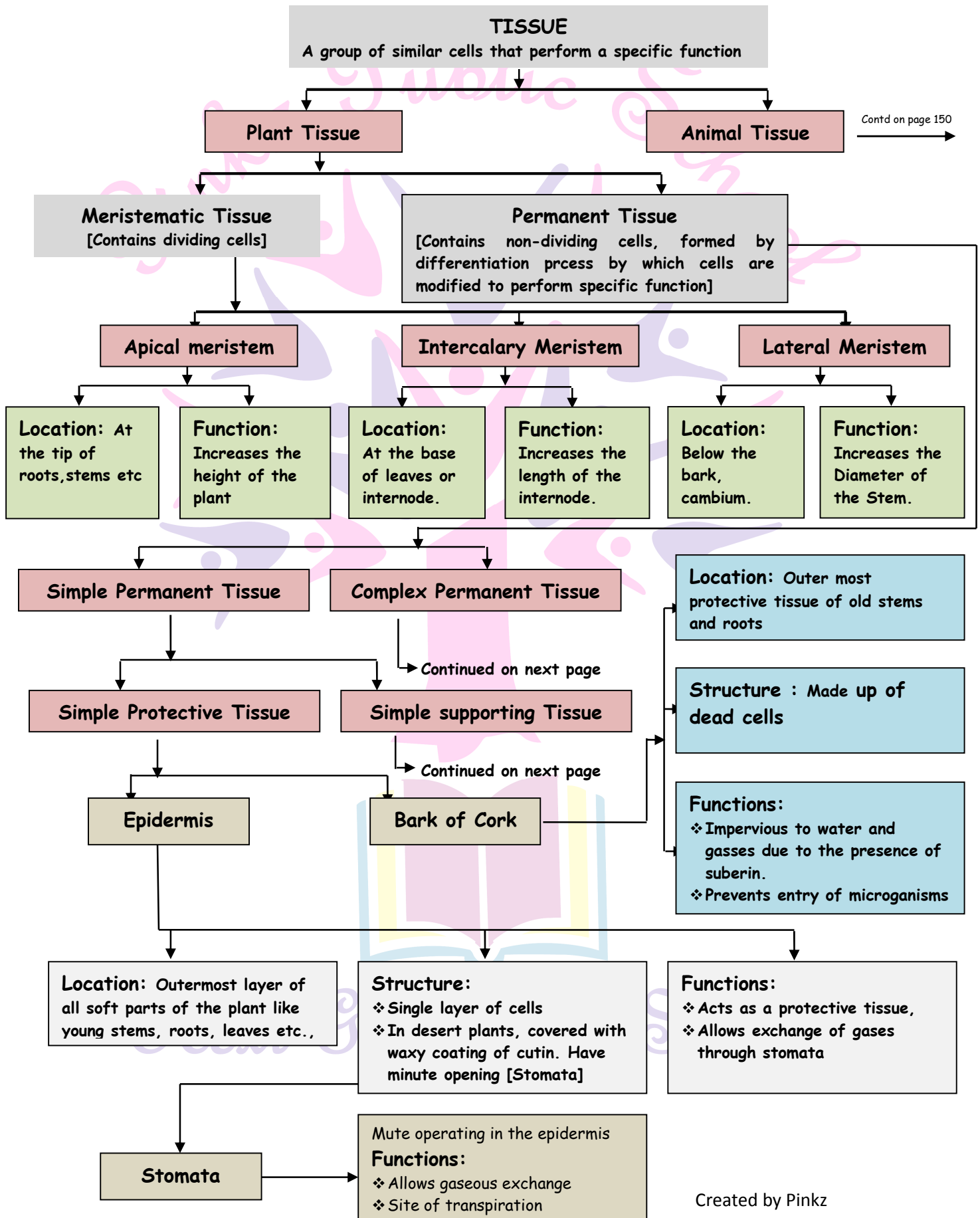


Grade IX

Lesson : 6 Tissues



Contd. From previous page

Simple Supporting Tissue

Parenchyma

Location: Soft parts of the plant such as cortex and

Features:

- Cells are thin-walled, living Cells, oval, or round in shape,
- Have dense cytoplasm
- Possess large central

Functions:

- Acts as a packing tissue
- Helps in storage of food
- Provides mechanical support

Collenchyma

Location : In the leaf stalks, below the epidermis

Features:

- Living cells, elongated in shape
- Have thickenings at the corner of the cell wall
- Very little inter-cellular spaces present

Function: Provides mechanical support and

Sclerenchyma

Location : Leaf veins, hard coverings of seeds, surrounds vascular bundles in stems etc.

Features: Dead cells without protoplasm, very thick walled due to the deposition of

Functions:

- Protective layer
- Makes the plant hard and stiff

Type

Chlorenchyma: Parenchyma cells of leaves containing chlorophyll forms the chlorenchyma They carry out photosynthesis

Aerenchyma: Parenchyma cells of aquatic plants containing large air cavities forms the aerenchyma. It gives buoyancy to plants that help them float.

Complex Permanent Tissue

Made up of more than one type of simple permanent cells that coordinate to perform a common function

Contd. From previous page

Xylem

Phloem

Tracheids

Structure :

- Elongated cells with tapering ends
- Dead cells

Function :

- Mechanical support
- Conducts water and mineral salts

Vessels

Structure :

- Long tube-like thick lignified cell wall
- Dead cells

Function :

- Mechanical support
- Conducts water and mineral salts

Xylem Parenchyma

Structure :

- Living parenchyma cells

Functions:

- Stores food
- Helps in lateral conduction of water

Contd

Xylem fibres / Sclerenchyma

Structure :

- Thick walled sclerenchyma cells

Function:

- Mechanical support

Contd. from prev. page

Phloem

Sieve Tubes

Structure:

- Elongated tube: like cells, placed end to end
- Cell wall contains pores. The end walls are perforated, called sieve plates

Function:

- Translocation of food

Companion Cell

Structure:

- Thin-walled cells with active cytoplasm

Function:

- Helps sieve tubes in translocation of food

Phloem Parenchyma

Structure:

- Thin-walled parenchyma cells

Function:

- Stored food

Phloem Fibres

Structure:

- Thick-walled Sclerenchyma Cells

Function:

- Mechanical support

Contd. from page 148

Animal Tissue

Epithelial Tissue

Covers body surface and lines body cavities. And internal organs.

Connective Tissue

Acts as packaging tissue and binds tissues

Muscular Tissue

Helps in movement of various body parts

Nervous Tissue

Receive and Transmits impulses from one place to another

Continued on next page

Continued on next page

Continued on next page

Simple Epithelial Tissue

Compound Epithelial Tissue

Squamous Epithelial

- ❖ Thin, flat cells which are closely packed
 - ❖ Lines cavities [mouth, oesophagus, alveoli, blood vessels]
- Functions:** Protects from mechanical injury and blocks the entry of germs.

Cuboidal Epithelium

- ❖ Cube-like cells
- ❖ Found in kidney tubules, salivary glands, sweat glands etc.,

Columnar Epithelium

- ❖ Pillar-like cells
 - ❖ Present in lining of stomach and intestine
- Function:** Absorption and secretion

Compound Epithelium

Stratified Squamous Epithelium

- ❖ Squamous epithelium arranged in many layers
 - ❖ Found in skin
- Function:** Protection from mechanical injury

Stratified Cuboidal Epithelium

Found in the inner side of the larger ducts of pancreatic and salivary glands

Ciliated Epithelium

- ❖ Columnar epithelium that bear cilia
 - ❖ Found in the lining of trachea, kidney tubules, etc
- Function:** Rhythmic movement of cilia, moves the materials in one direction

