Plant And Animal Tissues

Synopsis

- The unit of level of organisation is independent in its mode of existence and activity.
- All multi cellular organisms start their life as a single cell.
- **Plant tissues are basically of two type**
    1. meristematic
    2. permanent or non-dividing
- **The permanent – plant tissues are further of three types**
    1. protective
    2. supportive: parenchyma, collenchyma, sclerenchyma
    3. conductive: xylem, phloem
- Parenchymal cells have thin-walled cells and usually with a vacuole.
- Potatoes mainly are composed of parenchymal cells.
- Collenchyma are parenchymatous cells which are elongated and are thick at the comers. This helps to support the parts of the plant.
- Sclerenchyma tissue is formed of long, narrow and thick cells. This provides strength to the plant parts.
- Xylem is formed of thick-walled, tubular and often dead cells. They transport water and minerals absorbed by roots.
- Old xylem forms the **wood.**
- Phloem is formed of living tubular cells which provide a passage for the downward transport of food.
- **The four major groups of animal tissues**

    1. epithelial tissue
    2. connective tissue
    3. muscular tissue
    4. nervous tissue
- **The epithelial tissue is further of four types:**

    1. squamous epithelium (protective)
    2. cuboidal epithelium (absorption)
    3. columnar epithelium (secretory)
    4. ciliated epithelium (movement of substances)
- **Supportive connective tissue consists of**
    1. Cartilage
    2. Bone
- **Fibrous connective tissue:**
  It packs and binds most of the organs. It is of the following types.
    1. **areolar tissue:** binds skin to underlying tissue.
    2. **adipose tissue:** filled with fat.
    3. **tendon:** connect muscles to bones.

4. **ligaments:** connect bone to another bone.

- **Fluid connective tissue consists of**
  1. Blood
  2. Lymph
- **The liquid part of the blood is called plasma and the cellular part includes:**
  1. red blood cells
  2. white blood cells
  3. platelets.
- **Three distinct kinds of muscles are**
  1. striated or skeletal
  2. unstriated or smooth
  3. cardiac or heart.
- A nerve cell is formed of a cell body called **cyton** and one or more elongated hair-like extensions called **dendrites.** The longest dendrite is called **axon.**
- **Systems of the body with their primary vital function.**Skeletal system: support and protection
  1. **Muscular system:** movement
  2. Digestive system**:** nutrition
  3. **Respiratory system:** exchange of gases
  4. **Circulatory system:** transport of materials
  5. **Excretory system:** waste removal
  6. **Nervous system:** sensation and co-ordination
  7. **Reproductive system:** continuation of race.

Review Questions

MULTIPLE CHOICE QUESTIONS

1. Put a tick (✓) against the most appropriate alternative in the following statements.

(i) A group of similar cells to perform a specific function forms a
(a) organ
(b) species
(c) organ system
(d) tissue

(ii) The fine branches given out from the cell body of a nerve cell are
(a) dendrites
(b) cyton
(c) axon
(d) neurons

(iii) Fluid connective tissue of humans is
(a) blood and cartilage
(b) lymph and plasma
(c) blood and lymph
(d) stroma and matrix

Short Answer Questions

Question 1.
1. Define the following terms:

1. Tissue
2. Organ

Answer:

1. **Tissue:** A group of similar cells which perform a specific function.
   example: Muscular tissue in animals.
2. **Organ:** The different type of tissues which group together to function in a co-ordinated manner.
   example: liver

2. Answer the following:

Question 2(i).
What is a meristematic tissue ? How is it different from permanent tissues ?
Answer:
Plant tissues are classified into two types:

1. Meristematic tissue
2. Permanent or non-diving tissue

Meristematic tissues are the plant tissues which are made up of actively dividing cells. These tissues actively divide and lead to the growth of the plant body. They are found at the growth points of the plant like tips of root, stem and branches etc.

1. Cells are small with thin cell walls.
2. Cells have large and conspicuous nuclei.
3. Cells have no vacuoles.
4. Cells are actively dividing type cells.

