

2. PLANT TISSUES(SOLUTIONS)

TEACHING TASK (Page 50- 52)

Multiple Choice Questions (Single Correct Answer)

1. Meristematic tissues are composed of

Answer: B) Immature cells

Explanation: Meristematic tissues consist of actively dividing, immature cells that are responsible for plant growth. These cells are not fully differentiated, unlike permanent or mature cells.

2. Which of the following is a lateral meristem?

Answer: D) B & C (Inter fascicular cambium and Cork cambium)

Explanation: Lateral meristems contribute to the secondary growth (increase in girth) of plants. Both interfascicular cambium (part of vascular cambium) and cork cambium (produces bark) are lateral meristems. Vascular cambium (A) is also a lateral meristem, but since D includes both B and C, it is the most complete answer.

3. Meristem present at the tip of radicle is called

Answer: B) Root apex

Explanation: The radicle is the embryonic root, and the meristem at its tip is called the root apex, responsible for primary growth of the root.

4. A single tissue in plant comprises

Answer: A) Only one type cell

Explanation: A single plant tissue (simple tissue) is composed of only one type of cell, e.g., parenchyma, collenchyma, or sclerenchyma. Complex tissues like xylem and phloem contain multiple cell types.

5. Which of the following is a living mechanical tissue?

Answer: D) Collenchyma

Explanation: Collenchyma is a living mechanical tissue that provides flexible support to growing plant parts due to its thickened cell walls. Sclerenchyma (A) is dead at maturity, while parenchyma and aerenchyma are not primarily mechanical.

6. Chlorenchyma differs from parenchyma in having

Answer: B) Chlorophyll

Explanation: Chlorenchyma is a type of parenchyma specialized for photosynthesis due to the presence of chlorophyll. Other features like cellulose or living protoplasm are common to all parenchyma cells.

7. In desert plants, rate of water loss gets reduced due to the presence of

Answer: A) Cuticle

Explanation: The cuticle, a waxy layer on the epidermis, reduces water loss by transpiration in desert plants. Stomata (B) facilitate water loss, and lignin/suberin are not primarily responsible for this function.

8. A tracheid differs from a vessel in having

Answer: B) Discontinuous lumen which are separated by end wall

Explanation: Tracheids have a discontinuous lumen due to end walls, while vessels have perforated end walls, forming a continuous tube for water transport.

9. Vessels and companion cells are characteristic of xylem and phloem of

Answer: C) Angiosperms

Explanation: Vessels (in xylem) and companion cells (in phloem) are characteristic features of angiosperms. Gymnosperms lack vessels, and bryophytes/pteridophytes lack companion cells.

10. Trachea, tracheids, wood fibres, and parenchymatous tissues are found in

Answer: A) Xylem

Explanation: Trachea (vessels), tracheids, wood fibres (xylem fibres), and xylem parenchyma are all components of xylem tissue.

11. Sieve tubes have

Answer: D) Possess a broad lumen and perforated cross walls

Explanation: Sieve tubes in phloem have perforated cross walls (sieve plates) and a broad lumen to facilitate the transport of food materials.

12. Sieve tubes are better suited for translocation because of these

Answer: D) Possess a broad lumen and perforated cross walls

Explanation: The broad lumen and perforated cross walls (sieve plates) allow efficient translocation of organic materials in sieve tubes.

13. Companion cells are usually seen associated with

Answer: D) Sieve tubes

Explanation: Companion cells are specialized parenchyma cells that support sieve tubes in phloem by providing metabolic support.

Advanced Questions

More than One Correct Answer

14. Identify the wrong statement

Answer: C) iii & iv

Explanation:

i: Collenchyma can occur in the epidermis, cortex, or pith (correct).

ii: Parenchyma's main function is storage (correct).

iii: Vascular tissues (xylem and phloem) are primarily for transport, not mechanical strength (incorrect; xylem provides some strength, but it's not the main function).

iv: Sclerenchyma provides mechanical support, not transport (incorrect).

Thus, iii and iv are wrong.

15. Identify wrong statement

Answer: C) iii & iv

Explanation:

i: Xylem and phloem are complex tissues (correct).

ii: The main function of vascular tissues is transport (correct).

iii: Xylem and phloem are complex tissues, not simple tissues (incorrect).

iv: Vascular tissues are not primarily for storage (incorrect; parenchyma stores food).

