

## 2.tRNA (transfer RNA):

1. Translates the code from mRNA and transfers amino acids to the ribosome to build proteins.
2. It is highly folded into an elaborate 3D structure.
3. It comprises about 15% of total RNA.
4. It is also called as soluble RNA.

## 3.rRNA (ribosomal RNA):

1. It is made up of two subunits of ribosomes.
2. It constitutes 80% of the total RNA.
3. It is a polymer with varied length from 120–3000 nucleotides.
4. Genes for rRNA are highly conserved and employed for phylogenetic studies.

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# UNIT-IV.Plant Anatomy

## Chapter-9.Tissue and Tissue System

### I.Choose the correct answer:-

1. Refer to the given figure and select the correct statement.
  - i. A, B, and C are histogen of shoot apex
  - ii. A Gives rise to medullary rays.
  - iii. B Gives rise to cortex
  - iv. C Gives rise to epidermis

a. i and ii only   b. ii and iii only   **c. i and iii only**   d. iii and iv only
2. Read the following sentences and identify the correctly matched sentences.
  - i. In exarch condition, the protoxylem lies outside of metaxylem.
  - ii. In endarch condition, the protoxylem lie towards the centre.
  - iii. In centarch condition, metaxylem lies in the middle of the protoxylem.
  - iv. In mesarch condition, protoxylem lies in the middle of the metaxylem.

a. i, ii and iii only   b. ii, iii and iv only   **c. i, ii and iv only**   d. All of these
3. In Gymnosperms, the activity of sieve cells are controlled by
  - a. Nearby sieve tube members.
  - b. Phloem parenchyma cells
  - c. Nucleus of companion cells.
  - d. Nucleus of albuminous cells.**
4. When a leaf trace extends from a vascular bundle in a dicot stem, what would be the arrangement of vascular tissues in the veins of the leaf?
  - a. Xylem would be on top and the phloem on the bottom**
  - b. Phloem would be on top and the xylem on the bottom
  - c. Xylem would encircle the phloem
  - d. Phloem would encircle the xylem
5. Grafting is successful in dicots but not in monocots because the dicots have
  - a. Vascular bundles arranged in a ring
  - b. Cambium for secondary growth**
  - c. Vessels with elements arranged end to end
  - d. Cork cambium

### II.Two, Three, Five mark questions:-

#### 6.Why the cells of sclerenchyma and tracheids become dead?

1. They are dead cell and lacks protoplasm.
2. These cells are long or short, narrow, thick walled and lignified secondary walls.

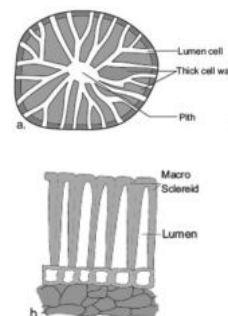
#### 7.Explain sclereids with their types.

##### 1.Brachysclereids or Stone cells:

1. They are Isodiametric, with hard cell wall.
2. Found in bark, pith, cortex and fleshy portion of some fruits.
3. Example: Pulp of Pyrus.

##### 2.Macroscleireids:

1. They are elongated and rod shaped cells.
2. Found in the outer seed coat of leguminous plants.
3. Example: Crotalaria and Pisum sativum.



### 3.Osteosclereids (Bone cells):

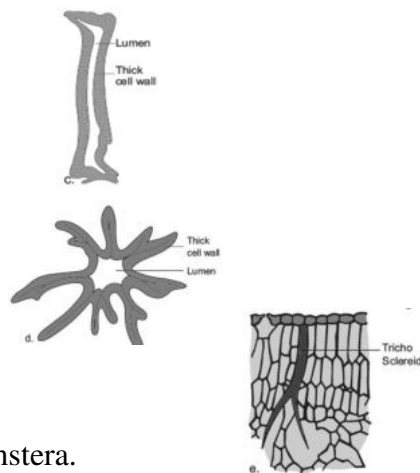
- 1.They are rod shaped cells with dilated ends.
- 2.Found in leaves and seed coats.
- 3.Example: seed coat of Pisum and Hakea.

### 4.Astrosclereids:

- 1.They are star shaped cells.
- 2.Found in petioles and leaves.
- 3.Example: Tea, Nymphae and Trochodendron.

### 5.Trichosclereids:

- 1.They are hair like thin walled cells.
- 2.Found in stems and leaves of hydrophytes.
- 3.Example: Nymphaea leaf and Aerial roots of Monstera.



### 8.What are sieve tubes ? Explain.

- 1.Sieve tubes are long tube like conducting elements in the phloem.
- 2.These are formed by sieve tube elements.
- 3.The end wall of sieve tube contains a number of pores and it looks like a sieve. So it is called as sieve plate.
- 4.The sieve elements show nacreous thickenings on their lateral walls.
- 5.In mature sieve tube, nucleus is absent.
- 6.It contains a lining layer of cytoplasm.
- 7.A special protein (P. Protein = Phloem Protein) called slime body is seen in it.
- 8.In mature sieve tubes, the pores in the sieve plate are blocked by a substance called callose.
- 9.The conduction of food material takes place through cytoplasmic strands.
- 10.Sieve tubes occur only in Angiosperms.

