producing (exergonic) reactions.
 (d) Heterotrophic plants are more directly dependent on the nitrifying bacteria for usable nitrogen than autotrophic plants.
8. 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*
9. *Azotobacter* and *Beijerinckia* are the examples of
 (a) symbiotic nitrogen-fixers
 (b) non-symbiotic nitrogen-fixers
 (c) ammonifying bacteria
 (d) disease causing bacteria
10. Which of the following is not performed by root hairs ?
 (a) Water uptake (b) Oxygen uptake
 (c) Mineral uptake (d) CO_2 uptake
11. The plant ash is an indication of.
 (a) organic matter of plant.
 (b) waste product.
 (c) mineral salts absorbed by plants.
 (d) None of the above
12. Plant obtains nitrogen from soil in the form of
 (a) nitrite (b) nitrate
 (c) ammonia (d) hydroxylamine
13. Hydroponics is
 (a) nutrient less culture (b) water less culture
 (c) soilless culture (d) none of these
14. Which element is required in the germination of pollen grain?
 (a) Chlorine (b) Potassium
 (c) Boron (d) Calcium
15. $\text{N}_2 + 8\text{e}^- + 8\text{H}^+ + 16\text{ATP} \rightarrow 2\text{NH}_4 + \text{H}_2 + 16\text{ADP} + 16\text{Pi}$
 The above equation refers to
 (a) ammonification (b) nitrification
 (c) nitrogen fixation (d) denitrification
16. A trace element essential for plant growth and radio-isotope, which is used in cancer therapy is
 (a) cobalt (b) calcium
 (c) sodium (d) iron
17. Which one of the following elements in plants is not remobilised?
 (a) Phosphorus (b) Calcium
 (c) Potassium (d) Sulphur
18. Element necessary for middle lamella is
 (a) Ca (b) Zn
 (c) K (d) Cu
19. Which of the following element is necessary for translocation of sugars in plants ?
 (a) Boron (b) Molybdenum
 (c) Manganese (d) Iron
20. Plants die from prolonged water-logging because
 (a) soil nutrients become very dilute.
 (b) root respiration stops.
 (c) cell sap in the plants becomes too dilute.
 (d) nutrients leach down due to excess water.
21. Conversion of ammonia into nitrates through *Nitrosomonas* is called
 (a) nitrogen fixation (b) nitrification
 (c) denitrification (d) ammonification

**RESPONSE
GRID**

- | | | | | |
|------------------|------------------|------------------|------------------|------------------|
| 7. (a)(b)(c)(d) | 8. (a)(b)(c)(d) | 9. (a)(b)(c)(d) | 10. (a)(b)(c)(d) | 11. (a)(b)(c)(d) |
| 12. (a)(b)(c)(d) | 13. (a)(b)(c)(d) | 14. (a)(b)(c)(d) | 15. (a)(b)(c)(d) | 16. (a)(b)(c)(d) |
| 17. (a)(b)(c)(d) | 18. (a)(b)(c)(d) | 19. (a)(b)(c)(d) | 20. (a)(b)(c)(d) | 21. (a)(b)(c)(d) |

Space for Rough Work

22. Which of the following is not a correct pairing of a macronutrient and the major functions it performs in the life of a plant ?
- Potassium-enzyme activation, water balance, ion balance.
 - Calcium-activity of membranes and cytoskeleton, second messenger.
 - Sulphur-in proteins and coenzymes.
 - Iron-in active sites of many redox enzymes and electron carriers.
23. Which of the following minerals activate the enzymes involved in respiration?
- nitrogen and phosphorus
 - magnesium and manganese
 - potassium and calcium
 - sulphur and iron
24. Soil can easily become deficient in _____ because these ions are negatively charged and do not stick to negatively charged clay particles.
- Nitrate
 - Calcium
 - Ammonium
 - Magnesium
25. Legumes' roots have swellings called nodules that
- produce antibiotics that protect the plant from soil bacteria
 - provide a steady supply of sugar to the host plant
 - increases the surface area for water uptake
 - contain nitrogen-fixing bacteria
26. Macronutrients are _____ than micronutrients.
- Larger molecules
 - Needed in greater quantities
 - More essential
 - More important for growth
27. 'Hunger signs' in plants are :
- Symptoms due to lesser water absorption in plants
 - Symptoms due to poor photosynthesis in plants
 - Deficiency symptoms of particular mineral nutrients
 - None of the above
28. Death of stem and root tips occur due to deficiency of :
- Calcium
 - Nitrogen
 - Carbon
 - Phosphorus
29. Which of the following is not involved in the phenomenon called ion exchange ?
- Negatively charged clay particles
 - pH
 - Cations like K^+ , Mg^{2+} , and Ca^{2+}
 - H_2S
30. Tea yellow is a disease of tea plants produced due to the deficiency of-
- Nitrogen
 - Sulphur
 - Potassium
 - Phosphorus
31. Nitrogenase
- is insensitive to oxygen.
 - contains magnesium
 - releases two NH_3 molecules as products.
 - requires an aerobic environment.
32. Deficiency of iron causes :
- interveinal chlorosis first on young leaves
 - decrease in protein synthesis
 - reduced leaves and stunted growth
 - bending of stem tip
33. You notice that the young leaves of your tomato plants are very yellow. What type of deficiency does this suggest ?
- Nitrogen
 - Carbon
 - Water
 - Iron

