

Descriptive Questions

Levels of Organization

Q.1 Explain the levels of organization in multicellular organism. How does each level contribute to the overall functioning of an organism?

09405001

Ans. Introduction

Organisms are built on a pattern of increasing complexity. The levels of organization in multicellular organisms begin with the smallest unit, the atom, and progress to the most complex level, the organism.

Level of Organization

1. Atom

Definition

Atoms are the smallest unit of matter that maintain the property of an element.

Examples

Carbon, Hydrogen and Oxygen etc.

2. Molecule

Definition

Atoms combine to form molecules which can have entirely different properties than the atoms they contain.

Examples

Water, protein and nucleic acid etc.

3. Organelle

Definition

Molecules combine in specific ways and make the subcellular level i.e., organelle. Each organelle is specialized to do a particular function.

Examples

Mitochondria are responsible for cellular respiration and ribosomes are specialized for protein synthesis.

4. Cell

Definition

When organelles assemble and interact with each other, they make cell - the smallest unit with characteristics of life. They can carry out life activities and can also reproduce.

Examples

Unicellular organisms are made of only one cell while multicellular organisms are made of many cells.

5. Tissue / What is a tissue level? Explain plant and animal tissues.

Introduction

In multicellular organisms, cells make tissues. A tissue is a group of similar cells that work together to perform one or more specific functions.

Examples

In animals

- **Epithelial tissue** - covers body surfaces and lines cavities (e.g., skin)
- **Muscle tissue** - enables movement (e.g., cardiac muscle in the heart)

In plants

- **Epidermal tissue** - protects the underlying parts (e.g., epidermis of leaf)
- **Vascular tissue** - transports water and nutrients (e.g., xylem and phloem)

6. Organ

Definition

An organ is a structure made up of related tissues working together to perform specific functions.

Examples

- **In animals:** Heart (pumps blood through the circulatory system), and lungs (facilitate gas exchange).
- **In plant:** Leaves (conduct photosynthesis), and roots (absorb water and nutrients from soil).

7. Organ System

Introduction

An organ system consists of multiple organs that work together to perform related functions.

Examples

- In animals - circulatory system (transports nutrients and oxygen throughout the body) and digestive system (breaks down food and absorbs nutrients).
- In plants - root system (anchors the plant and absorbs water and nutrients) and shoot system (supports the plant and conducts photosynthesis).

8- Organism

Introduction

An organism is a living entity that can function independently on behalf of proper functioning of its organ systems whose functions are coordinated to one another.

Examples

Examples include humans and trees.



Figure 5.1: Level of Organization

Q.2 What are emergent properties? Give examples when lower levels make higher levels. 09405002

Ans. Introduction

In organisms, the components at each level do not work solely. Instead, they interact with each other. Due to their interactions, they create new functions called **emergent properties**. These include the abilities that are present in higher level or organization but are not possible from the individual components.

Examples

Following are the examples of emergent properties when lower levels make higher levels:

1- From Organelles to Cells: Individual organelles have specific functions. However, when these organelles interact within a cell, they create a complex system capable of carrying out various cellular processes, such as metabolism, protein synthesis, and energy production.

2- From Cells to Tissues: Individual cells do not have properties that are present in the tissue which they make. For example, muscle cells combine to form muscle tissue, which can contract and generate force.

3- From Tissues to Organs. An organ performs complex functions that its individual tissues cannot perform. For example, the heart is composed of various tissues, including muscle tissue, connective tissue, and epithelial tissue. The coordinated interaction of these tissues allows the heart to pump blood throughout the body.

4- From Organs to Organ Systems: Multiple organs working together form organ systems, which carry out vital functions. For example, the digestive system is composed of organs like the mouth, oesophagus, stomach, intestines, and liver. These individual organs cannot digest food but the coordinated actions of these organs enable the digestion and absorption of nutrients.

5- From Organ Systems to Organisms: In an individual, the interactions of various organ systems bring emergent properties such as consciousness, thinking, and the ability to adapt to environment. These complex behaviours are not present in individual organ system but arise from their coordinated interactions.

Organs and Organ Systems in Plants

Q.3 Explain the functions of various plant organs. Explain organs and organ systems in plants. 09405003

Ans. Introduction

Organs are made of two or more types of tissues organized to serve a particular function. Organs which perform related functions work together and make an organ system. The following are examples of organs and organ system in plants.