### 9.Distinguish the anatomy of dicot root from monocot root.

| Characters         | Dicot Root   | Monocot Root                      |
|--------------------|--|-----------------------------------|
| Pericycle          | Gives rise to lateral roots, phellogen and vascular cambium. | Gives rise to lateral roots only. |
| Vascular tissue    | Present in limited numbers.                                  | Present in more numbers.          |
| Conjunctive tissue | Parenchymatous.  | Sclerenchymatous.                 |
| Cambium            | Present.   | Absent.                           |
| Xylem              | Tetrach.   | Polyarch.                         |

### 10.Distinguish the anatomy of dicot stem from monocot stem.

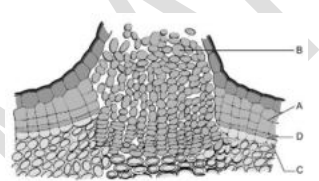
| Characters       | Dicot Stem  | Monocot Stem           |
|------------------|---|------------------------|
| Hypodermis       | Collenchymatous.  | Sclerenchymatous.      |
| Ground tissue    | Differentiated into cortex, endodermis, pericycle and pith. | Not differentiated.    |
| Starch sheath    | Present.  | Absent.                |
| Medullary rays   | Present.  | Absent.                |
| Vascular bundles | Collateral and open.  | Collateral and closed. |

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## UNIT-IV.Plant Anatomy

### Chapter-10.Secondary Growth

#### I.Choose the correct answer:-

- Consider the following statements  
In spring season vascular cambium.  
i. is less active ii. produces a large number of xylary elements iii. forms vessels with wide cavities of these,  
a. (i) is correct but (ii) and (iii) are not correct    **b. (i) is not correct but (ii) and (iii) are correct**  
c. (i) and (ii) are correct but (iii) is not correct    d. (i) and (ii) are not correct but (iii) is correct.
  - Usually, the monocotyledons do not increase their girth, because  
a. They possess actively dividing cambium    **b. They do not possess actively dividing cambium**  
c. Ceases activity of cambium    d. All are correct
  - In the diagram of lenticel identify the parts marked as A,B,C,D  
**a. A. phellem, B. Complementary tissue, C. Phelloderm, D. Phellogen.**  
b. A. Complementary tissue, B. Phellem, C. Phellogen, D. Phelloderm.  
c. A. Phellogen, B. Phellem, C. Phelloderm, D. complementary tissue.  
d. A. Phelloderm, B. Phellem, C. Complementary tissue, D. Phellogen.
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- The common bottle cork is a product of  
a. Phellem    **b. Phellogen**    c. Xylem    d. Vascular cambium
  - What is the fate of primary xylem in a dicot stem 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

#### II.Two, Three, Five mark questions:-

- In a forest, if the bark of a tree is damaged by the horn of a deer, How will the plant overcome the damage?**  
When the bark of a tree is damaged by the outer environment, it will be overcome by the activity of vascular cambial tissues like periderm, cortex, primary phloem and secondary phloem.
- In which season the vessels of angiosperms are larger in size, why?**  
In spring season the vessels of angiosperms are larger in size.  
**Reason:**  
1.In the spring season, cambium is very active and produces a large number of xylary elements having Vessels and tracheids with wide lumen.  
2.The tracheary elements are thick walled.  
3.The wood formed during this season is called spring wood or early wood.
- Continuous state of dividing tissue is called meristem. In connection to this, what is the role of lateral meristem?**  
1.Lateral meristem occurs in longitudinal axis of stem and root.  
2.It is responsible for secondary tissues and thickening of stem and root.  
3.Example: vascular cambium and cork cambium.
- A timber merchant bought 2 logs of wood from a forest & named them A & B, The log A was 50 year old & B was 20 years old. Which log of wood will last longer for the merchant? Why?**  
50 year old log of wood will last longer for the merchant.  
**Reason:**  
1.Annual rings are formed by early or spring wood and late or autumn wood.  
2.Each annual rings are denoted by one year growth.  
3.Hence, the plant age is decided by a timber merchant as 20 and 50.  
4.Sap wood and heart wood can be distinguished in the secondary xylem.  
5.From the economic point of view, generally the heartwood is more useful than the sapwood.  
6.The timber from the heartwood is more durable and more resistant than the timber from sapwood.

10. A transverse section of the trunk of a tree shows concentric rings which are known as growth rings.

**How are these rings formed? What are the significance of these rings?**

Growth rings or annual rings are formed by early or spring wood and late or autumn wood.

**Significance of growth rings or annual rings:**

1. Age of wood can be calculated.
2. The quality of timber can be ascertained.
3. Radio-Carbon dating can be verified.
4. Past climate and archaeological dating can be made.
5. Provides evidence in forensic investigation.

