

Anatomy of Flowering Plants

6.1 The Tissues

- Phloem in gymnosperms lacks
 - both sieve tubes and companion cells
 - albuminous cells and sieve cells
 - sieve tubes only
 - companion cells only. (NEET 2019)
- Regeneration of damaged growing grass following grazing is largely due to
 - lateral meristem
 - apical meristem
 - intercalary meristem
 - secondary meristem. (Odisha NEET 2019)
- Tracheids differ from other tracheary elements in
 - having Casparian strips
 - being imperforate
 - lacking nucleus
 - being lignified. (2014)
- Meristematic tissue responsible for increase in girth of tree trunk is
 - intercalary meristem
 - lateral meristem
 - phellogen
 - apical meristem. (Karnataka NEET 2013)
- Gymnosperms are also called soft wood spermatophytes because they lack
 - cambium
 - phloem fibres
 - thick-walled tracheids
 - xylem fibres. (2012)
- Companion cells are closely associated with
 - sieve elements
 - vessel elements
 - trichomes
 - guard cells. (2012)
- Function of companion cells is
 - providing energy to sieve elements for active transport
 - providing water to phloem
 - loading of sucrose into sieve elements by passive transport
 - loading of sucrose into sieve elements. (Mains 2011)
- Which one of the following is not a lateral meristem?
 - Intrafascicular cambium
 - Interfascicular cambium
 - Phellogen
 - Intercalary meristem (2010)
- The chief water conducting elements of xylem in gymnosperms are
 - vessels
 - fibres
 - transfusion tissue
 - tracheids. (2010)
- Transport of food material in higher plants takes place through
 - companion cells
 - transfusion tissue
 - tracheids
 - sieve elements. (Mains 2010)
- The length of different internodes in a culm of sugarcane is variable because of
 - size of leaf lamina at the node below each internode
 - intercalary meristem
 - shoot apical meristem
 - position of axillary buds. (2008)
- A common structural feature of vessel elements and sieve tube elements is
 - enucleate condition
 - thick secondary walls
 - pores on lateral walls
 - presence of P-protein. (2006)
- The apical meristem of the root is present
 - only in radicals
 - only in tap roots
 - only in adventitious roots
 - in all the roots. (2003)
- Chlorenchyma is known to develop in the
 - cytoplasm of *Chlorella*
 - mycelium of a green mould such as *Aspergillus*
 - spore capsule of a moss
 - pollen tube of *Pinus*. (2003)
- The cells of the quiescent centre are characterised by
 - having dense cytoplasm and prominent nuclei
 - having light cytoplasm and small nuclei
 - dividing regularly to add to the corpus
 - dividing regularly to add to tunica. (2003)
- Which of the following statements is true?
 - Vessels are multicellular with wide lumen.
 - Tracheids are multicellular with narrow lumen.
 - Vessels are unicellular with narrow lumen.
 - Tracheids are unicellular with wide lumen. (2002)

