NCERT Exemplar Solutions of Class 11 Biology – Chapter 6: Anatomy of Flowering Plants

MULTIPLE CHOICE QUESTIONS

Question 1

A transverse section of the stem is stained first with safranin and then with fast green following the usual schedule of double staining for the preparation of a permanent slide. What would be the colour of the stained xylem and phloem?

a. Red and green

b. Green and red

c. Orange and yellow

d. Purple and orange

Solution: Option (a) is the answer.

Enhanced Explanation: In double staining technique, safranin (a basic dye) stains lignified tissues (like xylem) red/pink, while fast green (an acidic dye) stains cellulosic tissues (like phloem) green. This differential staining helps distinguish between different tissue types in plant anatomy studies.

Question 2

Match the followings and choose the correct option from below:

Column I	Column II
A. Meristem	i. Photosynthesis, storage
B. Parenchyma	ii. Mechanical support
C. Collenchyma	iii. Actively dividing cells
D. Sclerenchyma	iv. Stomata
E. Epidermal tissue	v. Sclereids

Options: a. A-i, B-iii, C-v, D-ii, E-iv

b. A-iii, B-i, C-ii, D-v, E-iv

c. A-ii, B-iv, C-v, D-i, E-iii

d. A-v, B-iv, C-iii, D-ii, E-i

Solution: Option (b) is the answer.

Enhanced Explanation:

- Meristem (A) → Actively dividing cells (iii)
- Parenchyma (B) → Photosynthesis, storage (i)
- Collenchyma (C) → Mechanical support (ii)
- Sclerenchyma (D) → Sclereids (v)
- Epidermal tissue (E) → Stomata (iv)

Question 3

Match the following and choose the correct option from below:

Column I	Column II
A. Cuticle	i. Guard cells
B. Bulliform cells	ii. Single layer
C. Stomata	iii. Waxy layer
D. Epidermis	iv. Empty colourless cell

Options: a. A-iii, B-iv, C-i, D-ii
b. A-i, B-ii, C-iii, D-iv
c. A-iii, B-ii, C-iv, D-i
d. A-iii, B-ii, C-i, D-iv
Solution: Option (a) is the answer.
Enhanced Explanation:

- Cuticle (A) → Waxy layer (iii) - prevents water loss
- Bulliform cells (B) → Empty colourless cell (iv) - help in leaf folding during water stress
- Stomata (C) → Guard cells (i) - regulate gas exchange
- Epidermis (D) → Single layer (ii) - protective outer layer

Question 4
Identify the simple tissue system from the following: a. Parenchyma
b. Xylem
c. Epidermis
d. Phloem
Solution: Option (a) is the answer.
Enhanced Explanation: Simple tissues are composed of only one type of cell. Parenchyma is a simple tissue made up of only parenchyma cells. Xylem and phloem are complex tissues (composed of different cell types), while epidermis is a tissue system.

Question 5
Cells of this tissue are living and show angular wall thickening. They also provide mechanical support. The tissue is: a. Xylem
b. Sclerenchyma
c. Collenchyma
d. Epidermis
Solution: Option (c) is the answer.
Enhanced Explanation: Collenchyma cells are characterized by:

- Living cells (unlike sclerenchyma which are dead at maturity)
- Angular wall thickening at corners due to cellulose and pectin deposition
- Provide flexible mechanical support to growing organs
- Allow for growth while providing support

Question 6

Epiblema of roots is equivalent to: a. Pericycle

b. Endodermis

c. Epidermis

d. Stele

Solution: Option (c) is the answer.

Enhanced Explanation: Epiblema is the outermost layer of young roots, functionally equivalent to epidermis of stems and leaves. It lacks cuticle and often bears root hairs for water and mineral absorption.

Question 7

A conjoint and open vascular bundle will be observed in the transverse section of: a. Monocot root

b. Monocot stem

c. Dicot root

d. Dicot stem

Solution: Option (d) is the answer.

Enhanced Explanation:

- Conjoint: Xylem and phloem lie together on the same radius
- Open: Contains cambium between xylem and phloem, allowing secondary growth
- This arrangement is characteristic of dicot stems
- Monocot stems have conjoint but closed bundles (no cambium)
- Roots have radial arrangement (not conjoint)

Question 8

Interfascicular cambium and cork cambium is formed due to: a. Cell division

b. Cell differentiation

c. Cell dedifferentiation

d. Redifferentiation

Solution: Option (c) is the answer.