**RESPONSE
GRID**

- | | | | | |
|---------------------|---------------------|---------------------|---------------------|---------------------|
| 22. (a) (b) (c) (d) | 23. (a) (b) (c) (d) | 24. (a) (b) (c) (d) | 25. (a) (b) (c) (d) | 26. (a) (b) (c) (d) |
| 27. (a) (b) (c) (d) | 28. (a) (b) (c) (d) | 29. (a) (b) (c) (d) | 30. (a) (b) (c) (d) | 31. (a) (b) (c) (d) |
| 32. (a) (b) (c) (d) | 33. (a) (b) (c) (d) | | | |

Space for Rough Work

34. Where does most nutrient uptake occur in roots ?
 (a) At the root tip, where root tissue first encounters soil away from the zone of nutrient depletion.
 (b) At the casparian strip, where ions must enter the symplast prior to entering xylem cells.
 (c) In the symplastic and apoplastic pathways.
 (d) In root hairs and in the zone of maturation.
35. It is possible to determine whether an element is essential by observing growth of plants
 (a) On soil in which the particular element is removed
 (b) On soil in which only the particular element is present
 (c) On an inert medium to which solution of only the particular element is added
 (d) On an inert medium to which a nutrient solution excluding that particular element, is added.
36. Terrestrial plants obtain all of the following nutrients from the soil except
 (a) potassium (b) nitrogen
 (c) phosphorus (d) carbon
37. For chlorophyll formation a plant needs :
 (a) Fe, Ca & light (b) Fe, Mg & Light
 (c) Ca, K & light (d) Mn & Cu
38. Which element essential for the stability of chromosome structure?
 (a) Zn (b) Ca
 (c) Mo (d) Fe
39. Which mineral nutrients are called critical element for crops?
 (a) N, P, K (b) C, H, O
 (c) N, S, Mg (d) K, Ca, Fe
40. Nitrogenase enzymes are extremely sensitive to _____ molecules -
 (a) Hydrogen (b) Oxygen
 (c) Water (d) CO₂
41. Gray spots of Oat are caused by deficiency of :
 (a) Cu (b) Zn
 (c) Mn (d) Fe
42. Which element participates in photolysis of water, ionic balance maintenance and solute concentration?
 (a) Cl⁻ (b) B
 (c) Na⁺ (d) Mg²⁺
43. "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
44. Brown heart rot of beets is due to deficiency of
 (a) B (b) P
 (c) Mg (d) Mo
45. Which element is related with Khaira disease of paddy & auxin synthesis?
 (a) Fe (b) Zn
 (c) B (d) Cu

**RESPONSE
GRID**

34. (a) (b) (c) (d) 35. (a) (b) (c) (d) 36. (a) (b) (c) (d) 37. (a) (b) (c) (d) 38. (a) (b) (c) (d)
 39. (a) (b) (c) (d) 40. (a) (b) (c) (d) 41. (a) (b) (c) (d) 42. (a) (b) (c) (d) 43. (a) (b) (c) (d)
 44. (a) (b) (c) (d) 45. (a) (b) (c) (d)