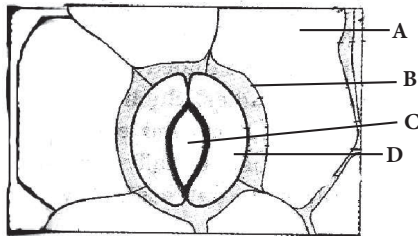
17. Axillary bud and terminal bud derived from the activity of
(a) lateral meristem (b) intercalary meristem
(c) apical meristem (d) parenchyma. (2002)
18. Vessels are found in
(a) all angiosperms and some gymnosperm
(b) most of angiosperms and few gymnosperms
(c) all angiosperms, all gymnosperms and some pteridophyta
(d) all pteridophyta. (2002)
19. At maturity, which of the following is non-nucleated?
(a) Palisade cell (b) Cortical cell
(c) Sieve cell (d) Companion cell (1997)
20. Which of the following is not true about 'sclereids'?
(a) These are groups of living cells.
(b) These are found in nut shells, guava pulp, pear.
(c) These are also called stone cells.
(d) These are form of sclerenchyma with fibres. (1996)
21. Which of the following plant cells will show totipotency?
(a) Sieve tubes (b) Xylem vessels
(c) Meristem (d) Cork cells (1993)
22. Bordered pits are found in
(a) sieve cells (b) vessel wall
(c) companion cells (d) sieve tube wall. (1993)
23. An organised and differentiated cellular structure having cytoplasm but no nucleus is
(a) vessels (b) xylem parenchyma
(c) sieve tubes (d) tracheids. (1991)
24. Angular collenchyma occurs in
(a) *Cucurbita* (b) *Helianthus*
(c) *Althaea* (d) *Salvia*. (1991)
25. Collenchyma occurs in
(a) herbaceous climbers (b) woody climbers
(c) climbing stems (d) water plants. (1990)
26. Collenchyma occurs in the stem and petioles of
(a) xerophytes (b) monocots
(c) dicot herbs (d) hydrophytes. (1990)
27. Cork cambium and vascular cambium are
(a) parts of secondary xylem and phloem
(b) parts of pericycle (c) lateral meristem
(d) apical meristem. (1990)
28. Sieve tubes are suited for translocation of food because they possess
(a) bordered pits (b) no end walls
(c) broader lumen and perforated cross walls
(d) no protoplasm. (1989)
29. Death of protoplasm is a pre-requisite for a vital function like
(a) transport of sap (b) transport of food
(c) absorption of water (d) gaseous exchange. (1989)
30. Organisation of stem apex into corpus and tunica is determined mainly by
(a) planes of cell division
(b) regions of meristematic activity
(c) rate of cell growth
(d) rate of shoot tip growth. (1988)
31. Which meristem helps in increasing girth?
(a) Lateral meristem (b) Intercalary meristem
(c) Primary meristem (d) Apical meristem (1988)
32. Tunica corpus theory is connected with
(a) root apex (b) root cap
(c) shoot apex (d) secondary growth. (1988)

6.2 The Tissue System

33. Stomata in grass leaf are
(a) dumb-bell shaped (b) kidney-shaped
(c) rectangular (d) barrel-shaped. (NEET 2018)
34. Specialised epidermal cells surrounding the guard cells are called
(a) bulliform cells (b) lenticels
(c) complementary cells (d) subsidiary cells. (NEET-I 2016)
35. Vascular bundles in monocotyledons are considered closed because
(a) there are no vessels with perforations
(b) xylem is surrounded all around by phloem
(c) a bundle sheath surrounds each bundle
(d) cambium is absent. (2015 Cancelled)
36. Which of the following statements is not true for stomatal apparatus?
(a) Guard cells invariably possess chloroplasts and mitochondria.
(b) Guard cells are always surrounded by subsidiary cells.
(c) Stomata are involved in gaseous exchange.
(d) Inner wall of guard cells are thick. (Karnataka NEET 2013)
37. Closed vascular bundles lack
(a) ground tissue (b) conjunctive tissue
(c) cambium (d) pith. (2012)
38. Ground tissue includes
(a) all tissues external to endodermis
(b) all tissues except epidermis and vascular bundles
(c) epidermis and cortex
(d) all tissues internal to endodermis. (2011)
39. Some vascular bundles are described as open because these
(a) are surrounded by pericycle but no endodermis
(b) are capable of producing secondary xylem and phloem

- (c) possess conjunctive tissue between xylem and phloem
(d) are not surrounded by pericycle. (Mains 2011)

40. Given below is the diagram of a stomatal apparatus. In which of the following all the four parts labelled as A, B, C and D are correctly identified?