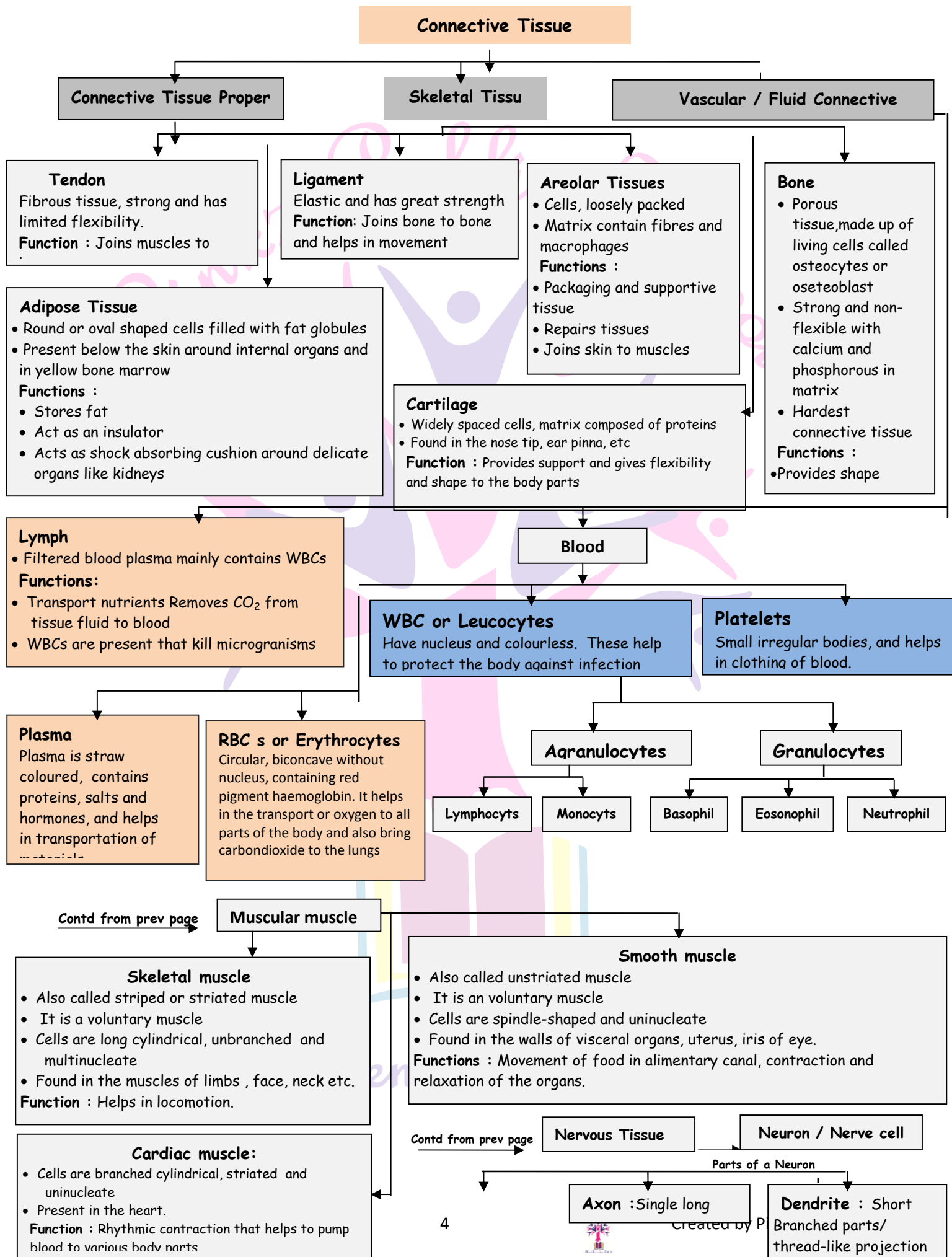
Glandular Epithelium

- ❖ Large cells [modified columnar epithelium] present in sweat glands, tear glands etc.,
- Function:** Secretion

Stratified Keratinised Squamous Epithelium

Found in the skin

Found in oesophagus and pharynx



NCERT BASED ACTIVITIES

Activity/Project 1:

Cell body/Cyton
Contain nucleus and cytoplasm

Topic Covered : Meristematic Tissues

Objectives :

1. To understand the location of meristematic tissues in plants
2. To know the role of meristems in plant growth
3. To differentiate between meristematic and permanent tissues.

Skills Developed :

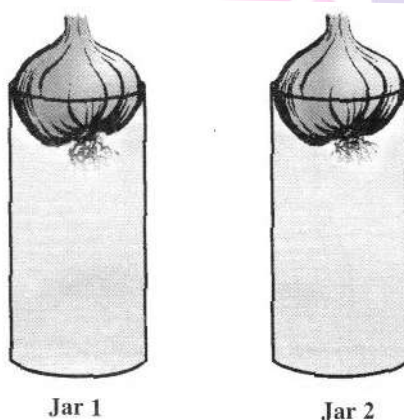
Critical thinking
Effective communication.

Time Required : A week or ten days

Materials Required : 2 Jars, water, onion bulb, scissors, measuring scale

Method :

1. Take two similar glass jars and fill them with water
2. Place one onion bulb on each of these jars as shown in the figure.
3. Keep observing the growth of roots in both the bulbs and measure the length



4. After a certain length of root growth. (after the 4th day of root growth) cut the tips of all the roots (for about a centimeter) in one of the jars and observe the growth of roots in the following days.

Observations :

Jar No.	Length of root (in cm)							
	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
1.								
2.								

Activity / Project 2 :

Topic Covered : A Cell (Neuron) unit of Nervous System

Objectives :

1. Identify the diagram of a neuron.
2. Recognise the different parts of a nerve cell (neuron)

Procedure :

1. Each student will be given a worksheet that has an incomplete diagram of a nerve cell in which specific parts have been labeled using numbers only.
2. The students shall read the questions given below the diagram, and make additions in the diagram / answer the questions accordingly.

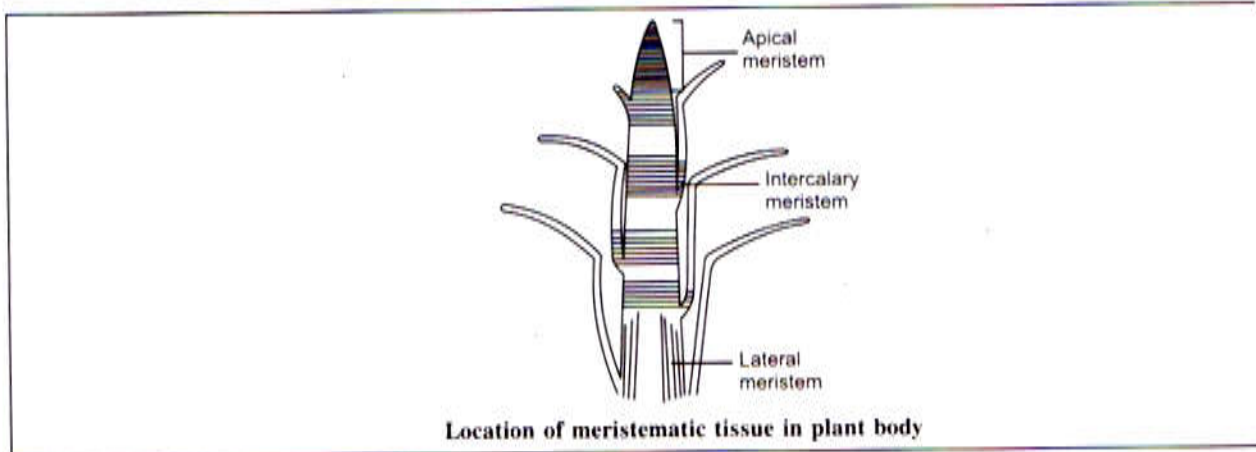
Time Required : 15 minutes.



