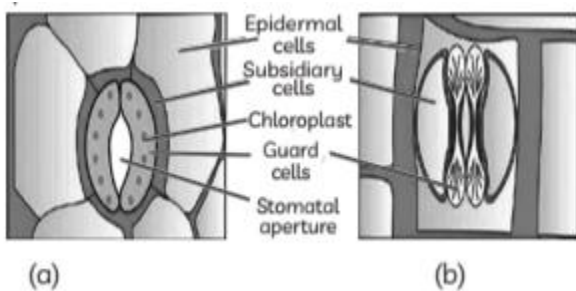


Anatomy of Flowering Plants

Case Study Based Questions

Read the following passages and answer the questions that follow:

1. Observe the following diagram and answer the questions.



Diagrammatic Representation of Stomata:

(a) Stomata with Bean-Shaped Guard Cells

(b) Stomata with Dumb-bell Shaped Guard Cells

(A) Where do you find Stomata with bean- shaped guard cells?

(B) Specify the shape of stomata present in monocots.

(C) What do you mean by stomatal apparatus? Write down the functions of guard cells.

Ans. (A) Dicots show stomata with bean-shaped guard cells.

(B) Stomata present in monocots like grasses are dumb-bell shaped.

2. Once Shruti was doing some practical work with all her classmates. She was given a section to study the anatomy of roots and stems. While doing practicals, the lab teacher instructed all the students about the procedure of studying the anatomy of roots or stems. While doing this, when Shruti observed the thin section under the microscope, she had so many queries related to this.

(A) What makes the apical meristem of the root sub-terminal?

(a) Meristems

(c) Root hairs

(b) Trichomes

(d) Root cap

(B) The meristem that occurs early in the life of a plant is known as:

(a) Lateral meristem

- (b) Embryonic meristem
- (c) Apical meristem
- (d) Both (b) and (c)

(C) Which of the following is the example of secondary meristem?

- (a) Intercalary meristem
- (b) Lateral meristem
- (c) Both (a) and (b)
- (d) Promeristem

(D) Meristem present in grasses is:

- (a) Intercalary meristem
- (b) Embryonic meristem
- (c) Primordial meristem
- (d) Promeristem

(E) Assertion (A): Apical meristem is responsible for the increase in length of root and stem.

Reason (R): Apical meristem is found in the growing tips of the plant such as root tip and shoot tip.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true and R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

Ans. (A) (d) Root cap

Explanation: The apical meristem of the root is sub-terminal because of the root cap. As this root cap covers the tip of the root for protection. Thus, the apical meristem present in the region of meristematic activity lies at the sub-terminal position. It lies just above the root cap.

(B) (d) Both (b) and (c)

Explanation: Meristems that occur at an early stage in plants at the tip of root and shoot are apical meristems. Embryonic meristem occupies a minor area of the tip of the root and shoot. This type of meristem occurs from the beginning of plant growth. Lateral meristem is a secondary meristem usually found in matured parts of root and shoot sections of plants.

(C) (b) Lateral meristem

Explanation: Lateral meristem, also known as the secondary meristem, is found in matured root and shoot sections of plants. They have a spherical form and create secondary tissue. Secondary meristem is always lateral in position. Intercalary meristem is a primary meristem that occurs in between mature tissue. This type of meristem occurs in the early life of plants and helps in forming primary plant bodies. Promeristem is also known as embryonic meristem or primordial meristem, it develops at an early stage in plants.

(D) (a) Intercalary meristem

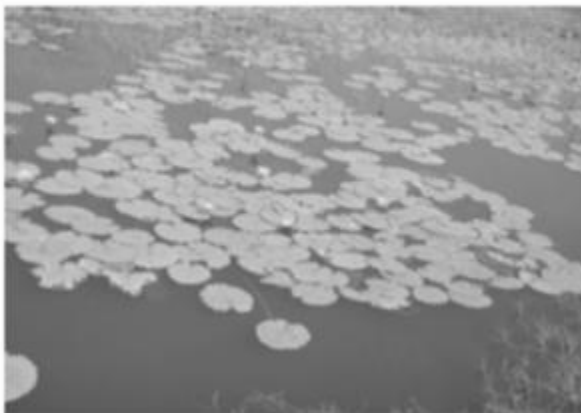
Explanation: Meristem present in grasses is intercalary meristem, since grass is a monocot, meristem found in monocots is intercalary meristem. Intercalary meristem is a primary meristem that occurs in between mature tissue. This type of meristem occurs in the early life of plants and helps in forming primary plant bodies.

(E) (a) Both A and R are true and R is the correct explanation of A.

Explanation: Both Assertion and reasoning are correct and reason is the correct explanation of assertion.

3. Observe carefully the given picture and answer the questions

Aeren- chyma	Collen- chyma	Scleren- chyma	Chloren- chyma
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(A) Among the above mentioned tissues, which one is a characteristic feature of aquatic plants? Explain.