Thus, iii and iv are wrong.

Assertion & Reason

16. A) Sclerenchyma fibre constitute the major mechanical tissue of the plants

R) The cells are thick walled and is made up of cellulose (or) Lignin (or) both

Answer: A) A & R are true & R explains A

Explanation: Sclerenchyma fibres provide mechanical strength due to their thick walls, which are composed of cellulose, lignin, or both. The reason explains the assertion.

17. A) Death of sieve tube membrane results in the death of its adjacent companion cell.

R) Both are derived from the same mother cell

Answer: A) A & R are true & R explains A

Explanation: Sieve tubes and companion cells are derived from the same mother cell, and companion cells support sieve tubes metabolically. If the sieve tube dies, the companion cell, being dependent on the same developmental origin and function, also dies.

18. A) Xylem & phloem are complex tissues

R) Complex tissue is a collection of different types of cells

Answer: A) A & R are true & R explains A

Explanation: Xylem and phloem are complex tissues because they consist of multiple cell types (e.g., tracheids, vessels, sieve tubes, companion cells). The reason correctly explains the assertion.

Match the Following

19. Match the following

Column I:

1. Parenchyma
2. Aerenchyma
3. Collenchyma
4. Permanent tissue

Column II:

- a. Sclerenchyma
- b. Localized thickenings
- c. Buoyancy
- d. Thin-walled, packing cells

Answer: A) 1-d, 2-c, 3-b, 4-a

Explanation:

Parenchyma: Thin-walled, packing cells (d).

Aerenchyma: Parenchyma with air spaces for buoyancy (c).

Collenchyma: Cells with localized thickenings for support (b).

Permanent tissue: Includes sclerenchyma, a dead tissue for mechanical support (a).

20. Match the following

Column I:

1. Apical meristem
2. Lateral meristem
3. Intercalary meristem
4. Vascular tissues

Column II:

- a. Cork cambium
- b. Tips of roots and stems
- c. Xylem and phloem
- d. Width or girth

Answer: A) 1-b, 2-a, 3-d, 4-c

Explanation:

Apical meristem: Found at tips of roots and stems (b).

Lateral meristem: Includes cork cambium for girth increase (a).

Intercalary meristem: Contributes to length or girth in specific regions, e.g., grass nodes (d).

Vascular tissues: Xylem and phloem for transport (c).

Comprehensive Questions (Based on Paragraph)

Paragraph: Xylem and phloem are complex permanent tissues. Xylem conducts water, and phloem conducts food materials. Xylem cells include tracheids, vessels, xylem parenchyma, xylem fibres. Phloem includes sieve tubes, companion cells, phloem parenchyma, phloem fibres. Xylem provides mechanical strength. In xylem, conduction mostly occurs in one direction, and in phloem, it occurs in both directions. Phloem fibres are dead; xylem fibres provide mechanical strength. The textile fibres of flax, hemp, and jute are phloem fibres.

21. Conducting tissues are

Answer: C) A and B (Xylem and Phloem)

Explanation: Both xylem (water conduction) and phloem (food conduction) are conducting tissues.

22. Components of xylem are

Answer: A) Tracheids

Explanation: Tracheids are a component of xylem, while companion cells and sieve tubes are part of phloem. Option C (A and B) is incorrect as companion cells are not in xylem.

23. Conduction of water and food done by

Answer: A) Xylem, phloem

Explanation: Xylem conducts water, and phloem conducts food, as stated in the paragraph.

24. Phloem fibres are

Answer: B) Sclerenchyma fibres

Explanation: Phloem fibres are dead sclerenchyma cells, as mentioned in the paragraph (e.g., textile fibres of flax, hemp, jute).

LEARNERS TASK (Page 53 – 56)

Single Answer Type

1. Tissue may be defined as

C) A group of cells common in origin, form and function

Explanation: Tissue is a group of cells that share a common origin, structure (form), and function, working together to perform a specific role in the plant.

2. Each meristematic cell is

D) All the above

Explanation: Meristematic cells have thin, uniform cellulose cell walls, are non-vacuolated, and have prominent nuclei, making all options correct.

3. Meristem present at the leaf base of grasses is

B) Intercalary

Explanation: Intercalary meristems are located at the base of leaves or internodes in grasses, contributing to their elongation.