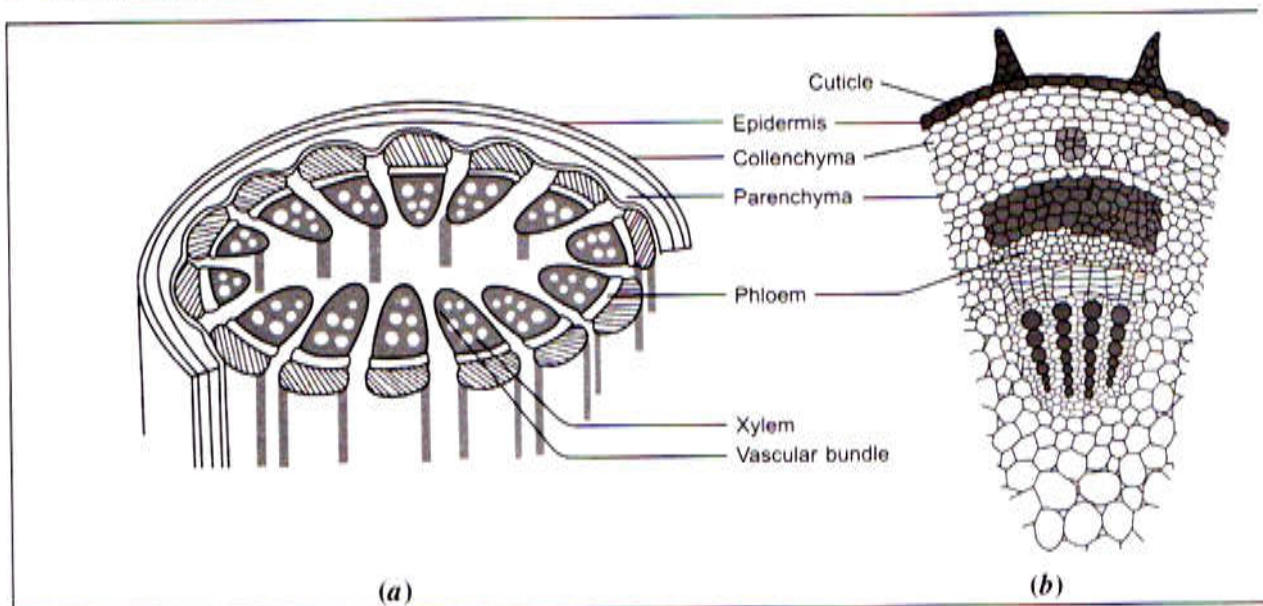
Next Generation School

Important Diagrams

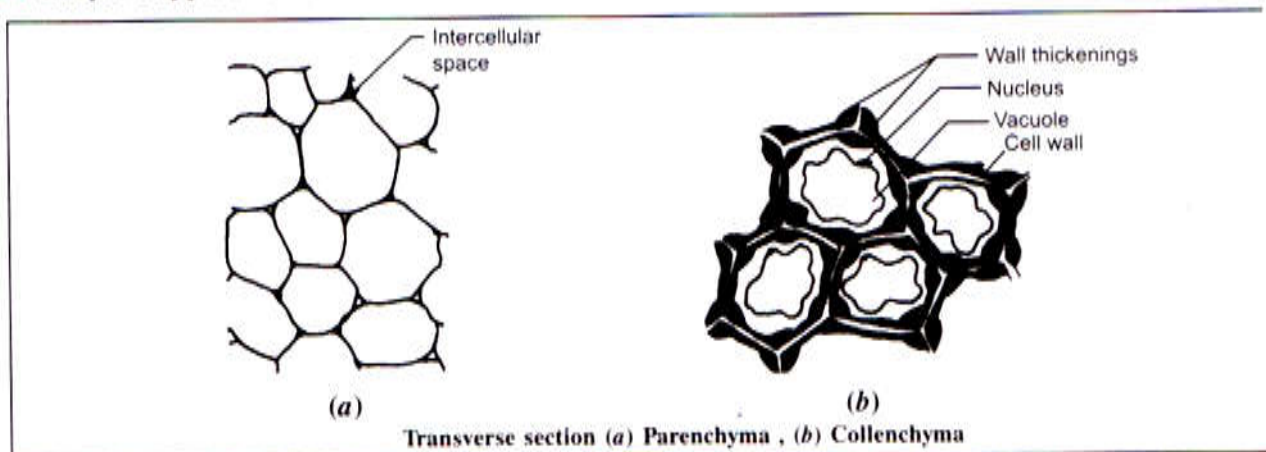
1. Meristematic Tissue in Plant Body

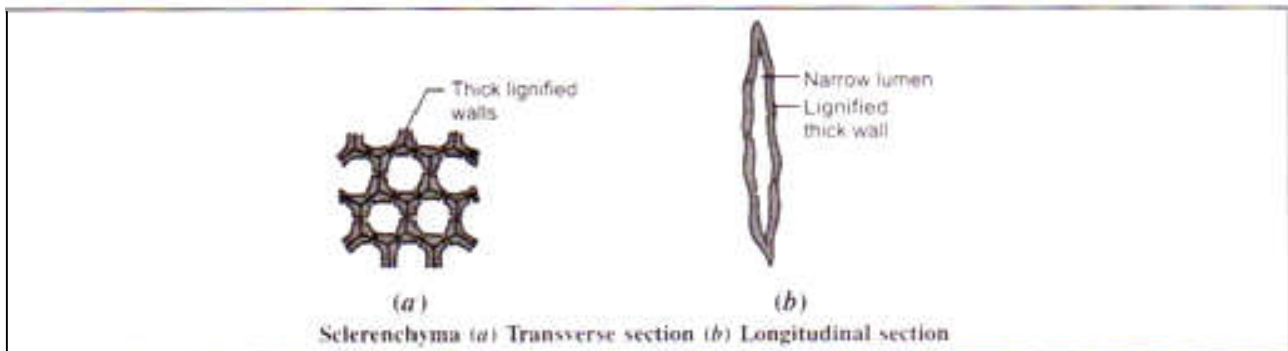


2. Section of a stem

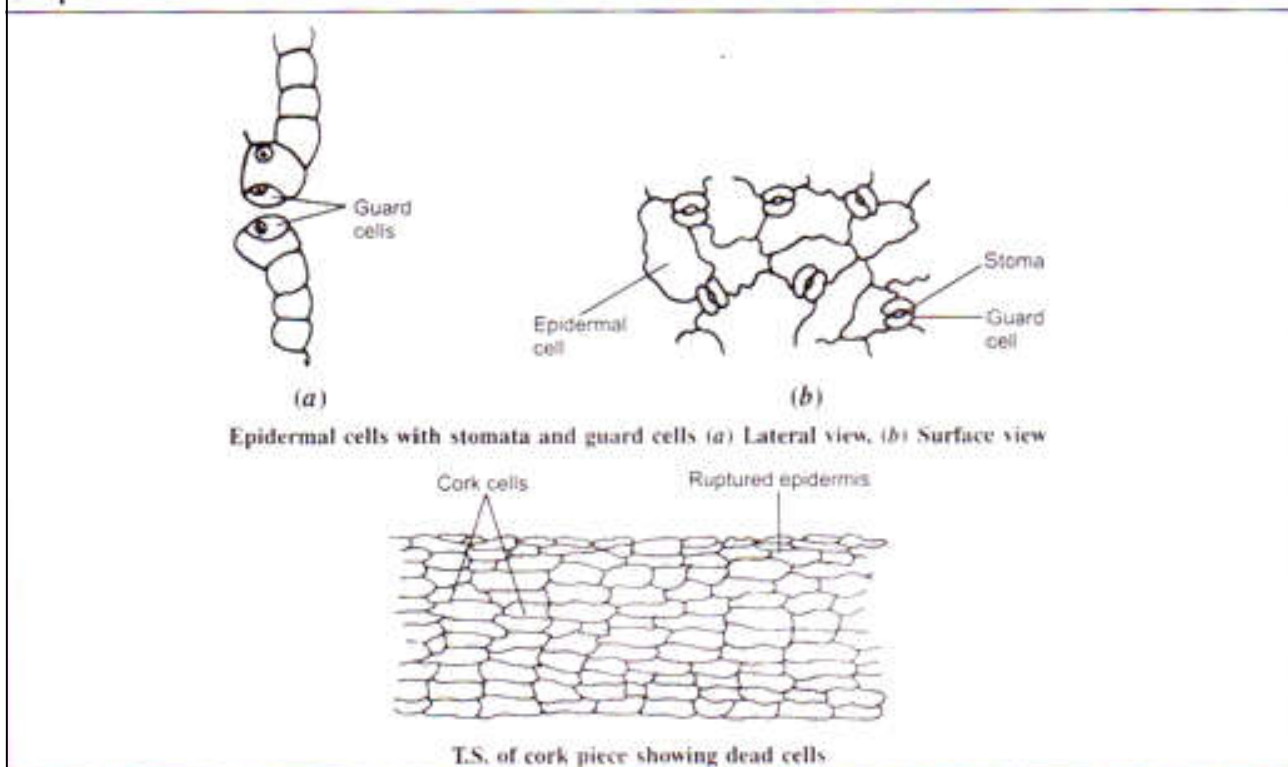


3. Simple Supportive Tissue

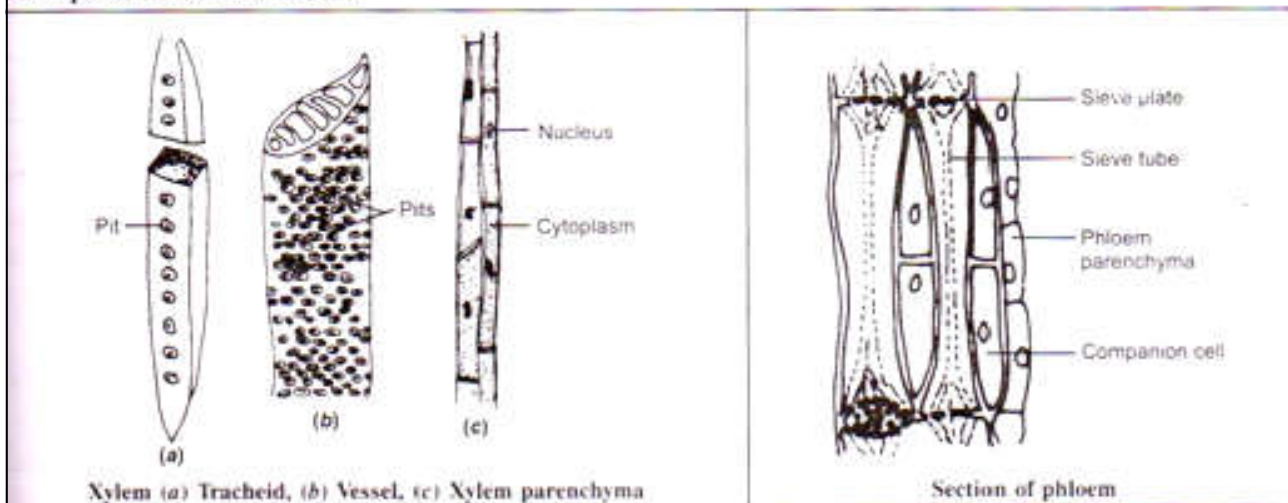




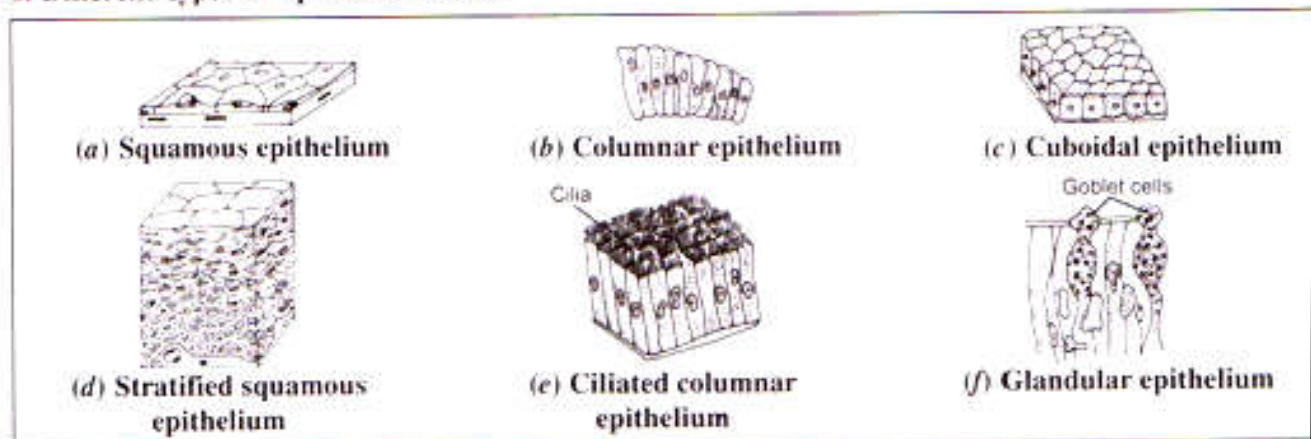
Simple Protective Tissue



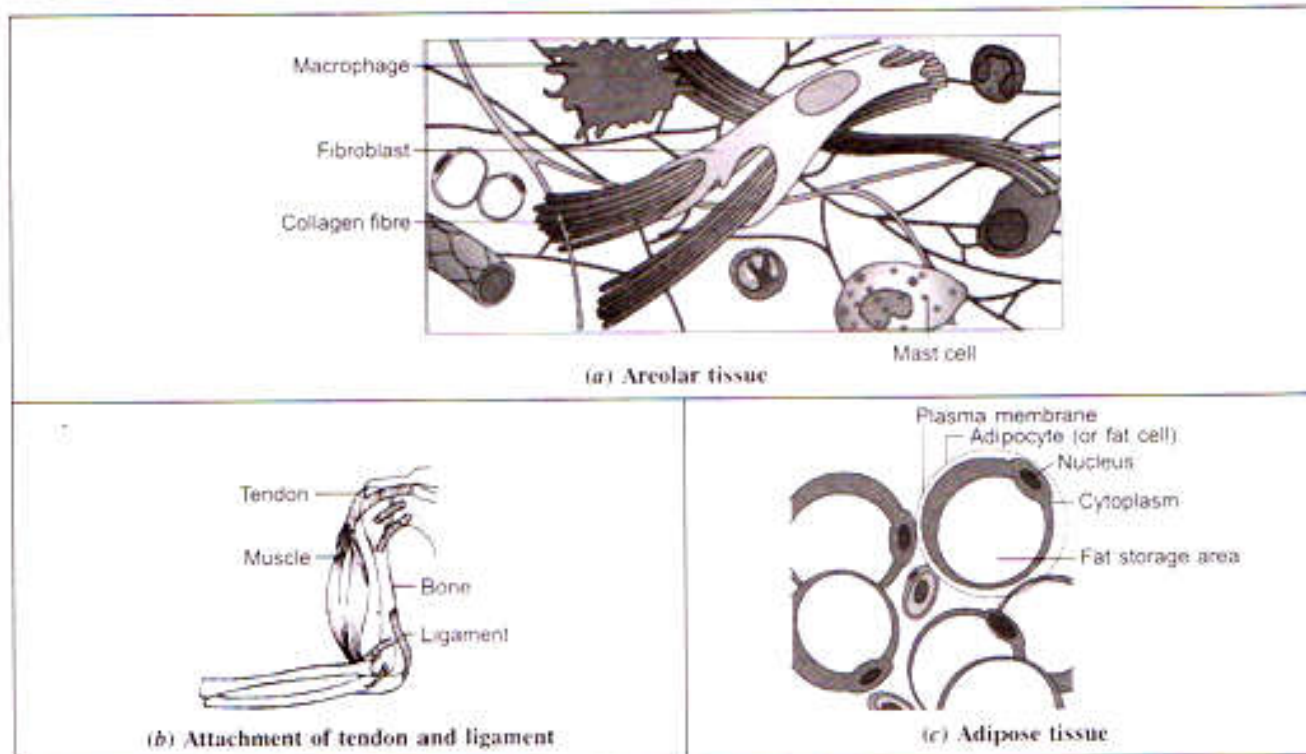
Complex Permanent Tissue



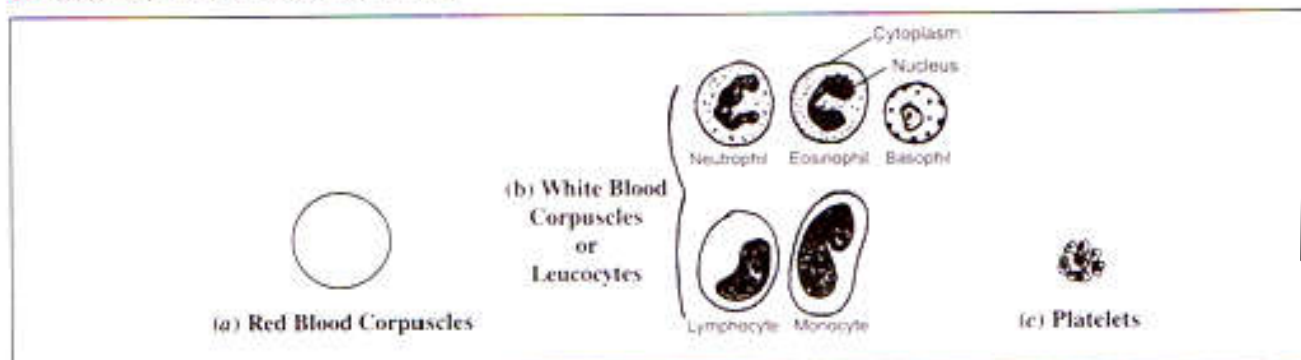
6. Different Types of Epithelial Tissues



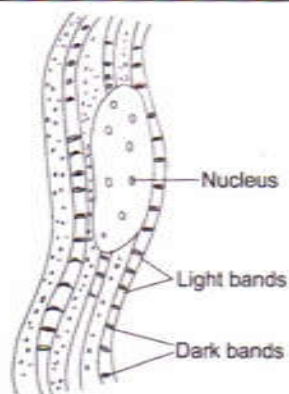
7. Connective Tissue



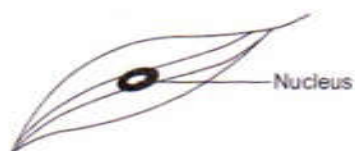
8. Vascular/Fluid Connective Tissue



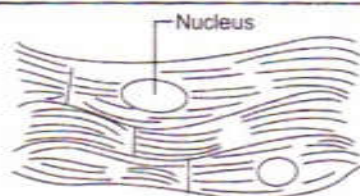
Muscular Tissue



(a) Striated (striped muscle)

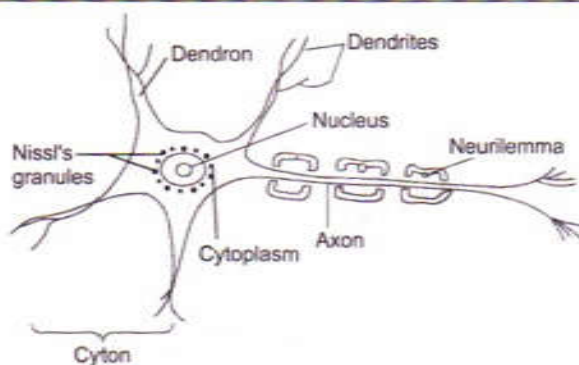


(b) Unstriated (Smooth muscle)



(c) Cardiac muscle

Nervous Tissue



Neuron/Nerve cell



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Objective Type Questions

I. Multiple choice questions

- Chloroplasts may occur in
 - collenchymas and sclerenchyma
 - parenchyma and collenchymas
 - chlorenchyma and sieve tubes
 - xylem parenchyma and sclerenchyma
- The plant tissue which provides mechanical strength and consists of living cells, is
 - parenchyma
 - aerenchyma
 - collenchyma
 - sclerenchyma
- Lignified or thickened cell wall is a characteristic feature of
 - collenchyma
 - xylem
 - parenchyma
 - phloem
- The conducting cell of xylem are
 - tracheid and xylem fibres
 - vessels and xylem fibres
 - tracheid and vessels
 - vessels and sieve tubes
- Bones are connected to muscles at the joints by
 - tendon
 - areolar tissue
 - ligament
 - adipose tissue
- _____smoothens the bone surfaces at the joints
 - Cartilage
 - Adipose tissue
 - Ligament
 - areolar tissue
- The columnar epithelial cells posses cilia in
 - stomach
 - respiratory tract
 - ureters
 - digestive tract
- Branched involuntary muscle fibres are found in
 - limbs
 - ureters
 - heart
 - tongue
- Both collenchyma and sclerenchyma give mechanical strength to plants: but the former differs from the latter, in
 - retaining the protoplasm at maturity
 - having uniformly thickened wall
 - having dead cells
 - both a) and d)

10. Chlorenchyma and aerenchyma are modified specialised
- a) phloem b) parenchyma c) collenchyma d) sclerenchyma
11. Cambium is an example of
- a) apical meristem b) intercalary meristem
c) collenchymas d) sclerenchyma
12. The substance found in the cell wall of cork or bark that makes it impervious to water is