- | A | B | C | D |
|---------------------|-------------------|-------------------|-------------------|
| (a) Subsidiary cell | Epidermal cell | Guard cell | Stomatal aperture |
| (b) Guard cell | Stomatal aperture | Subsidiary cell | Epidermal cell |
| (c) Epidermal cell | Guard cell | Stomatal aperture | Subsidiary cell |
| (d) Epidermal cell | Subsidiary cell | Stomatal aperture | Guard cell |
- (Mains 2010)

41. In barley stem vascular bundles are
(a) closed and scattered (b) open and in a ring
(c) closed and radial (d) open and scattered. (2009)
42. A bicollateral vascular bundle is characterised by
(a) phloem being sandwiched between xylem
(b) transverse splitting of vascular bundle
(c) longitudinal splitting of vascular bundle
(d) xylem being sandwiched between phloem. (1992)

6.3 Anatomy of Dicotyledonous and Monocotyledonous Plants

43. The transverse section of a plant shows following anatomical features :
(i) Large number of scattered vascular bundles surrounded by bundle sheath
(ii) Large conspicuous parenchymatous ground tissue
(iii) vascular bundles conjoint and closed
(iv) phloem parenchyma absent
Identify the category of plant and its part.
(a) Monocotyledonous stem
(b) Monocotyledonous root
(c) Dicotyledonous stem
(d) Dicotyledonous root (NEET 2020)
44. Grass leaves curl inwards during very dry weather. Select the most appropriate reason from the following.
(a) Tyloses in vessels (b) Closure of stomata
(c) Flaccidity of bulliform cells
(d) Shrinkage of air spaces in spongy mesophyll (NEET 2019)

45. In the dicot root the vascular cambium originates from
(a) tissue located below the phloem bundles and a portion of pericycle tissue above protoxylem
(b) cortical region
(c) parenchyma between endodermis and pericycle
(d) intrafascicular and interfascicular tissue in a ring. (Odisha NEET 2019)

46. Casparian strips occur in
(a) epidermis (b) pericycle
(c) cortex (d) endodermis. (NEET 2018)

47. Root hair develop from the region of
(a) elongation (b) root cap
(c) meristematic activity
(d) maturation. (NEET 2017)

48. Cortex is the region found between
(a) epidermis and stele
(b) pericycle and endodermis
(c) endodermis and pith
(d) endodermis and vascular bundle. (NEET-II 2016)

49. A major characteristic of monocot root is the presence of
(a) vasculature without cambium
(b) cambium sandwiched between phloem and xylem along the radius
(c) open vascular bundles
(d) scattered vascular bundles. (2015 Cancelled)

50. You are given a fairly old piece of dicot stem and a dicot root. Which of the following anatomical structures will you use to distinguish between the two?
(a) Secondary xylem (b) Secondary phloem
(c) Protoxylem (d) Cortical cells (2014)

51. Water containing cavities in vascular bundles are found in
(a) sunflower (b) maize
(c) *Cycas* (d) *Pinus*. (2012)

52. As compared to a dicot root, a monocot root has
(a) more abundant secondary xylem
(b) many xylem bundles
(c) inconspicuous annual rings
(d) relatively thicker periderm. (Mains 2012)

53. Palisade parenchyma is absent in leaves of
(a) mustard (b) soybean
(c) gram (d) *Sorghum*. (2009)

54. The annular and spirally thickened conducting elements generally develop in the protoxylem when the root or stem is
(a) elongating (b) widening
(c) differentiating (d) maturing. (2009)