4. Permanent Tissues are

C) Living or dead

Explanation: Permanent tissues can be living (e.g., parenchyma, collenchyma) or dead (e.g., sclerenchyma) depending on their type and function.

5. Primary growth in a plant body is brought about by

C) Apical

Explanation: Apical meristems, located at the tips of shoots and roots, are responsible for primary growth, which increases the length of the plant.

6. Parenchyma is a

A) Simple tissue

Explanation: Parenchyma is a simple tissue composed of a single type of cell, performing functions like storage and photosynthesis.

7. Parenchyma which takes up the function of photosynthesis is called

B) Chlorenchyma

Explanation: Chlorenchyma is parenchyma tissue containing chloroplasts, enabling photosynthesis.

8. Aerenchyma is a common tissue found in

C) Hydrophytes

Explanation: Aerenchyma, with air cavities, is typical in hydrophytes (aquatic plants) to aid buoyancy and gas exchange.

9. Parenchyma cells containing chloroplasts are called

C) Chlorenchyma

Explanation: Chlorenchyma cells contain chloroplasts, enabling them to perform photosynthesis.

10. Parenchyma cells containing air cavities are

A) Aerenchyma

Explanation: Aerenchyma is characterized by large air spaces, aiding in buoyancy and gas exchange in aquatic plants.

11. Cell walls of sclerenchyma are rich in

C) Lignin

Explanation: Sclerenchyma cell walls are thickened with lignin, providing mechanical strength and rigidity.

12. Flexibility in plants is due to

A) Collenchyma

Explanation: Collenchyma provides flexibility and mechanical support due to its thickened, elastic cell walls.

13. The husk of coconut is made of

D) Sclerenchyma

Explanation: The coconut husk is composed of sclerenchyma, a dead tissue with lignified walls, providing strength and durability.

Descriptive Type

1. What will happen if

a. Apical meristem is damaged or cut

Solution: If the apical meristem is damaged or cut, primary growth (increase in length) of the shoot or root will be halted. The plant may fail to develop new leaves, stems, or roots from the affected apex. However, lateral branches or adventitious shoots may develop from other meristems to compensate.

b. Cork is not formed in older stems and roots

Solution: If cork (phellem) is not formed in older stems and roots, the plant will lack a protective layer, making it susceptible to water loss, mechanical damage, and pathogen invasion. The epidermis may also rupture due to secondary growth, exposing internal tissues.

2. A tissue present in the plant A located inside the vascular bundles and helps in the conduction of water and minerals. Tissue B present on the outermost part of the plant organs or parts which is having structure C which helps in exchange of gases.

a. Name the tissue A: Xylem

Explanation: Xylem, located inside vascular bundles, conducts water and minerals from roots to other parts of the plant.

b. Name the tissue B: Epidermis

Explanation: The epidermis is the outermost layer of plant organs, providing protection and facilitating gas exchange.

c. Name the structure C: Stomata

Explanation: Stomata are structures in the epidermis that regulate gas exchange (CO_2 and O_2) and transpiration.

3. Name the plant tissue which shows the following characteristics:

a. Made up of living cells showing thickening, provide mechanical support to the plant: Collenchyma

Explanation: Collenchyma consists of living cells with thickened cell walls, providing flexible mechanical support, especially in young stems and leaves.

b. Made up of dead cells showing thickening, provide mechanical support to the plants, are made of one type of cells: Sclerenchyma

Explanation: Sclerenchyma consists of dead, lignified cells (fibres or sclereids) that provide rigid mechanical support and are a simple tissue.

c. Made up of living cells containing green coloured chloroplasts, possesses intercellular spaces: Chlorenchyma

Explanation: Chlorenchyma is parenchyma with chloroplasts, involved in photosynthesis, and typically has intercellular spaces for gas exchange.

Advanced Questions

More than one answer

1. Which of the following statement is true

C) i & iv

Explanation:

I: True. Apical meristems occur at the tips of shoots and roots, responsible for primary growth.

II: False. Lateral meristems, not apical, increase the length of internodes (secondary growth).

iii: False. Intercalary meristems increase length, not width; lateral meristems increase girth.

iv: True. Lateral meristems (e.g., vascular cambium) occur along the sides, parallel to the long axis of roots and stems, contributing to secondary growth.