Enhanced Explanation: Cell dedifferentiation is the process where mature, differentiated cells regain meristematic activity. Interfascicular cambium forms from dedifferentiation of parenchyma cells between vascular bundles, and cork cambium forms from dedifferentiation of cortical or epidermal cells.

Question 9

Phellogen and Phellem respectively denote: a. Cork and cork cambium

b. Cork cambium and cork

c. Secondary cortex and cork
d. Cork and secondary cortex
Solution: Option (b) is the answer.
Enhanced Explanation:

- Phellogen = Cork cambium (meristematic tissue)
- Phellem = Cork (protective tissue formed outward by cork cambium)
- Phelloderm = Secondary cortex (formed inward by cork cambium)
- Together, these three form the periderm

Question 10
In which of the following pairs of parts of a flowering plant is the epidermis absent? a. Root tip and shoot tip
b. Shoot bud and floral bud
c. Ovule and seed
d. Petiole and pedicel
Solution: Option (a) is the answer.
Enhanced Explanation: Root tips and shoot tips contain actively dividing meristematic cells that have not yet differentiated into specialized tissues like epidermis. The epidermis is formed by the protoderm as cells mature and differentiate.

Question 11
How many shoot apical meristems are likely to be present in a twig of a plant possessing 4 branches and 26 leaves? a. 26
b. 1
c. 5
d. 30
e. 4
Solution: Option (c) is the answer.
Enhanced Explanation: Each branch tip has one shoot apical meristem. With 4 branches plus the main shoot axis, there are 5 shoot apical meristems total. The number of leaves doesn't affect the number of apical meristems.

Question 12
A piece of wood having no vessels (trachea) must belong to: a. Teak
b. Mango
c. Pine
d. Palm
Solution: Option (c) is the answer.

Enhanced Explanation: Pine is a gymnosperm, and gymnosperms lack vessels in their xylem. Instead, they have tracheids for water conduction. Teak, mango, and palm are angiosperms that possess vessels.

Question 13

A plant tissue, when stained, showed the presence of hemicellulose and pectin in the cell wall of its cells. The tissue represents: a. Collenchyma

b. Sclerenchyma

c. Xylem

d. Meristem

Solution: Option (a) is the answer.

Enhanced Explanation: Collenchyma cell walls contain cellulose, hemicellulose, and pectin, which provide flexible support. Sclerenchyma contains lignin, xylem contains lignin and cellulose, while meristem has thin cellulosic walls.

Question 14

In conifers, fibres are likely to be absent in: a. Secondary phloem

b. Secondary xylem

c. Primary phloem

d. Leaves

Solution: Option (b) is the answer.

Enhanced Explanation: Coniferous secondary xylem consists mainly of tracheids and lacks both vessels and fibres. The mechanical support is provided by the thick-walled tracheids themselves.

Question 15

When we peel the skin of a potato tuber, we remove: a. Periderm

b. Epidermis

c. Cuticle

d. Sapwood

Solution: Option (a) is the answer.

Enhanced Explanation: Potato skin consists of periderm (cork tissue), not epidermis. In mature potato tubers, the original epidermis is replaced by periderm as a protective tissue.

Question 16

A vessel-less piece of stem possessing prominent sieve tubes would belong to: a. Pinus

b. Eucalyptus

c. Grass

d. Trochodendron

Solution: Option (d) is the answer.

Enhanced Explanation: Trochodendron is a primitive angiosperm that lacks vessels but has well-developed sieve tubes in phloem. Pinus (gymnosperm) lacks both vessels and sieve tubes, while Eucalyptus and Grass have vessels.

Question 17

Which one of the following cell types always divides by anticlinal cell division? a. Fusiform initial cells

b. Root cap

c. Protoderm

d. Phellogen

Solution: Option (c) is the answer.

Enhanced Explanation: Protoderm cells divide anticlinally (perpendicular to the surface) to maintain the single-layered epidermis. This ensures that the protective outer layer remains intact as a single layer.

Question 18

What is the fate of primary xylem in a dicot root showing extensive secondary growth? a. It is retained in the centre of the axis

b. It gets crushed

c. May or may not get crushed

d. It gets surrounded by primary phloem

Solution: Option (a) is the answer.

Enhanced Explanation: In dicot roots undergoing secondary growth, the primary xylem remains in the central position and is not crushed because it consists of lignified, dead cells that can withstand pressure from secondary growth.