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## UNIT-IV. Plant Physiology

### Chapter-11. Transport in Plants

**I. Choose the correct answer:-**

1. In a fully turgid cell  
a.  $DPD = 10 \text{ atm}$ ;  $OP = 5 \text{ atm}$ ;  $TP = 10 \text{ atm}$     **b.  $DPD = 0 \text{ atm}$ ;  $OP = 10 \text{ atm}$ ;  $TP = 10 \text{ atm}$**   
c.  $DPD = 0 \text{ atm}$ ;  $OP = 5 \text{ atm}$ ;  $TP = 10 \text{ atm}$     d.  $DPD = 20 \text{ atm}$ ;  $OP = 20 \text{ atm}$ ;  $TP = 10 \text{ atm}$
2. Which among the following is correct?  
i. apoplast is fastest and operate in nonliving part  
ii. Transmembrane route includes vacuole  
iii. symplast interconnect the nearby cell through plasmodesmata  
iv. symplast and transmembrane route are in living part of the cell  
a. i and ii    b. ii and iii    c. iii and iv    **d. i, ii, iii, iv**
3. What type of transpiration is possible in the xerophyte *Opuntia*?  
a. Stomatal    b. Lenticular    **c. Cuticular**    d. All the above
4. Stomata of a plant open due to  
**a. Influx of  $K^+$**     b. Efflux of  $K^+$     c. Influx of  $Cl^-$     d. Influx of  $OH^-$
5. Munch hypothesis is based on  
**a. Translocation of food due to TP gradient and imbibition force**    b. Translocation of food due to TP  
c. Translocation of food due to imbibition force    d. None of the above

**II. Two, Three, Five mark questions:-**

6. If the concentration of salt in the soil is too high and the plants may wilt even if the field is thoroughly irrigated. Explain.  
i) Under extreme saline condition, plants are unable to absorb water from the soil.  
ii) The osmotic pressure of pure water is always zero.  
iii) It increases with the increases of solute concentration.  
iv) Hence, if the concentration of salt in the soil is too high, the plants will wilt even if the field is thoroughly irrigated.
7. How phosphorylase enzyme open the stomata in starch sugar interconversion theory?  
i) In guard cells phosphorylase enzyme was discovered by Hanes in 1940.  
ii) During the day time phosphorylase enzyme hydrolyses starch into sugar.  
iii) Hence, the high pH followed by endosmosis is opening the stomata during day time.  
iii) The vice versa takes place during the night time.
8. List out the non-photosynthetic parts of a plant that need a supply of sucrose?  
1. Root    2. Stem    3. Flower    4. Fruit

### 9. What are the parameters which control water potential?

Water potential ( $\Psi$ ) is controlled by the following parameters.

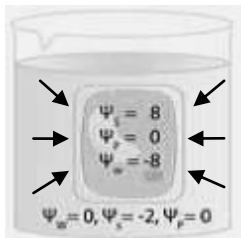
1. Solute concentration or Solute potential ( $\Psi_S$ )
2. Pressure potential ( $\Psi_P$ )

$$\text{Water Potential} = \text{Solute potential} + \text{Pressure potential}$$

$$\Psi_W = \Psi_S + \Psi_P$$

### 10. An artificial cell made of selectively permeable membrane immersed in a beaker (in the figure). Read The values and answer the following questions?

a. Draw an arrow to indicate the direction of water movement



b. Is the solution outside the cell isotonic, hypotonic or hypertonic?

Ans: Hypotonic.

c. Is the cell isotonic, hypotonic or hypertonic?

Ans: Hypertonic.

d. Will the cell become more flaccid, more turgid or stay in original size?

Ans: More turgid.

e. With reference to artificial cell state, is the process endosmosis or exosmosis? Give reasons.

Ans: Endosmosis.

**Reason:** Endosmosis is defined as the osmotic entry of solvent into a cell or a system when it is placed in a pure water or hypotonic solution.

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## UNIT-V.Plant Physiology

### Chapter-12.Mineral Nutrition

#### I.Choose the correct answer:-

1. Identify correct match.

1. Die back disease of citrus - (i) Mo
2. Whip tail disease - (ii) Zn
3. Brown heart of turnip - (iii) Cu
4. Little leaf - (iv) B

- a. 1 (iii) 2 (ii) 3 (iv) 4 (i)
- b. 1 (iii) 2 (i) 3 (iv) 4 (ii)
- c. 1 (i) 2 (iii) 3 (ii) 4 (iv)
- d. 1 (iii) 2 (iv) 3 (ii) 4 (i)

2. If a plant is provided with all mineral nutrients but, Mn concentration is increased, what will be the deficiency?

- a. Mn prevent the uptake of Fe, Mg but not Ca
- b. Mn increase the uptake of Fe, Mg and Ca
- c. Only increase the uptake of Ca
- d. Prevent the uptake Fe, Mg, and Ca

3. The element which is not remobilized?

- a. Phosphorous
- b. Potassium
- c. Calcium
- d. Nitrogen

4. Match the correct combination.

| Minerals     | Role           |
|--------------|----------------|
| A Molybdenum | 1. Chlorophyll |
| B Zinc       | 2. Methionine  |
| C Magnesium  | 3. Auxin       |
| D Sulphur    | 4. Nitrogenase |

- a. A-1 B-3 C-4 D-2
- b. A-2 B-1 C-3 D-4
- c. A-4 B-3 C-1 D-2
- d. A-4 B-2 C-1 D-3