2. Which of the following is incorrect

D) only iii

Explanation:

i: True. Parenchyma is a primitive simple tissue with similar structure and function.

ii: True. Collenchyma is a simple tissue, like parenchyma.

iii: False. Sclerenchyma is a simple tissue, not a complex tissue (complex tissues include xylem and phloem).

iv: True. Sclereids are thick-walled, lignified, and hard, providing mechanical support.

Assertion & Reason

3.A) Permanent tissue is composed of matured cells. R) Meristematic tissue is a group of actively dividing cells

A) A & R are true & R explains A

Explanation: Permanent tissues consist of mature, non-dividing cells derived from meristematic tissues, which are actively dividing. The reason explains why permanent tissues are mature (they lose the ability to divide).

4. A) The rigidity in leaf is due to Sclerenchyma. R) Sclerenchyma are dead tissue and provide mechanical strength

A) A & R are true & R explains A

Explanation: Sclerenchyma provides rigidity in leaves due to its lignified, dead cells, which offer mechanical strength. The reason directly explains the assertion.

Match the Following

5. Meristematic tissue matching

B) 1-c, 2-d, 3-b, 4-a

Explanation:

- 1) Meristematic tissue: Growing points of a plant (c). Meristematic tissues are responsible for growth.
- 2) Apical meristem: Tip of shoots and roots (d). Located at apices for primary growth.
- 3) Lateral meristem: Side, long axis of root (b). Contributes to secondary growth (girth).
- 4) Intercalary meristem: Base of internodes (a). Found in grasses for elongation.

6. Xylem components matching

C) 1-d, 2-b, 3-a, 4-c

Explanation:

- 1) Tracheids: Non-living elongated cells (d). Conduct water, have tapered ends.
- 2) Vessels: Cylindrical tubes (b). Formed by end-to-end tracheary elements for water conduction.
- 3) Xylem parenchyma: Living cells (a). Store substances and assist in conduction.
- 4) Xylem Fibre: Non-living thick lignin (c). Provide mechanical support.

7. Phloem components matching

A) 1-d, 2-a, 3-b, 4-c

Explanation:

- 1) Sieve tubes: Conducting elements (d). Transport organic nutrients.
- 2) Companion cells: Helping to sieve tubes (a). Assist in loading/unloading sugars.

- 3) Phloem parenchyma: Storage of food (b). Store nutrients in phloem.
- 4) Phloem Fibres: Mechanical support (c). Provide strength with lignified walls.

Comprehensive

Paragraph-based questions

Based on the provided paragraph about plant tissues (meristematic and permanent tissues, simple and complex tissues, and characteristics of parenchyma, collenchyma, and sclerenchyma):

8. Permanent tissues are formed from

C) Meristematic tissue

Explanation: Permanent tissues are derived from meristematic tissues after they lose their ability to divide.

9. Parenchyma present in

D) All the above

Explanation: Parenchyma is found in roots, stems, leaves, fruits, and seeds, as stated in the paragraph.

10. Which one acts as living mechanical tissue

B) Collenchyma

Explanation: Collenchyma is a living tissue with thickened cell walls, providing flexible mechanical support.

11. Sclerenchyma cell walls deposition of

B) Lignin

Explanation: Sclerenchyma cell walls are thickened with lignin, making them rigid and dead at maturity.

12. Identify the simple tissue

C) Parenchyma, collenchyma, sclerenchyma

Explanation: Simple tissues are made of one cell type, including parenchyma, collenchyma, and sclerenchyma. Xylem and phloem are complex tissues.

Additional Questions (Single Answer Type)

1. The outermost primary meristem gives rise to

A) Epidermis

Explanation: The outermost primary meristem (protoderm) forms the epidermis, the protective outer layer.

2. Vascular cambium is an example of

C) Secondary meristem

Explanation: Vascular cambium is a lateral meristem responsible for secondary growth, increasing girth.

3. The complex tissue includes

A) Xylem

Explanation: Xylem is a complex tissue composed of multiple cell types (tracheids, vessels, parenchyma, fibers). Sclerenchyma and collenchyma are simple tissues.

4. Which meristem helps in increasing girth

A) Lateral meristem

Explanation: Lateral meristems (e.g., vascular cambium, cork cambium) increase the girth of stems and roots.

5. Wood is the common name for

B) Secondary Xylem

Explanation: Wood is primarily secondary xylem, produced by the vascular cambium during secondary growth.