Organs in Plants

Roots: Roots are usually found underground; anchor the plant in the soil and absorb water and essential minerals from the soil. Roots also store nutrients that the plants use for their growth.

Stems: Stems are above-ground structures that support leaves, flowers, and fruits. Stems contain vascular tissues (xylem and phloem) that facilitate the movement of water, minerals, and nutrients between roots and leaves.

Leaves: Leaves are the primary sites of photosynthesis and transpiration (loss of water vapour through small pores called stomata in leaves).

Flower: Flower is reproductive part of a plant. It plays a crucial role in plant's sexual reproduction.

Leaf as an Organ

(a) Introduction

In plants, leaf is a complex organ made of various related tissues.

(b) Major tissues of a leaf / Describe the tissue composition of the leaf, how does each tissue contribute to the functioning of the leaf?

The major tissues that form a leaf are:

1- Epidermal Tissue: The outermost layer of leaf is made of epidermal tissue (epidermis). The upper epidermis is usually covered by waxy cuticle, which reduces water loss and provides protection. The lower epidermis often contains guard cells. Two guard cells enclose a stoma (plural stomata), which are tiny pores that regulate gas exchange and water vapour loss.

2- Mesophyll Tissue: This tissue lies between the upper and lower epidermis. It consists of cells rich in chloroplasts. It is the site of photosynthesis. It is divided into two distinct regions.

i. **Palisade Mesophyll:** It is located just beneath the upper epidermis. It consists of tightly packed elongated cells.

ii. **Spongy Mesophyll:** It is present below the palisade mesophyll. It is composed of loosely arranged cells with air spaces between them. These air spaces facilitate the diffusion of gases throughout the leaf.

3- Vascular Tissue: It is arranged in the midrib and veins in leaf. It is categorized as complex tissue because it consists of two tissues i.e., xylem and phloem.

i. Xylem

The xylem of leaf conducts water and dissolved minerals from the xylem of stem to leaf cells.

ii. Phloem

Phloem tissue transports the products of photosynthesis (sugars) from leaf cells to the phloem of stem.

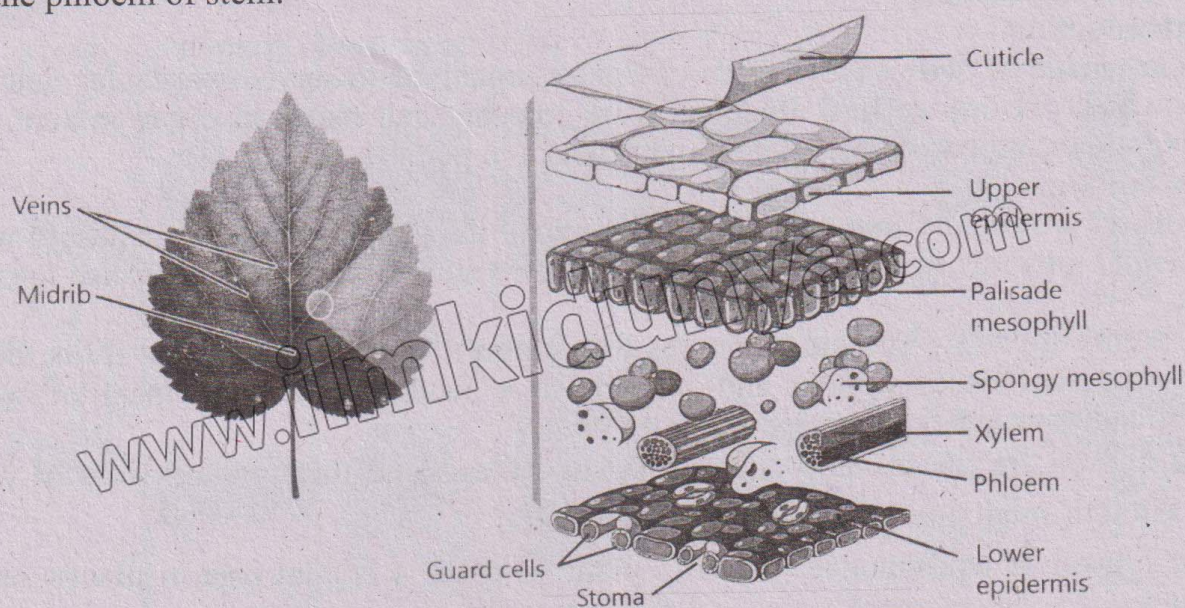


Figure 5.2: Tissues which make the Leaf Organ

Organ Systems in Plants

a) Introduction

In plants, the organ system level is less complex than in animals. However, plants do exhibit some level of organization in terms of tissues and structures that work together for specific functions.

b) Examples

The **root system** anchors the plant and absorbs water and nutrients, while the **shoot system** includes stems, leaves, and reproductive structures like flowers. These components work together to enable processes like photosynthesis and reproduction.