Difference between Meristematic and permanent
Meristematic tissue :

1. Meristematic tissue is present at the tip of the root and stem and in between the xylem and phloem. Form apical meristematic tissue when present at the tips. It is in the form of cambium in between the xylem and phloem.
2. Meristematic cells divide and form other types of tissues. The cells are thin walled.
3. Meristematic cells may be intercalary as in case of monocots.
4. The cells are small and isodiametric, vacuoles are small or absent.
5. Respiratory and biosynthetic activities maximum.
6. The cells are immature and mitochondria simple.
7. Proplastids act as plastids.

Permanent tissue

1. Permanent tissue may be simple as parenchyma, collenchyma or sclerenchyma and it may be complex as xylem and phloem.
2. These are made up of more than one kind of cells. These perform a common function Xylem and phloem form vascular system of the plant. These cells do not have the power to divide.
3. These cells may act as epidermis cortex or grit cells. Sclerenchyma gives strength.
4. Living cells of permanent tissue have vacuoles. The cells are large and of different shapes.
5. Both these activities are low.
6. The cells fully mature, mitochondria fully developed.
7. Living cells have plastids.

Question 2(ii).
Which living material would you take to demonstrate meristematic tissue ?
Answer:
Green gram seeds can be used to demonstrate meristematic tissue which when soaked in a petridish stuffed with wet cotton and left for 3-4 days would sprout out. These sprouted seeds have roots developing whose root tips have meristematic tissue.

Question 2(iii).
What is the function of meristematic tissue ?
Answer:
The meristematic tissue have the primary role in the growth of the plant tissue as it consists of active dividing cells

Question 3.
State whether the following statements are True or False.

(i) A tissue is formed of only one type of cells.
Ans. True

(ii) Only one type of tissue forms an organ.
Ans. False.
Correct: Two or more types of tissue form an organ.

(iii) Permanent tissue is made up of undifferentiated and dividing Cells.
Ans. False.
Correct: Meristematic tissue is made up of undifferentiated and dividing cells.

(iv) Meristematic tissue is found at growing tips of a plant.
Ans. True

(v) Phloem is formed of dead tubular cells.
Ans. False.
Correct: Phloem is formed of living tubular cells.

Question 4.
Fill in the blanks by selecting suitable words from the list given below:
"Thin – walled, collenchyma, vascular, tissues, conducting"

1. A group of different **tissues** working together to perform a function is called an organ.
2. Xylem and phloem form the **conducting** tissue.
3. Conducting tissue is also called **vascular** tissue.
4. Cells are elongated and thick at the comers in **collenchyma** tissue.
5. Parenchyma is composed of large **thin-walled** cell

Question 5.
Match the items given is column A with those given in column B:

Column A
(i) Fibrous connective tissue
(ii) Fluid connective tissue
(iii) Supportive connective tissue
(iv) Ligament
(v) Tendon
Column B
(a) blood
(b) cartilage

(iii) Supportive connective tissue
another bone.
(d) areolar tissue
(e) connects a muscle
with a bone.

Ans.

Column A	Column B
(i) Fibrous connective tissue	(d) areolar tissue
(ii) Fluid connective tissue	(a) blood
(iii) Supportive connective tissue	(b) cartilage
(iv) Ligament	(c) connects a bone to another bone.
(v) Tendon	(e) connects a muscle with a bone.

Question 6.

How do you rank the following among cells, tissues, organs, or organism ?

1. **Amoeba :** organism
2. **Euglena:** organism
3. **Skin :** organ
4. **Lungs :** organ
5. **Neuron :** tissue
6. **Cardiac muscles:** Ti1ue

Question 7.