- a) lignin b) cutin c) suberin d) pectin
13. The extremely thick and flat cells forming a delicate lining in the lung alveoli constitute.
- a) simple squamous epithelium b) simple cuboidal epithelium
c) stratified squamous epithelium d) ciliated epithelium
14. The mineral elements found in our bone making it hard, are
- a) sodium and calcium b) calcium and phosphorus
c) phosphorus and sodium d) sodium and potassium
15. Areolar tissue is a type of (i) _____ tissue and is found in (ii) _____
- a) i) connective ii) bone marrow b) i) muscular ii) heart
c) i) connective ii) around nerves d) both a) and c)
16. Glands in our body are formed by
- a) connective tissue b) smooth muscles
c) epithelial tissue d) adipose tissue
17. The epithelium is separated from the underlying connective tissue by
- a) basement membrane b) thick deposition of fat
c) mucosa d) none of the above
18. Tendons help to connect
- a) bone to bone b) muscle to bone c) muscle to muscle d) all the above
19. Most of the metabolic functions of plants are carried out by
- a) parenchyma b) collenchyma c) sclerenchyma d) meristem

20. The mechanical strength most mechanical strength and rigidity of cell wall is due to

- a) cellulose b) lignin c) suberin d) cutin e) pectin

21. Find out incorrect sentence

(NCERT)

- a) Parenchymatous tissues have intercellular spaces.
b) Collenchymatous tissues are irregularly thickened at corners.
c) Apical and intercalary meristems are permanent tissues
d) Meristematic tissues, in its early stage, lack vacuoles.

22. Girth of stem increases due to

- a) apical meristem b) lateral meristem
c) intercalary meristem d) vertical meristem

23. Intestine absorb the digested food materials. What type of epithelial cells are responsible for that?

- a) Stratified squamous epithelium b) Columnar epithelium
c) Spindle fibres d) Cuboidal epithelium

24. A person met with an accident in which two long bones of hand were dislocated. Which among the following may be the possible reason?

- a) Tendon break b) Break of skeletal muscle
c) Ligament break d) Areolar tissue break

25. While doing work and running, you move your organs like hands, legs, etc. Which among the following is correct?

- a) Smooth muscles contract and pull the ligament to move the bones.
b) Smooth muscles contract and pull the tendons to move the bones.
c) Skeletal muscles contract and pull the ligament to move the bones.
d) Skeletal muscles contract and pull the tendon to move the bones.