55. Anatomically fairly old dicotyledonous root is distinguished from the dicotyledonous stem by

- (a) absence of secondary phloem
(b) presence of cortex
(c) position of protoxylem
(d) absence of secondary xylem. (2009)
- 56.** Passage cells are thin walled cells found in
(a) phloem elements that serve as entry points for substance for transport to other plant parts
(b) testa of seeds to enable emergence of growing embryonic axis during seed germination
(c) central region of style through which the pollen tube grows towards the ovary
(d) endodermis of roots facilitating rapid transport of water from cortex to pericycle. (2007)
- 57.** In a woody dicotyledonous tree, which of the following parts will mainly consist of primary tissues?
(a) All parts (b) Stem and root
(c) Flowers, fruits and leaves
(d) Shoot tips and root tips (2005)
- 58.** Four radial vascular bundle are found in
(a) dicot root (b) monocot root
(c) dicot stem (d) monocot stem. (2002)
- 59.** What happens in plants during vascularisation?
(a) Differentiation of procambium, formation of primary phloem followed by formation of primary xylem
(b) Differentiation of procambium followed by the formation of primary phloem and xylem simultaneously
(c) Formation of procambium, primary phloem and xylem simultaneously
(d) Differentiation of procambium followed by the formation of secondary xylem (2000)
- 60.** Casparian strips are found in
(a) epidermis (b) hypodermis
(c) periderm (d) endodermis. (1999)
- 61.** Casparian strip occurs in a
(a) endodermis (b) exodermis
(c) pericycle (d) epidermis. (1994)
- 62.** A plant bears fruit, has a column of vascular tissue and a tap root system. This plant is a
(a) angiosperm and dicot
(b) gymnosperm and dicot
(c) angiosperm and monocot
(d) gymnosperm and monocot. (1994)
- 63.** Where do the Casparian bands occur?
(a) Epidermis (b) Endodermis
(c) Pericycle (d) Phloem (1994, 1990)
- 64.** A narrow layer of thin walled cells found between phloem/bark and wood of a dicot is
(a) cork cambium (b) vascular cambium
(c) endodermis (d) pericycle. (1993)
- 65.** What is true about a monocot leaf?

- (a) Reticulate venation
(b) Absence of bulliform cells from epidermis
(c) Mesophyll not differentiated into palisade and spongy tissues
(d) Well differentiated mesophyll (1992, 1990)
- 66.** Pericycle of roots produces
(a) mechanical support (b) lateral roots
(c) vascular bundles (d) adventitious buds. (1990)
- 67.** Monocot leaves possess
(a) intercalary meristem (b) lateral meristem
(c) apical meristem (d) mass meristem. (1990)
- 68.** Pith and cortex do not differentiate in
(a) monocot stem (b) dicot stem
(c) monocot root (d) dicot root. (1988)

6.4 Secondary Growth

- 69.** Identify the incorrect statement.
(a) Heartwood does not conduct water but gives mechanical support.
(b) Sapwood is involved in conduction of water and minerals from root to leaf.
(c) Sapwood is the innermost secondary xylem and is lighter in colour.
(d) Due to deposition of tannins, resins, oils, etc., heartwood is dark in colour. (NEET 2020)
- 70.** Which of the statements given below is not true about formation of annual rings in trees?
(a) Annual rings are not prominent in trees of temperate region.
(b) Annual ring is a combination of spring wood and autumn wood produced in a year.
(c) Differential activity of cambium causes light and dark bands of tissue-early and late wood respectively.
(d) Activity of cambium depends upon variation in climate. (NEET 2019)
- 71.** Secondary xylem and phloem in dicot stem are produced by
(a) apical meristems (b) vascular cambium
(c) phellogen (d) axillary meristems. (NEET 2018)
- 72.** Plants having little or no secondary growth are
(a) grasses
(b) deciduous angiosperms
(c) conifers (d) cycads. (NEET 2018)
- 73.** The vascular cambium normally gives rise to
(a) primary phloem (b) secondary xylem
(c) periderm (d) phelloderm. (NEET 2017)
- 74.** Which of the following is made up of dead cells?
(a) Collenchyma (b) Phellem
(c) Phloem (d) Xylem parenchyma (NEET 2017)