(B) Which type of tissue provides buoyancy in aquatic plants?

(C) Give the common names of any two aquatic angiosperms known to you.

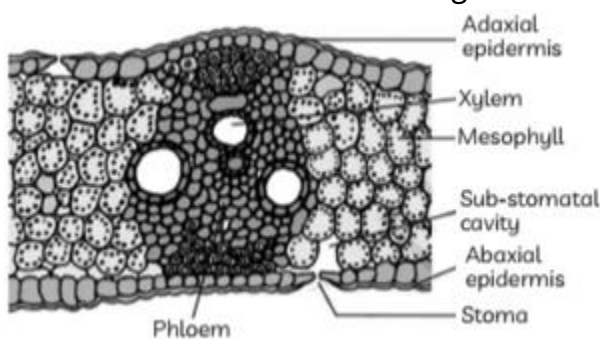
Ans. (A) Large air gaps exist in the parenchyma of aquatic plants to let them float on water. Such a parenchyma type is called aerenchyma. It is a type of tissue with air gaps. It

allows them to float to the water's upper surface.

(B) The buoyancy of floating plants is helped by aerenchyma.

(C) Water lily and water hyacinth.

4. There are a lot of different types of cells inside a plant that are specialised for carrying out different vital life functions, one of the types is parenchyma. Parenchyma refers to a bulk or a cluster of cells. In plants, it is defined as a tissue that is composed of living cells with very thin cell walls. Parenchyma cells make up the non-woody interior structure of many plants. They can be found in stems, roots and leaves as they form the cortex of these structures. Observe the diagram carefully and answer the following questions.



(A) A distinct layer lies on the upper epidermis prevents excessive transpiration is:

- (a) Guard cells
- (b) Cuticle
- (c) Mesophyll
- (d) Bundle sheath

(B) The spongy parenchyma lies:

- (a) between the upper epidermis and lower epidermis
- (b) below the vascular bundles
- (c) between the lower epidermis and palisade parenchyma
- (d) below the upper epidermis

(C) The leaf which is distinct into upper and lower surfaces and mesophyll are distinguishable is:

- (a) Dorsiventral
- (b) Isobilateral
- (c) Unifacial
- (d) All of these

(D) Identify the simple tissue system from the following.

- (a) Parenchyma
- (b) Xylem
- (c) Epidermis
- (d) Phloem

(E) Bulliform or motor cells are present in:

- (a) In both adaxial and abaxial epidermal cells of a dicot.
- (b) In some adaxial epidermal cells of grasses.
- (c) In adaxial epidermal of dicot leaves.
- (d) None of the above

Ans. (A) (b) Cuticle

Explanation: A distinct layer of cuticle lies outside of the epidermis which prevents excessive transpiration. While guard cells are present in abaxial epidermis, mesophyll is between the upper and lower epidermis and vascular bundle is surrounded by bundle sheath.

(B) (c) between the lower epidermis and palisade parenchyma

Explanation: The spongy parenchyma lies between the lower epidermis and the palisade parenchyma while palisade parenchyma lies below the upper epidermis.

(C) (a) Dorsiventral

Explanation: Dorsiventral leaf is distinct into upper and lower surfaces and mesophyll is distinguishable into palisade and spongy tissues while Isobilateral and unifacial leaves are not distinct into upper and lower surfaces.

(D) (a) Parenchyma

Explanation: Parenchyma is a simple tissue. It is made up of only one type of cells whereas xylem, epidermis and phloem are complex tissues. They are made up of more than one type of cell.

(E) (b) In some adaxial epidermal cells of grasses.

Explanation: Bulliform cells are present in some adaxial epidermal cells of grasses. They are highly vacuolated and can store water in case of stress.

5. Epiblema is the outermost layer of the root and are compactly arranged thin-walled parenchymatous cells. Epiblema gives rise to thin-walled tubular outgrowth called root hairs. Root hairs possess a gummy pectic layer on the outside for cementing with soil particles and retaining water on the surface due to the presence of root hairs, it is a

porous layer. Root hairs commonly do not live for more than one week. With their death, the epiblema cells become suberised and cutinized. Cortex lies below the epidermis made up of thin-walled parenchyma cells. Innermost layer of cortex, endodermis is made up of a single layer of barrel-shaped cells and does not enclose intercellular spaces.

(A) From where do the lateral roots originate?

(B) Write one function of root hairs present in epiblema cells.

(C) Why endodermis function as a biological check post?

Ans. (A) Pericycle of mature zone.

(B) Root hairs take part in absorption of water and mineral salts from the soil.

(C) Endodermis act as a biological check post because of the Casparian strip, the endodermal cells do not allow wall to wall movement of substances between the cortex and pericycle. Substances must enter the cytoplasm of endodermal cells.