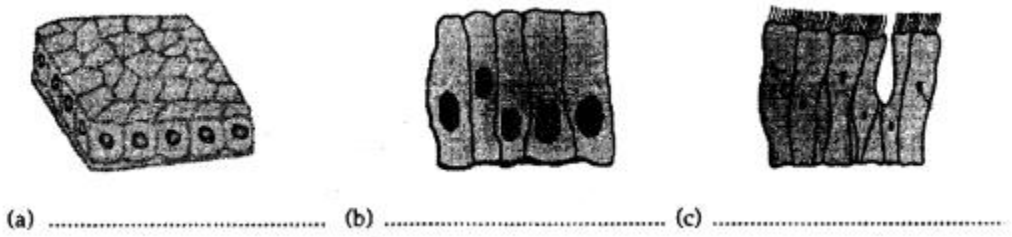
Each of the tissues listed in Column A is related to one of the functions given in Column B. Match the lines correct pairs by drawing

	Column A (Tissue)	Column B (Function)
	(a) Epithelial tissue	**(i) movement**
	(b) Connective tissue	**(ii) protection**
	(c) Vascular tissue	**(iii) messages**
	(d) Nervous tissue	**(iv) support**
	(e) Muscular tissue	**(v) transport**
Ans.	**Column A (Tissue)**	**Column B (Function)**
	(a) Epithelial tissue	(ii) protection
	(b) Connective tissue	(iv) support
	(c) Vascular tissue	(v) transport
	(d) Nervous tissue	(iii) messages
	(e) Muscular tissue	(i) movement

Question 8.
Name the kind of tissue that

1. Carries oxygen around your body — **Blood tissue.**
2. Brings about movements in animals — **muscular tissue.**
3. Transports food to different parts of plant— **phloem**.
4. Transports water in plants — **xylem**.
5. Supports an animal's body — **connective tissue (supportive)**
6. Binds different tissues together — **Fibrous connective tissue**.
7. Conducts messages from one part of the body to another — **nervous tissue.**

Question 9.
Based on the following information, identify the three types of epithelial tissue in the figures given below :



(i) **Cuboidal epithelium :** It consists of a single layer of cuboidal cells.

(ii) **Columnar epithelium:** It is composed of tall, cylindrical cells with oval nuclei usually placed at the base of the cells.

(iii) **Ciliated epithelium :** It consists of cells being hair-like cilia on their free surface.
Answer:
(i) fig. b (ii) fig. a (iii) fig. c

Question 10.
Write three differences between the two principal vascular tissues found in plants.
Answer:
Xylem

1. Transports water and minerals absorbed by the roots to other plant parts.
2. Consists mainly of dead cells.
3. Conduction is unidirectional i.e. only upwards from the roots.

Phloem

1. Conducts food manufactured in the leaves to other plant parts.
2. Consists mainly of living cells.
3. Bidirectional conduction i.e. both upwards and downwards from the leaves.

Additional Questions

A. Fill in the blanks

1. **Meristematic** tissue is situated at the tip of root and stem.
2. **Complex Permanent** tissue consists of more than one kind of cells.
3. **Phloem** is a complex tissue that distributes food in plants.
4. Epithelial tissue is made of cells without any **intercellular** spaces.
5. **Voluntary** muscles help in the movement of limbs.
6. The **neurons** or nerve fibers constitute the nerves.
7. **Ligaments** connects one bone to another.
8. **Adipose** tissue cushions and insulates the body.

B. Write true or false for each statement. Rewrite the false statements correctly.

1. Sclerenchyma cells are dead cells with no protoplasmic content.
   True
2. Voluntary muscles are present in the internal organs of the body.
   False. Involuntary muscles are present in the internal organs of the body.
3. Cardiac muscles are involuntary muscles.
   True
4. Cardiac muscles have dark and light bands.
   True
5. Short thred-like branches arising from the surface of the cyton are called axons.
   False. Short thred-like branches arising from the surface of the cyton are called dendrites.
6. Yellow fibrous tissue, a type of connective tissue, is found in ligaments.
   True
7. Tendons connect muscles to muscles.
   False. Tendons connect muscles to bones.
8. The fluid-filled spaces in which cartilage cells are present are called lacunae.
   True
9. RBCs and WBCs are formed in the bone marrow.
   True
10. The fluid part of the blood is called plasma.
    True

C. Define these terms.

1. tissue
2. species
3. population
4. biotic community
5. biosphere
6. neuron
7. connective tissue

Answer:

1. **tissue** — A group of cells that are similar in structure and perform similar functions forms a tissue.
2. **species** — A group of living organisms which can breed among themselves constitute a species.
3. **population** — All the members or individuals of a particular species living in a particular area constitute its population.
4. **biotic community** — The population of all plant and animal species living in a particular area constitute a biotic community.
5. **biosphere** — The zone on the earth in which all living beings exists is termed as biosphere. ,
6. **neuron** — The cells that constitute nervous tissue are called neurons or nerve cells.
7. **connective tissue** — The tissue which connects various tissues together in any organ is called connective tissue.