75. Identify the wrong statement in context of heartwood.
 (a) It is highly durable.
 (b) It conducts water and minerals efficiently.
 (c) It comprises dead elements with highly lignified walls.
 (d) Organic compounds are deposited in it.
 (NEET 2017)
76. The balloon-shaped structures called tyloses
 (a) originate in the lumen of vessels
 (b) characterise the sapwood
 (c) are extensions of xylem parenchyma cells into vessels
 (d) are linked to the ascent of sap through xylem vessels.
 (NEET-II 2016)
77. Read the different components from (i) to (iv) in the list given below and tell the correct order of the components with reference to their arrangement from outer side to inner side in a woody dicot stem.
 (i) Secondary cortex (ii) Wood
 (iii) Secondary phloem (iv) Phellem
 The correct order is
 (a) (iv), (i), (iii), (ii) (b) (iv), (iii), (i), (ii)
 (c) (iii), (iv), (ii), (i) (d) (i), (ii), (iv), (iii).
 (2015)
78. Lenticels are involved in
 (a) food transport (b) photosynthesis
 (c) transpiration (d) gaseous exchange.
 (NEET 2013)
79. Age of a tree can be estimated by
 (a) number of annual rings
 (b) diameter of its heartwood
 (c) its height and girth (d) biomass. (NEET 2013)
80. Interfascicular cambium develops from the cells of
 (a) endodermis (b) pericycle
 (c) medullary rays (d) xylem parenchyma.
 (NEET 2013)
81. The common bottle cork is a product of
 (a) dermatogen (b) phellogen
 (c) xylem (d) vascular cambium.
 (2012)
82. The cork cambium, cork and secondary cortex are collectively called
 (a) phelloderm (b) phellogen
 (c) periderm (d) phellem. (2011)
83. Heartwood differs from sapwood in
 (a) presence of rays and fibres
 (b) absence of vessels and parenchyma
 (c) having dead and non-conducting elements
 (d) being susceptible to pests and pathogens.
 (2010)
84. Vascular tissues in flowering plants develop from
 (a) periblem (b) dermatogen
 (c) phellogen (d) plerome. (2008)
85. For a critical study of secondary growth in plants, which one of the following pairs is suitable?
 (a) Teak and pine (b) Deodar and fern
 (c) Wheat and maiden hair fern
 (d) Sugarcane and sunflower (2007)
86. Diffuse porous woods are characteristic of plants growing in
 (a) alpine region (b) cold winter regions
 (c) temperature climate (d) tropics. (2003)
87. Which of the following meristems is responsible for extrastelar secondary growth in dicotyledonous stem?
 (a) Interfascicular cambium
 (b) Intercalary meristem
 (c) Phellogen
 (d) Intrafascicular cambium (1998)
88. The periderm includes
 (a) secondary phloem (b) cork
 (c) cambium (d) all of these. (1998)
89. As a tree grows older, which of the following increases more rapidly in thickness?
 (a) Heart wood (b) Sapwood
 (c) Phloem (d) Cortex (1994)
90. Periderm is produced by
 (a) vascular cambium (b) fascicular cambium
 (c) phellogen
 (d) intrafascicular cambium. (1993)
91. Which exposed wood will decay faster?
 (a) Sapwood (b) Softwood
 (c) Wood with lot of fibres
 (d) Heartwood (1993)
92. Abnormal/anomalous secondary growth occurs in
 (a) *Dracaena* (b) ginger
 (c) wheat (d) sunflower. (1993)
93. Vascular cambium produces
 (a) primary xylem and primary phloem
 (b) secondary xylem and secondary phloem
 (c) primary xylem and secondary phloem
 (d) secondary xylem and primary phloem.
 (1992, 1990)
94. Out of diffuse porous and ring porous woods, which is correct?
 (a) Ring porous wood carries more water for short period.
 (b) Diffuse porous wood carries more water.
 (c) Ring porous wood carries more water when need is higher.
 (d) Diffuse porous wood is less specialised but conducts water rapidly throughout. (1989)
95. Cork is formed from
 (a) cork cambium (phellogen)
 (b) vascular cambium (c) phloem
 (d) xylem. (1988)

ANSWER KEY

[illegible]