26. Which muscles act involuntarily?

- i) Striated muscles ii) Smooth muscles iii) Cardiac muscles iv) Skeletal muscles
a) i) and ii) b) ii) and iii) c) iii) and iv) d) i) and iv

27. Meristematic tissues in plants are

- a) localised and permanent
- b) not limited to certain regions
- c) localised and driving cells
- d) growing in volume

28. Cartilage is not found in

- a) nose
- b) ear
- c) kidney
- d) larynx

29. Fats are stored in human body as

- a) cuboidal epithelium
- b) adipose tissue
- c) bones
- d) cartilage

30. Bone matrix is rich in

- a) fluoride and calcium
- b) calcium and phosphorus
- c) Calcium and potassium
- d) phosphorus and potassium

1. b	2. c	3. b	4. c	5. a	6. a	7. b	8. c	9. d	10. b
11. c	12. c	13. a	14. b	15. d	16. c	17. a	18. b	19. a	20. b
21. c	22. b	23. b	24. c	25. d	26. b	27. c	28. c	29. b	30. b

I. Match the columns

31. Match the Column I with Column II

Column I		Column II	
i)	Tendon	1.	Ducts of salivary glands
ii)	Cuboidal epithelium	2.	Lung alveoli
iii)	Thin, flat cells	3.	Repair of damaged tissues
iv)	Areolar tissue	4.	Connects muscles to bones.

i) 4	ii) 1	iii) 2	iv) 3
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I. Fill in the blanks

32. Contractile proteins are present in _____ tissue.
33. _____ connects two bones at joint
34. _____ in the cell wall of cork/bark makes it impervious to water.
35. The cells enclosing the stoma are called _____ cells
36. The simple permanent tissue that consist of thick-walled, narrow elongated, dead cells is _____

32. Muscle	33. Ligament	34. Suberin	35. Guard	36. Sclerenchyma
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I. TRUE OR FALSE

37. Areolar tissue is found in bone marrow.
38. Tendon is a fibrous tissue which is elastic.
39. Heart muscles are voluntary.
40. Cuboidal epithelium lines the kidney tubules.
41. A nerve is a bundle of axons of the neurons
42. Collenchyma cells are dead and have irregular thickenings at the corners

37. True	38. False	39. False	40. True	41. True	42. False
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Next Generation School

DIRECTION: [Q. 43 TO Q. 45]

In the following Questions. The Assertion and Reason have been put forward. Read the statements carefully and choose the correct alternative from the following:

- (a). Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.
- (b). The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.
- (c). Assertion is true but the Reason is false.
- (d). The statement of the Assertion is false but the Reason is true.

43. Assertion: Plant tissues are mostly dead.

Reason: Dead tissues can provide mechanical strength and need less maintenance.

- (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.

44. Assertion: Growth in plants occur only in certain specific regions.

Reason: Meristematic tissues are located only at certain region.

- (b) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.

45. Assertion: Epithelial tissues are the protective tissues of animal body.

Reason: Squamous epithelium are the thickest amongst all the epithelial tissues..

- (c) Assertion is true but the Reason is false.

46. State the location of apical meristem. Or

Which meristem is present at growing tips of stems and roots?

Apical meristem is present at the growing tips of stems and roots.

47. Which meristem is located near the node?

Intercalary meristem is located near the node.

48. Name the fluid matrix of a connective tissue.

Plasma

49. Name the tissue present under the skin and arranged in a pattern of layers.

Stratified squamous epithelium tissue is present under the skin and arranged in a pattern of layers.

50. Name the two types of processes present in neuron.

Axon and dendrites.

51. Name the basic packing tissue of plant.

Parenchyma

52. State one function of parenchyma.

Parenchyma provides mechanical support of plants and also stores food.

53. Name the tissue present in soft parts of the plants like pith and cortex.

Parenchyma

54. What are the functions of phloem?

Phloem transports food from leaves to other parts of the plant.

55. What are the functions of xylem?

Xylem transports water and minerals from roots to leaves vertically upward.

56. What are the various types of tissues found in plants?

Tissues in plants are mainly of two types: Meristematic tissues and permanent tissues.

57. Give one major difference between permanent and meristematic tissues.

Meristematic tissue has actively dividing cells that give rise to new cells and helps in growth. While permanent tissues have matured cells. That do not divide and have low metabolic rate.

58. Name the tissue which is present in the veins of leaves.

Formed of cellulose and deposited with pectin and has pits.

59. What is the nature of cell wall in collenchyma cell?

Formed of cellulose and deposited with pectin and has pits.

60. Why meristematic tissues lack vacuoles?

Vacuoles are storage sacs for solid and liquid content whereas meristematic tissues are liquid content whereas meristematic tissues are associated with cell division. These tissues do not require any waste materials to form, hence, vacuoles are absent in meristematic tissues.

61. Name the dead element of phloem

Phloem fibres.

62. Which chemical is deposited at the corners of cells in collenchyma?

Pectin

63. What is the common name of (i) Xylem (ii) Phloem?

(i). Wood

(ii) Bast

64. Name the cell which is attached to the lateral sides of sieve tube.

Companion Cell

65. Which type of tissue is most abundant in animals

Connective tissue.

66. Which epithelium is also called pavement epithelium?

Squamous epithelium

67. which muscle has spindle shaped cells?

Smooth muscle.

68. Which type of muscle cells show rhythmic contractions?

Cardiac muscle cells.

69. Give one word for the junction of two neurons.

Synapse.

70. Which part of neuron receives impulse and which part takes it away from neuron?

The dendrite receives impulse and axon takes away the impulse from the cell body.

71. Which connective tissue is specialised for fat storage and act as heat insulator.

Adipose tissue.

72. Name the animal tissue whose cells divide throughout the life.

Epithelial tissue of skin and digestive tract.

73. Which is the hardest connective tissue in human beings?

Bone

74. Name the tissue which forms inner lining of blood vessels.

Squamous epithelium tissue.

75. In simple squamous epithelium, what does squama stands for?

Squama stands from scale of skin.

76. What is the average life span of RBCs of man?

120 Days

77. Which bio chemicals compose the solid matrix of cartilage?

Proteins and mineral salts.

78. Name the protein found in yellow fibres.

Elastin protein.

79. Which mineral is most abundantly found in bones

Calcium phosphate.

80. What is the specific function of cardiac muscle tissues?

Auto rhythmic contraction to force the blood into the blood vessels

81. What is the function of ligament?

It connects bone to bone.

82. What is the function of blood platelets in human body?

They help in blood clotting at the place of injury.

83. Why are smooth muscles called visceral muscles?

As they are found in the wall of visceral organs, e.g. stomach, intestine.

84. What is differentiation of tissues?

Meristematic tissue when it loses the ability to divide, it takes up specific role and becomes permanent tissue, this process of taking up a permanent shape, size and function is called differentiation.

85. How does aerenchyma tissue help a plant?

Aerenchyma is a type of parenchyma which gives buoyancy to the plants as they have air sacs that help them to float.

86. Which body cell provides resistance against infection?

WBCs [White Blood Cells]

87. Name the various types of WBCs

WBCs are of two types - Granulocytes and agranulocytes.

Granulocytes are of 3 types - basophil, eosinophil, and neutrophil, Agranulocytes are of two types - lymphocytes and monocytes.

88. What is the other name of RBC?

RBCs are also known as erythrocytes

89. Name the type of cells from which phloem is made up of.

Phloem is made up of five type of cells which are sieve cells, sieve tubes, companion cells, phloem fibres and the phloem parenchyma.

90. Name the special protein contained in muscles which contract and relax to cause movement.

Contractile protein [myofibril]

91. What are the contents of plasma?

Plasma contains proteins, salts and hormones.

92. State the difference between the tissue of the outer layer of the branch of a tree and the outer layer of young tree stem.

The outer layer of a tree is made up of bark [dead cells] whereas outer layer of a young tree stem is made up of epidermis [living cells]

93. What is nerve impulse?

The messages carried by nerve cells are called nerve impulse.

94. Name the tissue which helps in transportation of oxygen that we inhale to various parts of our body.

Blood helps in transportation of oxygen in our body.

95. Do the roots of a plant continue growing after their tips are removed? Explain giving reason.

Roots do not grow after their tips are removed. Apical meristem is present at the tips of roots, which divide to increase the length of roots. When tips are removed, apical meristem is also removed and hence the roots stop growing.

96. Name a group of cells with similar structure and designed to give highest efficiency of function.

Tissue

97. Name the process of taking up a permanent shape, size and function.

Differentiation

98. Name the animal tissue connecting muscle to bones.

Tendons

99. Name the kidney shaped cells that enclose stomata

Guard Cell

100. Name the tissue present in soft parts of the plant like cortex and pith of stem.

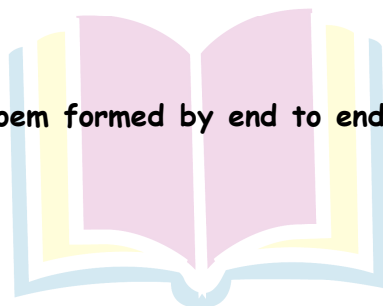
Parenchyma

101. Name a long and unbranched extension of a neuron

Axon

102. Name a component of phloem formed by end to end fusion of cells with perforated transverse walls.

Sieve tubes



Next Generation School

I. Short answer

103. Explain the basic criteria for classification of permanent tissue in plants.

The following are the basic criteria for classification of permanent tissue:

- (i). Type of cells with which the tissues are made up of
 - ❖ Tissues which are made up of only one type of cells are called simple permanent tissue.
 - ❖ Tissues which are made up of more than one type of cells are called complex permanent tissue,
- (ii). Whether the tissues are living [like xylem and phloem] or dead [like collenchyma, cork]
- (iii). Function of the tissues
 - ❖ Conducting - xylem and phloem
 - ❖ Supportive - Parenchyma

104. What changes do occur on the outer layer of a young stem when it becomes a tree?

When a plant grows older, the outer protective tissue undergoes certain changes. A strip of secondary meristem replaces the epidermis of the stem. Cells on the outside are cut off from this layer. This forms the several layer thick cork or the bark of the tree. Cells of cork are dead and compactly arranged without intercellular spaces. They also have a chemical called suberin on their walls which make them impervious to gases and water.

105. (a) State two important functions of areolar tissue,

(b) Why are skeletal muscles known as striated muscles?

(a) Two important functions of areolar tissue are as follows

- (i) They act as a supporting and packing tissue between organs lying in the body cavity.
- (ii) They also help in repair of tissues.

(b) The skeletal muscles show alternate dark and light bands or stripes or striations, so they are known as striated or striped muscles.

106. (a) Why is connective tissue called so?

(b) What is the function of the areolar connective tissue?