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 12 - BIOLOGY

Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

HINTS & SOLUTIONS

DPP/CB12

1. (b)
2. (c)
3. (a) Molybdenum is a component of nitrogenase and nitrate reductase involved during N_2 fixation. Copper is essential for photosynthesis and respiration. Zinc is involved in synthesis of auxin. Manganese is activator of enzymes involved in nitrogen metabolism.
4. (b) The root nodules of leguminous plants contain a symbiotic nitrogen fixing bacteria *Rhizobium*. Root nodules are small irregular outgrowth of the roots which are pinkish internally due to presence of a pigment called leghaemoglobin. It is related to blood pigment haemoglobin. The cells of root nodules are tetraploid and contain polyhedral bacteria called bacteroids. Leghaemoglobin is an oxygen scavenger and protects the nitrogen fixing enzyme nitrogenase of bacteroids.
5. (c) 'Whip-tail' disease in cauliflower is noted due to deficiency of molybdenum. Cauliflower is the most sensitive of crops to molybdenum (Mb) deficiency. Light sandy soils with pH levels close to or below pH 6 under conditions of high fertility can show severe Mb deficiency. Molybdenum is the only plant essential micronutrient that becomes less available as the soil acidifies—the opposite of copper, zinc and iron.
6. (b) The essential elements are divided into macroelements and microelements based on the quantity in which they are required by the plants. Mn, Fe, Cu, Mo, Zn, B, and Cl are the micronutrients needed in very small quantities by the plants. C, H, O, N, P, S, K, Ca, Mg, Fe are the macronutrients required in more quantity.
7. (d) Heterotrophic plants are less dependent on nitrogen obtained from nitrification since they receive some nitrite and nitrate through their parasitic or carnivorous nutritional modes.
8. (d)
9. (b)
10. (d) Root hairs absorb water, minerals and oxygen but they do not absorb CO_2 . CO_2 intake takes place in leaves.
11. (c) The ash that is left after burning any dry part of the plant contains only mineral elements and is called plant ash.
12. (b) The atmospheric nitrogen is fixed in the soil in the form of nitrate. Nitrate and ammonium can be taken up by plants or used by other soil organisms. Any nitrate or ammonium that is not used for growth is added to the pool of inorganic nitrogen in the soil.
13. (c) Cultivation of plants by placing the roots in the nutrient solution without any soil is called hydroponics. It is also known as soilless culture/ water culture/ solution culture. It is used to determine which elements are essential for plant growth and what symptoms are produced by the absence or deficiency of essential elements.
14. (c)
15. (c)
16. (a) Cobalt stimulates growth of legumes such as beans, clover and alfalfa. This stimulation of growth by cobalt is due to its use, not by the plant itself, but by nitrogen-fixing bacteria that live in roots of plants.
17. (b)
18. (a)
19. (a)
20. (b)
21. (b)
22. (d)
23. (b) 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.
24. (a) NO_3^- , is negatively charged and not tightly bound to soil particles.
25. (d) Legume roots have swellings called nodules that contain nitrogen-fixing bacteria of the genus *Rhizobium*.
26. (b) The main difference between micronutrients and macronutrients is in how much of them a plant needs to survive.
27. (c) Symptoms caused by deficiency of essential mineral elements on plants are called Hunger signs.
28. (a) The deficiency of calcium results in death of leaf, stem and root apices.
29. (c) Hydrogen sulphide has little to do with ion exchange.
30. (b) Due to immobile property of sulphur, chlorosis occurs first in young leaves.
31. (c) All other statements are false.
32. (a) The characteristic symptom of iron deficiency is the interveinal chlorosis. The symptom may be general or localised to a single leaf or a single branch because of the limited mobility of iron in the tissues. The deficiency symptom first appears in young leaves.
33. (d) An iron deficiency is suspected in a plant. If the older leaves are yellow, a nitrogen deficiency would be suspected because nitrogen is easily relocated in the plant while iron is not.
34. (d)
35. (d) The bulk of the organic material of a plant is derived from carbon dioxide assimilated from the atmosphere.
36. (d)
37. (b) For chlorophyll formation, a plant needs Fe, Mg & light
38. (c)
39. (a)
40. (b)
41. (c)
42. (a)
43. (b) "Reclamation" and "Little leaf" disease is caused by deficiency of Cu and Zn.
44. (a)
45. (a)