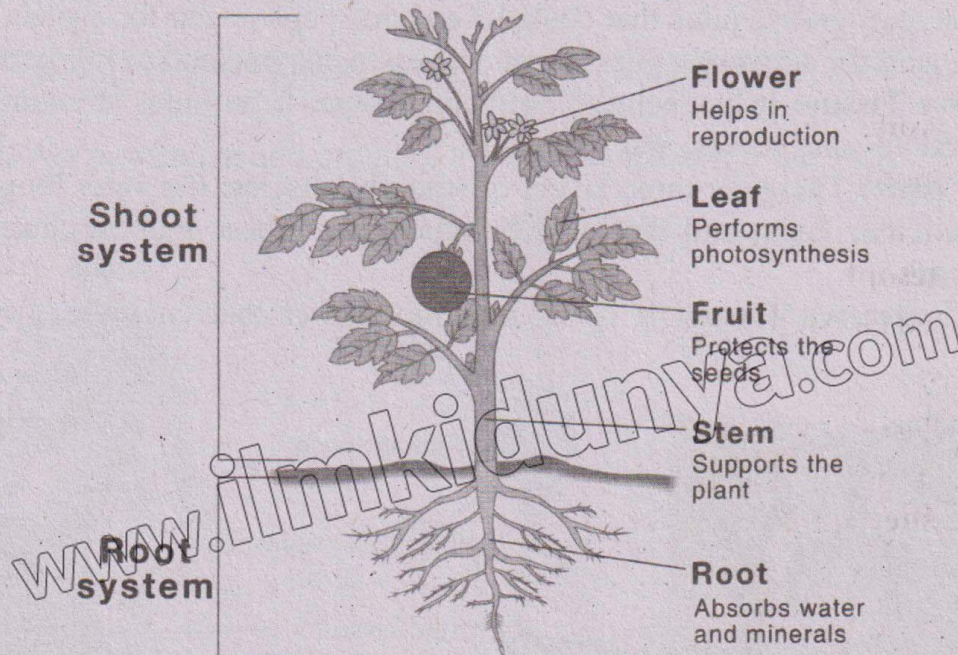


Figure 5.3: Organs and Organ System in Plants

Organs and Organ Systems in Humans

Q.4 Describe Organs and Organ Systems in Humans.

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Ans. Organs in Human Body

Various organs are present in human body, each with specific functions. Here are a few of the most important organs.

Heart: The heart is a muscular organ that pumps blood throughout the body. It is essential for delivering oxygen and nutrients to cells and removing waste products.

Lungs: The lungs are responsible for breathing, allowing the exchange of oxygen and carbon dioxide between the body and the environment.

Brain: The brain is the control center of the body, responsible for thoughts, emotions, and movements.

Liver: The liver performs many vital functions, including filtering blood, producing bile, and storing glucose.

Kidneys: The kidneys are responsible for filtering waste products from the blood and producing urine.

Stomach: The stomach is a muscular organ that breaks down food using digestive enzymes.

Intestines: The intestines are long, tubular organs that absorb nutrients from food.

Pancreas: The pancreas produces digestive enzymes and hormones, such as insulin and glucagon.

Stomach as an Organ / Describe the tissues composition of the stomach. How does each tissue contribute to the digestive function of the stomach?

Stomach is responsible for the breakdown of proteins through mechanical and chemical processes and for storing food. It is composed of the following tissues that contribute to its functions.

1- Epithelial Tissue: The inner wall is made up of epithelial tissue. It is glandular in nature and secretes mucus. The mucus lines the inner wall and protects it from acids. This tissue also secretes gastric juice that contains enzyme pepsinogen for protein digestion and hydrochloric acid for activating pepsinogen to pepsin enzyme and to kill germs.

2- Connective Tissue: It lies beneath epithelial tissue. It provides structural support and contains blood vessels, nerves, and lymphatics.