(c) Which substance is present in the adipocyte? How does it help?

(a) These tissues connect various body organs, They connect bones to each other, muscles to bones and bind tissues, they are therefore called connective tissues.

(b) Areolar connective tissue are loose and cellular connective tissue. They act as a supporting and packing tissue between organs lying in the body cavity. They also help in repairing of tissues.

(c) Adipocytes are filled with fat globules. They keep visceral organs in position forming shock absorbing cushions around them, storage of fat also act as an insulator.

107. Establish the relationship between structure, function and location in each case:

(a). Bone

(b) Areolar Tissue

(c) Striated muscle

Bone	Areolar Tissue	Striated Muscle
(i) Bones are hard and non flexible.	i) Areolar tissue are loose and cellular connective tissue	i) Striated muscles are arranged in bundles. They are long. Cylindrical, unbranched & multinucleated.
(ii) Bone provides shape to the body. It also anchors the muscles and support the main organs of the body.	(ii) They act as supporting and packing tissue between organs lying in the body cavity. They also help in repair of tissues.	(ii) Striated muscles provide force of locomotion and all other voluntary movement of the body.
(iii) Bones make the skeleton of the body.	(iii) Areolar tissue are found between skin and muscles, around blood vessels & nerves and in the bone marrow	(iii) They are found in the muscles of limbs, body wall, face, neck etc.,

Relationship among Bone, Areolar Tissue and Striated Muscles

108. Name the following and give one characteristic of each,

(a). Living tissue that provides mechanical support in plants.

(b). Highly specialised cells for being stimulated and then transmitting the stimulus very rapidly within the body of animals.

(c). Animal tissue with elongated cells and contractile proteins responsible for movement.

(a) Parenchyma tissue e: These are loosely packed with large intercellular spaces.

(b) Nervous tissue : Each nerve cell of nervous tissue consists of cyton, dendrite and axon.

(c) Striated muscle: It has alternate light and dark band.

109. (a). State any two differences between tendon and ligament.

(b). Give the function of adipose tissue

(a) Differences:

Tendon	Ligament
(i) It is strong and non-flexible	(i) It is elastic and flexible
(ii) It joins muscles to bones	(ii) It joins bones to bones
(iii) It is formed of white fibrous connective tissue	(iii) It is formed of yellow fibrous connective tissue.

(b) Adipose tissue stores fats and are found below the skin and between internal organs. It also acts as an insulator.

110. (a) Name the animal tissue which is present in the larynx?

(b) Write the chemical constituents of this tissue?

(c) What functions does this tissue perform?

(a) Stratified squamous epithelium is present in larynx. It is the voice box that holds vocal cords and is a part of the respiratory system.

(b). The epithelial cells are made up of phospholipid that contains specific proteins.

(c) Squamous epithelial cells protect the underlying cells from drying, injury, bacterial and viral infection and from the effect of harmful chemicals.

111. Identify the type of muscular tissues having the following characteristics:

(i) cylindrical, branched and uni-nucleated.

(ii) long with pointed ends sand uni-nucleated.

(iii) long cylindrical, unbranched and multi-nucleated.

(i) Cardiac muscle

(ii) Unstriated muscles

(iii) striated muscles.

112. (a) Why is plasma membrane called selectively permeable membrane?

(b) How is flexible nature of plasma membrane useful for Amoeba? Name this process.

(a) Plasma membrane allows the entry and exit of some materials in and out of the cell. On the other hand, it prevents movement of some other substances through it. Hence it is called selectively permeable membrane.

(b) The flexibility of cell membrane enables Amoeba to engulf in food and other materials from its external environment. This process is known as endocytosis.

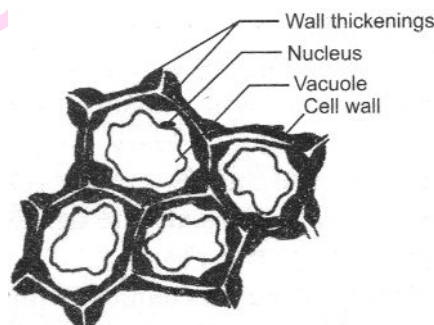
113. (a). You can very easily bend the stem of a plant without breaking it. Name the tissue in the plant which makes it possible. Where is it located? State any two characteristic features of the cells of this tissue.

(b) Draw a labelled diagram of the transverse section of this tissue.

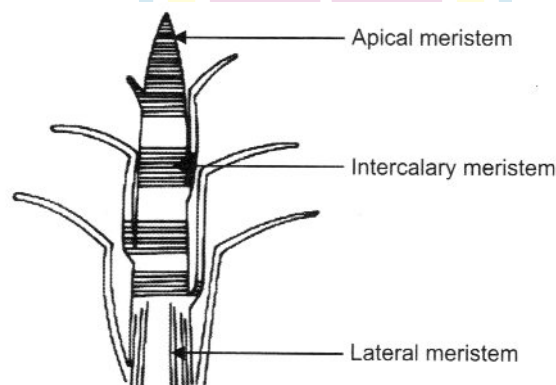
(a) It is possible due to Collenchyma tissue, It is located in the leaf stalk and stem of plants.

- ❖ The cells of this tissue are living, elongated and irregularly thickened at the corners.
- ❖ Intercellular space is very little

(b).



114. Draw a diagrammatic labelled sketch of stem tip to show the location of meristematic tissue.



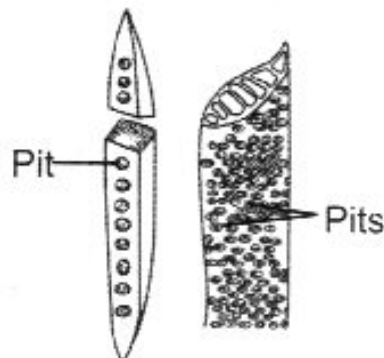
Location of meristematic tissue in plant body

115. Write a short note on different types of meristematic tissue with their locations and functions in plants.

Location and functions of Meristematic tissue:

- (a) **Apical meristems:** They are present at the growth tips of stems and roots. They increases the length of stem and root.
- (b) **Lateral meristems (cambium) :** They lie on lateral sides of stems and roots. They increases the girth of stem and root.
- (c) **Intercalary meristems :** They lie at the base of the leaves or internodes on twigs. They increases longitudinal growth of plants.

116. a. Identify the given figures.



b. State in brief their structure.

c. Describe the role performed by the two

a) The given figures are of tracheid and vessel of complex tissue - xylem

b) **Tracheids :** They are long, tubular dead cells with lignified walls and tapering ends.

Vessels : They are very long tube-like structures formed by a row of cells placed end to end. The walls are lignified. They generally posses pits.

c) They provide mechanical support and conduct water and mineral salts.

117. List any six characteristics of parenchyma.

Parenchyma:

It is the most common simple tissue in plants with relatively little specialisation.

They are living cells which form the bulk of the plant body and possess the power of division.

The cell wall is thin and made up of cellulose.

The cells are loosely packed with large intercellular spaces occurring in-between cells.

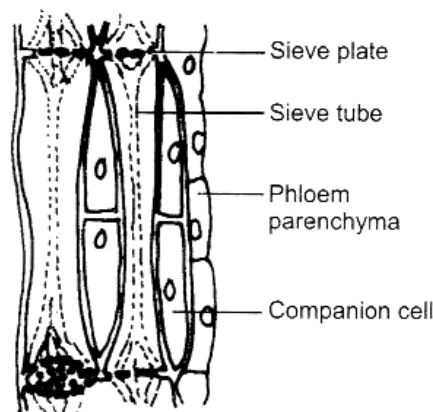
The parenchyma tissues are found in soft parts of the plant such as cortex of roots, ground tissues in stems and mesophyll of leaves.

118. a) Name the two types of complex tissues.

b) Draw a neat diagram of the section of the tissue that is responsible for the translocation of food from the leaves to the different parts of the plant.

a) The two types of complex tissues are xylem and phloem.

b) The tissue phloem is responsible for the translocation of food from the leaves to the different parts of the plant.

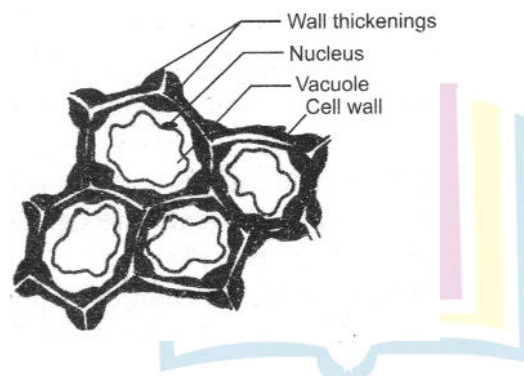


Section of phloem

119. a) Draw the labelled diagram of collenchyma tissue as seen in transverse section.

b) i) Name the tissue found in the husk of a coconut.

ii) Name the chemical substance that makes the cork cells impervious to gases and water.

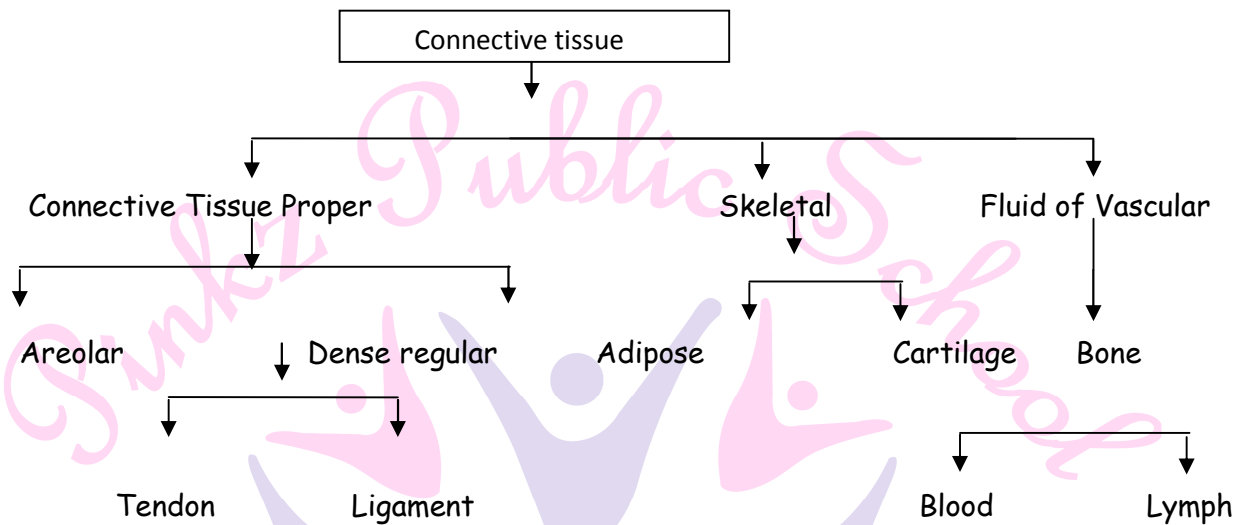


a)

b) i) Sclerenchyma tissue

ii) A chemical called suberin makes cork impervious to gases and water.