D. Differentiate between

Question 1.
lower level of organization and higher level of organization
Answer:

Lower level of organization

1. The cell is the lowest level of organization in this level
2. Cell to organ system level forms the lower level of organisation.

Higher level of organization

1. The species is the lowest level of organization in this level
2. Population to biosphere forms the higher level of organisation.

Question 2.
community and biosphere.
Answer:

Community

1. All the organisms living together in area constitute community.
2. It does not forms the highest level of organization.

Biosphere

1. All ecosystems together make up biosphere.
2. It is the highest level of organization.

E. Write short answers.

Question 1.
Name the lowest level of organization
Answer:
The cell is the lowest level of organization, which is living and can exist independently

Question 2.
What is a species ?
Answer:
A species is a group of living organisms which can breed among themselves

Question 3.
Define population.
Answer:
All the members of a particular species living in a particular area constitute its population.

Question 4.
What is an ecosystem ?
Answer:
All living organisms along with the non living organisms of an area forms an ecosystem.

Question 5.
What constitutes the vascular system of the plant ?
Answer:
Xylem and phloem, which are the complex permanent
tissues together constitute the vascular system of the plant. These tissues extend from the tip of the root to the tip of the leaf.

Question 6
What is a neuron ?
Answer:
The cells that constitute the nervous tissue are called neuron or nerve cells. The neuron is the smallest part of nervous tissue.

Question 7.
Where is the white fibrous tissue found in human body?
Answer:
The white fibrous tissue is found in tendons. Tendons connect the muscles to the bones. This tissue has considerable strength and high elasticity.

F. Answer in detail.

Question 1.
Explain the lower levels of organization.
Answer:
Lower levels of organization are:

1. **Cellular level:** The lowest level of organization is the cell. A cell is living and can exist independently. In single celled organisms like amoeba, paramecium, yeast etc all functions of life like digestion, respiration, reproduction and excretion are performed by single cell.
2. **Tissue level:** The cells that are similar in structure and functions organize to form a tissue, in multi cellular organisms. For example nervous tissue is formed of neurons, muscular tissue is formed of muscle cells and so on. Similarly the plants are also made up of different tissues.
   For example parenchyma, sclerenchyma etc.
   The organization of similar cells to form tissues is known as tissue level of organization.
3. **Organ level:** Different types of tissues in a living organism organise to form organs which perform a specific function. This is called organ level of organization. Stomach is an organ in human beings, which consists of different types of tissues and perform specific functions. Similarly intestine kidney and brain are other organs that perform specific functions and made up of different types of tissues. In plants leaf, roots, stem, flowers and fruits are different organs, which are made up of different type of tissues.
4. **Organ system level:** Many organs work together in a coordinated manner to perform a specific function and form an organ system. Organ system is the next level of organization. For example digestive system has a job of digesting food. Many organs like stomach, intestine, liver and pancreas constitute digestive system. Root and shoot system in plants are the organ systems that perform specific functions and are composed of different organs

Question 2.
What is the difference between an organ and an organ system ?
Answer:
Organ

1. Different tissues combine to form organs which perform specific functions.
2. Stomach, kidneys, lungs etc. are the different organs of human beings.

Organ System

1. Different organs combine to form organ system to perform a specific function.Digestive
2. system,nervous system etc. are the different organ systems of the human beings.

Question 3.

Which tissue is responsible for the increase in the height of a plant ? Where is it located ?
Answer:

1. **Apical meristematic** tissue is responsible for the increase in the height of a plant. This tissue is present at the root tip and shoot tip. The cells of this tissue are usually small, thin walled and full of cytoplasm. They have a large nucleus. These cells divide rapidly and continuously, the plant thereby gains height.
2. **Meristematic tissue** is present in the growing parts of a plant, such as root tip and shoot tip.