3- Muscle Tissue: There are three layers of smooth muscles: the outer longitudinal layer, the middle circular layer, and the inner oblique layer. These muscle churn and mix the food in stomach.

4- Outer Connective Tissue: It is the outermost layer that encircles the stomach and supports it

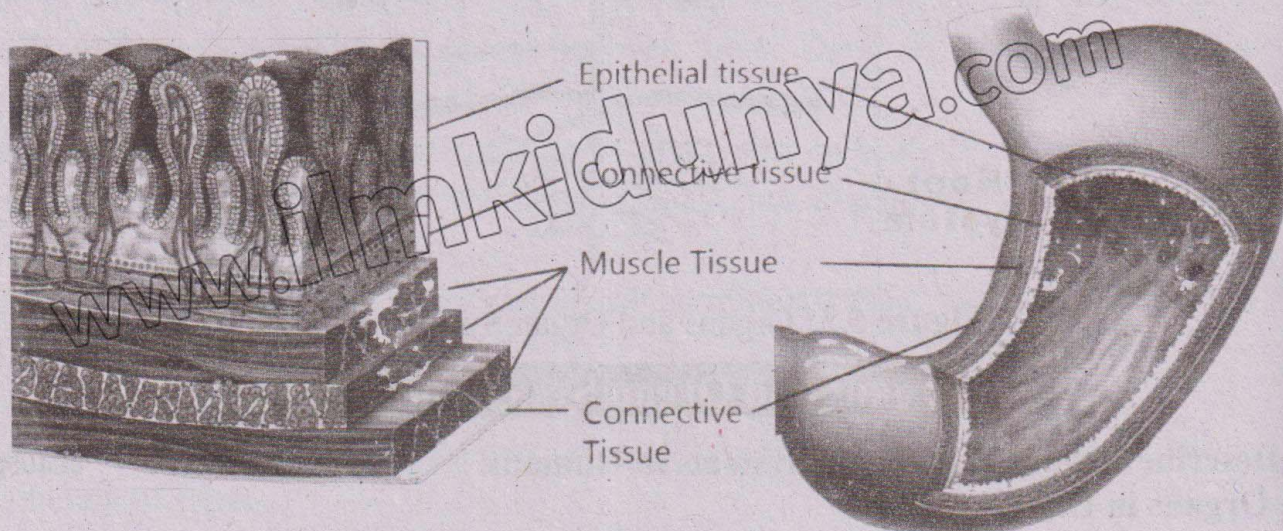


Figure 5.4: Tissues which make the Stomach Organ

Organ Systems in Human Body / How do the organ systems come together to form the human body?

Following are a few examples of organ systems which form the human body.

1. Skeletal System

Parts

It consists of bones, cartilages and tendons.

Functions

It provides structure, support, and protection for the body. It serves as a framework for muscles to attach, allowing movements. It also stores minerals and produces blood cells.

2. Digestive System

Parts

It consists of organs such as mouth, oesophagus, stomach, small intestine, and large intestine.

Functions

This system is responsible for the break down and absorption of nutrients from food.

3. Respiratory System

Parts

It includes the lungs, trachea (windpipe), and bronchi (air tubes).

Functions

This system is involved in the exchange of gases (oxygen and carbon dioxide) between the body and the environment.

4. Muscular System

Parts

It includes skeletal muscles, which attach to bones and contract to produce movements.

Functions

This system allows movement and provides structural support for the body.