121. Draw a flow chart showing the various types of connective tissue.



122. List the constituents of the phloem. What will happen if the phloem at the base of a branch is removed?

Phloem is made up of four types of elements sieve tubes, companion cells, phloem fibres and phloem parenchyma.

If the phloem at the base of a branch is removed, the area below the cut will not receive food from the leaves of that branch, But it will continue to receive food from the other branches and the plant will not die. Food can move in phloem in both the directions.

123. What is xylem? Name the four elements of xylem and write one function of each.

Xylem is a complex permanent tissue which conducts water and mineral salts upward from roots to leaves.

The four elements of xylem are - Tracheids, vessels, xylem parenchyma and xylem fibres.

Functions of each of the elements are -

- (i). Tracheids: They transport water and minerals vertically.
- (ii) Vessels: They also transport water and minerals vertically.
- (iii) Xylem parenchyma: It stores food and helps in sideways conduction of water.
- (iv) Xylem fibres: They are mostly supportive in functions.

124. write a note on the protective tissue in plant.

The outermost layer of plant body [such as stems, roots and leaves] are modified into protective tissue. It is one cell thick and covered with cutin and protects the underlying tissues present in the plant body. They are of two types - Epidermis and cork.

125. Describe three functions of the protective tissue in plants.

Functions of protective tissue are:

- (i) Protection of plant from excessive heat or cold, and from the attack of parasitic fungi and bacteria.
- (ii) The cuticle of epidermis checks the excessive evaporation of water

126. List the constituents of the xylem. What would happen if the xylem of root of a plant is blocked?

Xylem is composed of four type of elements - tracheids, vessels, xylem parenchyma and xylem fibres.

Xylem transports water and minerals vertically from roots to leaves, if the xylem of the roots of a plant are blocked, the root will not be able to transport water and minerals to the leaves. The plant will therefore not be able to manufacture its food and will die.

127. Give the names of the following

- (i) Tissue concerned with the conduction of food materials.
- (ii) Tissue capable of cell divisions
- (iii) Minute pores present in the epidermis.

(i) Complex tissue [Phloem] (ii) Meristematic Tissue (iii) Stomata

128. Name the common simple tissues of plant body and write one function of each.

The common simple tissues of plant body along with their functions are as follows.

(i) **Parenchyma** : It stores and assimilates food and serves as a food storage tissues.

(ii) **Collenchyma**: It provides mechanical support and elasticity, and thus is a mechanical tissue.

(iii) **Sclerenchyma**: It provides mechanical strength to the plants.

129. Name the kinds of muscles found in your limbs and lungs. How do they differ from each other structurally and functionally?

Muscles found in our limbs are called skeletal muscles. Muscles found in our lungs are called smooth muscles.

Difference between:

Skeletal muscle	Smooth muscle
(i) Structure: The cells of skeletal muscles are long. Cylindrical, unbranched and multinucleate.	(i) Structure: The cells of smooth muscles are long with pointed end and uninucleate.
(ii) Function: Skeletal muscles are voluntary. One has complete control over their contraction and relaxation.	(ii) Function: Smooth muscles are involuntary. One has no control over their contraction and relaxation.

130. What are the characteristic features of meristematic tissues?

The characteristic features of meristematic tissues are:

- (i) The cells of this tissue are similar in structure and are thin-walled.
- (ii) The shape may be oval, spherical, rectangular or polygonal.
- (iii) They contain dense cytoplasm with single large nucleus and few or no vacuoles.

131. What are the functions of stomata?

Functions of stomata:

- (i) Exchange of gases, i.e. O_2 and CO_2 between the plants and the atmosphere takes place through stomata.
- (ii) Plants eliminate excessive water in the form of vapour through stomatal openings.
- (iii) Stomatal opening gets closed when there is shortage of water. Thus, reduces loss of water, Stomatal opening also close down during night. Thus, stomata regulate water loss from plants. i.e. They regulate transpiration.

132. Given below are the names of some connective tissues. Mention the composition and function of each of them: Bone, cartilage, blood.

Bone : Bone is a very strong and non-flexible tissue embedded in a hard matrix made up of both organic matter [protein] and inorganic matter [calcium and phosphorous compounds]. It provides shape and skeletal support of the body. It also anchors the muscles and supports the main organs of the body.

Cartilage: The cartilage is a specialised connective tissue which is compact and less vascular.

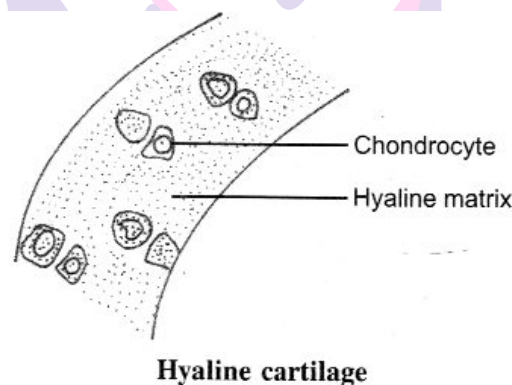
It provides support and flexibility to the body parts and also smoothens bone surfaces at joints. Cartilage has widely spaced cells and is present in the nose, ear, trachea and larynx.

Blood: It is a fluid [liquid] connective tissue. In this tissue, the cells move in a fluid matrix or medium called blood plasma. The blood plasma contains cells called blood corpuscles which include red blood corpuscles [RBCs] white blood corpuscles [WBCs] and platelets. RBCs and WBCs are living while plasma and platelets are non-living components.

Blood flows and transports gases, digested food, hormones and waste materials to different parts of the body.

133. Name the tissue that smoothens bone surfaces at joints. Describe its structure with the help of a diagram.

Cartilage smoothens bone surfaces at joints.



Cartilage: The cartilage is a specialised connective tissue. Which is compact and less vascular having an extensive matrix of delicate network of collagen fibres and having cells, chondrocytes. It provides support and flexibility to the body parts and also smoothens bone surfaces at joints. Cartilage has widely spaced cells and is present in the nose, ear, trachea and larynx.

134. Name three different types of blood cells and give their functions.

The three different types of blood cells are red blood cells, [RBCs], white blood cells [WBCs] and platelets.

Functions:

- (i) RBCs transport respiratory gases, oxygen and carbon dioxide.
- (ii) WBCs of blood help to fight with diseases by producing antibodies and engulfing the germs.
- (iii) Blood platelets help in the clotting of blood.

135. Give three differences between epithelial tissue and connective tissue.

Differences:

Epithelial tissue	Connective tissue
(i) It is a covering or protective tissue.	(i) It connects various body organs.
(ii) Cells are tightly packed.	(ii) Cells are loosely spaced.
(iii) Epithelial tissues are separated from the underlying tissue by a fibrous membrane	(iii) Connective tissue are not separated from other tissues by any membrane.

136. Correlate the structure and location with the function in case of:

(a). Simple squamous epithelium

(b) Columnar epithelium

(a) **Simple Squamous Epithelium:** Simple squamous epithelium consists of extremely thin and flat cells forming a delicate lining, e.g. the oesophagus and the lining of the mouth. Skin epithelial cells are arranged in many layers to prevent the wear and tear. Since they are arranged in a pattern of layers, the epithelium is called stratified squamous epithelium.

(b) **Columnar Epithelium:** It consists of tall cells which are pillar-like having elongated nuclei, It is found in the inner lining of the intestine where absorption and secretion occurs. This columnar epithelium facilitates movement across the epithelial barrier.

137. Differentiate between bone and cartilage.

Or

Differentiate between bone and cartilage with respect to structure, function and location

Ans. Differences:

Bone	Cartilage
(i) Bones are strong and non-flexible. Matrix is made up of protein and mineral salts. A narrow cavity is often present in the interior.	(i) Cartilage are soft and flexible. Matrix is made up of protein. A narrow cavity is always absent.
(ii) Blood vessels present.	(ii) Blood vessels absent.

(iii) Matrix is arranged in concentric circles,	(iii) Matrix is uniform, not in concentric circles
(iv) It is porous	(iv) It is non-porous.
(v) It forms the framework that supports the whole body.	(v) It smoothens bone surfaces at joints
(vi) Bones present in skeletal system of vertebrates.	(vi) Cartilages are present in ear, nose, larynx and trachea.

138. Mention one function of each of the following

(a) Areolar Tissue (b) Tendon (c) Ligament

(a) Function of Areolar tissue: It joins different tissues and helps in keeping the organs in place and in normal shape.

(b) Function of Tendon: It forms extensible attachment of muscles to bones

(c) Function of Ligament : It connects bone to bone at joints and holds them in position

139. What is tissue? What are the functions of connective tissue? Give one difference between ligament and tendon.

A tissue is a group of cells of the same origin, which are similar in structure and function.

Functions of connective tissue:

(i) They connect different tissues and organs.

(ii) They provide the structural framework and support to the body.

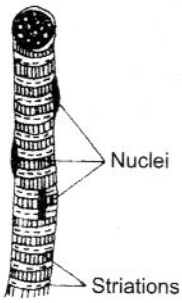
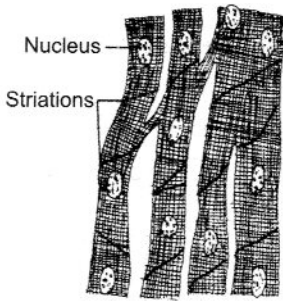
Difference between ligament and tendon:

Ligaments are elastic and connect bones to bones whereas tendons are strong and connect muscles to bones.

140. Write two difference between the muscles present in the heart and the limbs of man. Also draw labelled diagrams of these two kinds of muscles.

Muscles present in the heart are cardiac muscles and that present in the limbs of man are voluntary or striated muscles.

Difference:

Striated muscle	Cardiac muscle
<p>(i) It is arranged in bundles.</p> <p>(ii) Its ends are blunt.</p>  <p>(a) Single Striated muscle fibre</p>	<p>(i) It is arranged as a network.</p> <p>(ii) Its ends are flat and zig-zag.</p>  <p>(b) Cardiac muscle</p>

I. Long answer type

141. Write one word for the following?

- (i) Thickening present in sclerenchyma cells.
- (ii) Thin, hair-like projections present at the free ends of cuboidal epithelium
- (iii) Waterproof layer present on the outer wall of epidermal cells.
- (iv) The pigment present in red blood cells.
- (v) Zig-Zag thickenings in cardiac muscles.

(i) Lignin

(ii) Cilia

(iii) Cuticle

(iv) Haemoglobin

(v) Intercalated discs

142. Write difference between animal tissue and plant tissue.

Plant Tissues	Animal Tissues
---------------	----------------

(i) Tissue organisation is towards stationary or fixed habit of plants.	(i) Tissue organisation is towards active locomotion of animals.
(ii) In plants, dead supportive tissues are more abundant.	(ii) In animals, living tissues are more abundant.
(iii) Plants need less maintenance energy as they are capable of making their own food.	(iii) Animals need more maintenance energy as they have to move in search of food.
(iv) There is differentiation of meristematic and permanent tissues	(iv) Such differentiation is absent in animal tissue.
(v) Organisation is simple in plant	(v) Organisation is complex in animal tissues due to the development of specialised organs and organ systems.
(vi) Growth is limited to certain regions..	(vi) Growth is not limited to a region in animals

143. What is parenchyma? Write about its function.

Parenchyma: It is the most common simple tissue in plants with relatively little specialisation. The cells are living which form the bulk of the plant body and possess the power of division.

Functions of Parenchyma:

- (i) The main function of parenchyma is to store and assimilate food and serve as a food storage tissue.
 - (ii) Due to turgidity property, parenchyma forms the means of support to the stem of herbaceous plants.
 - (iii) Parenchyma cells of leaves containing chlorophyll are called chlorenchyma. They carry out photosynthesis.
 - (iv). Parenchyma cells of aquatic plants containing large air cavities are called aerenchyma, which give buoyancy to aquatic plants to help them float.
 - (v). Parenchyma serves as a packing tissue to fill the spaces between other tissues and maintain the shape and firmness of the plant.
 - (vi). Transport of materials occur through cells or cell walls of parenchyma cells
- [any five]

144. (i) Which plant tissue will you associate with the conduction of food in plants?

(ii) Write its four components

- i) Phloem conducts food in plants.
- ii) **Phloem** : It is also called bast and is a living conduction tissue, composed of four elements - sieve tubes companion cells. Phloem parenchyma and phloem fibres.
- (a) **Sieve Tubes**: The sieve tubes do not have a nucleus but have a thin layer of cytoplasm.
- (b) **Companion Cells**: These are small elongated cells having dense cytoplasm and a prominent nucleus.
- (c) **Phloem Parenchyma**: These are thin, walled living parenchymatous cells, which are mainly concerned with storage and transportation of food.
- (d) **Phloem Fibres**: These are thick-walled. Elongated dead sclerenchymatous cells which provide mechanical strength to the tissue.

145. Based upon cell shape, cell wall and intercellular spaces, prepare a comparative study table between parenchyma, collenchyma and sclerenchyma. Which of these tissues is dead.

Parenchyma	Collenchyma	Sclerenchyma
(i) Living cells and isodiametric in shape.	(i) Living Cells with thick corners.	(i) Dead cells, long and narrow with tapered ends.
(ii) Cell walls are thin and made up of cellulose.	(ii) Cell walls are thickened at corners with extra deposition of cellulose and pectin.	(ii) Cell walls are thick due to heavy deposition of lignin
(iii) Cells have distinct nucleus and a large central vacuole	(iii) Cells have distinct nucleus and dense cytoplasm.	(iii) Cells do not have a nucleus and cytoplasm.
(iv) It stores food, waste products and forms packing tissue.	(iv) It gives mechanical support and flexibility	(iv) It gives rigidity and mechanical strength to the plant.
(v) It is present in all soft parts of plant. i.e. in stems, roots, leaves, flowers and fruits.	(v) It is present below the epidermis in stems and leaves.	(v) It is present in xylem and phloem, in shells of units, in hard seeds, pulp of pear, etc.,

Sclerenchyma is a dead tissue.

146. Answer the followings:

- (a). Name the constituents of phloem tissues.
- (b) Write the specific function of cardiac muscle
- (c) State two differences between tendon and ligament.
- (d) Name the tissue that:
 - (i) Forms inner lining of our mouth.
 - (ii) Forms soft parts of leaf, stem, root and fruit.
- (e) Write two functions of adipose tissues.

- (a) Phloem consists of four elements -

Sieve tubes, companion cells, phloem parenchyma and phloem fibres.

- (b) Cardiac muscles show rhythmic contraction and relaxation of the heart and thus help to pump and distribute blood to various parts of the body.

Tendon	Ligament
(i) It is strong and non-flexible	(i) It is elastic and flexible
(ii) It joins muscles to bones	(ii) It joins bones to bones
(iii) It is formed of white fibrous connective tissue	(iii) It is formed of yellow fibrous connective tissue.

- (d) (i) Squamous epithelium
- (ii) Parenchyma

- (e) (i) It protects delicate organs.
- (ii) Storage of fats helps it to act as an insulator and as a shock absorber.

147. Explain the formation of complex permanent tissue in plants. Mention two types of complex tissues and write their functions.

Complex permanent tissue are made up of more than one type of cells, all these cells coordinate the common function. Xylem and phloem are examples of complex tissues. They transport water, minerals and food within the plant body.

Next Generation School

148. Complete the following table

	Example	Tissue	Type of Tissue	Cell [Living/Dead]	Main function
1	Husk of coconut				
2	In lead stalk below the epidermis				

S. No	Example	Tissue	Type of Tissue	Cell [Living/Dead]	Main function
1	Husk of coconut	Sclerenchyma	Simple Permanent Tissue	Dead	Provides protective covering and mechanical strength
2	In lead stalk below the epidermis	Collenchyma	Simple Permanent Tissue	Living	Provide mechanical support and elasticity of plant

149 List three functions of epidermis. What changes take place in epidermis as the plant grows older?

- Epidermis protects the plant from excessive heat or cold and from the attack of parasitic fungi and bacteria.
- It allows exchange of gases and transpiration through stomata.
- The cuticle of epidermis checks the excessive evaporation of water.

As the plants grow older, the epidermis undergo certain changes. A stream of secondary meristem replaces the epidermis of the stem. Cells on the outside are cut off from this layer. This form several layer thick cork or bark of the tree.

150.(a) What do you mean by a meristematic tissue?

(b) Mention different types of meristematic tissues present in plants. Draw a diagram showing the three types of meristematic tissues.

(a) **Meristematic tissue [Meristem]:** It consists of undifferentiated. Actively dividing cells. Meristematic tissues are growth tissues and are found in those regions of the plant that grows. For example, the root tip, shoot tip and cambium. These tissues are lignin and bring about an increase in the length and girth [thickness] of the plant. According to their position in the plant, meristems are apical, lateral and intercalary.

(b) Location of meristematic tissue in plant body

Location and functions of Meristematic tissue:

- (a) **Apical meristems:** They are present at the growth tips of stems and roots. They increases the length of stem and root.
- (b) **Lateral meristems (cambium) :** They lie on lateral sides of stems and roots. They increases the girth of stem and root.
- (c) **Intercalary meristems :** They lie at the base of the leaves or internodes on twigs. They increases longitudinal growth of plants.

151. What is a nervous tissue? Give its functions. Explain the structure of a neuron with a diagram.

Or

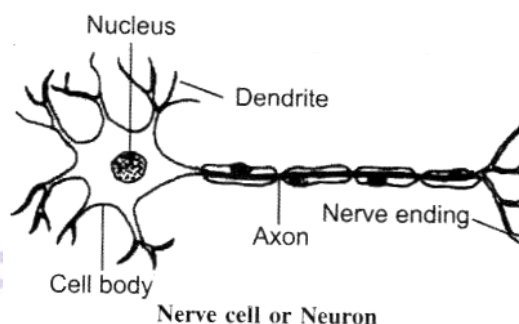
What are neurons? Where are they found in the body? What functions do they perform in the body of an organism?

Nervous Tissue: The cells of nervous tissue are highly specialised for being stimulated and then transmitting the stimulus very rapidly from one place to another within the body, The brain, spinal cord and nerves are all composed of the nervous tissue. The cells of this tissue are called Nerve cells or neurons.

Functions of Nervous Tissue:

- (i) Nervous tissue controls all the body activities
- (ii) It coordinates among various body parts during any body functions.
- (iii) Dendron carry nerve impulses towards the cyton whereas axon carries impulses away from the cyton.

Each neuron has three parts - the cyton or cell body, dendrites and the axon.



- (i) **Cyton:** It is the cell body of a nerve cell that has a large central nucleus and cytoplasm, from which long thin hair-like parts arise.

Dendrite: The short branched fibre of neuron which receives nerve impulses.

Axon: A single long conducting fibre extending from a neuron that transmits impulse



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