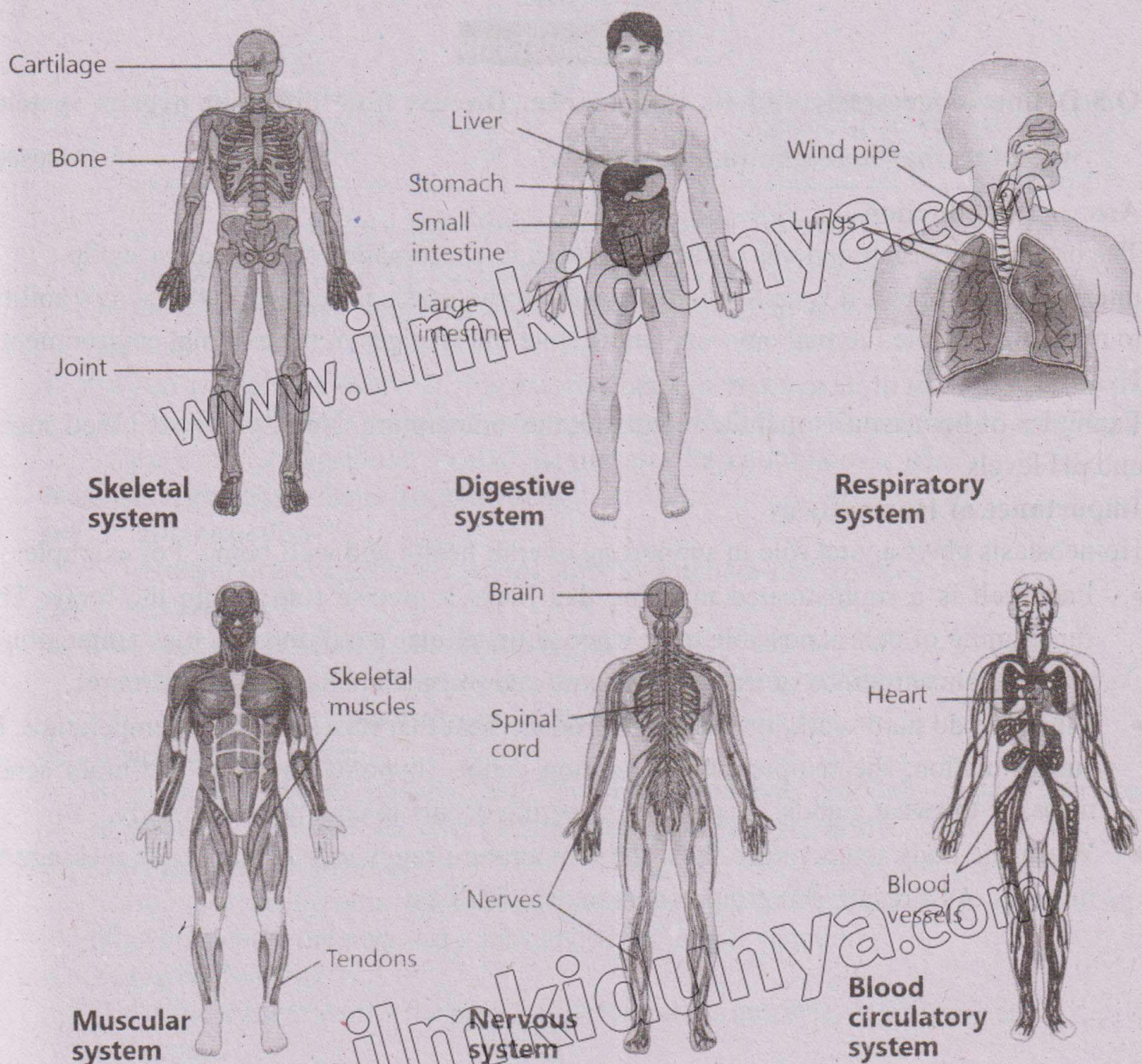


Figure 5.5: Important Organs Systems in Human Body

5. Nervous System

Parts

It includes brain, spinal cord, and nerves.

Functions

The nervous system coordinates and controls body functions through nerve impulses.

6. Blood Circulatory System

Parts

It includes heart, blood vessels (arteries, veins, and capillaries), and blood.

Functions

This system transports oxygen, nutrients, hormones, and waste products throughout the body.

Homeostasis

Q.5 Define homeostasis and its importance. Discuss how different organs systems work together to maintain homeostasis?

09405005

Ans. Introduction

The organs and organ systems of the body work in coordination to maintain a stable internal environment. It is called homeostasis. Homeostasis is defined as the body's ability to maintain a stable internal environment despite the changes in the external environment.

Examples

Examples of homeostasis include regulating the temperature, blood pressure, blood sugar, and pH levels.

Importance of Homeostasis

Homeostasis plays a vital role in supporting overall health and well-being. For example;

- Each cell is a sophisticated machine that plays a precise role within the body. The functioning of cell is possible only when extracellular conditions such as temperature, pH and concentrations of salts, the glucose and oxygen are kept in normal range.
- When we do hard work, our muscles produce heat that raises the body temperature. In such situation, the temperature regulating centre (hypothalamus) in the brain sends message to sweat glands. As a result, sweating occurs to cool down the body.
- When the body temperature falls, the temperature regulatory centre sends message to muscles. As a result, shivering occurs to generate heat.

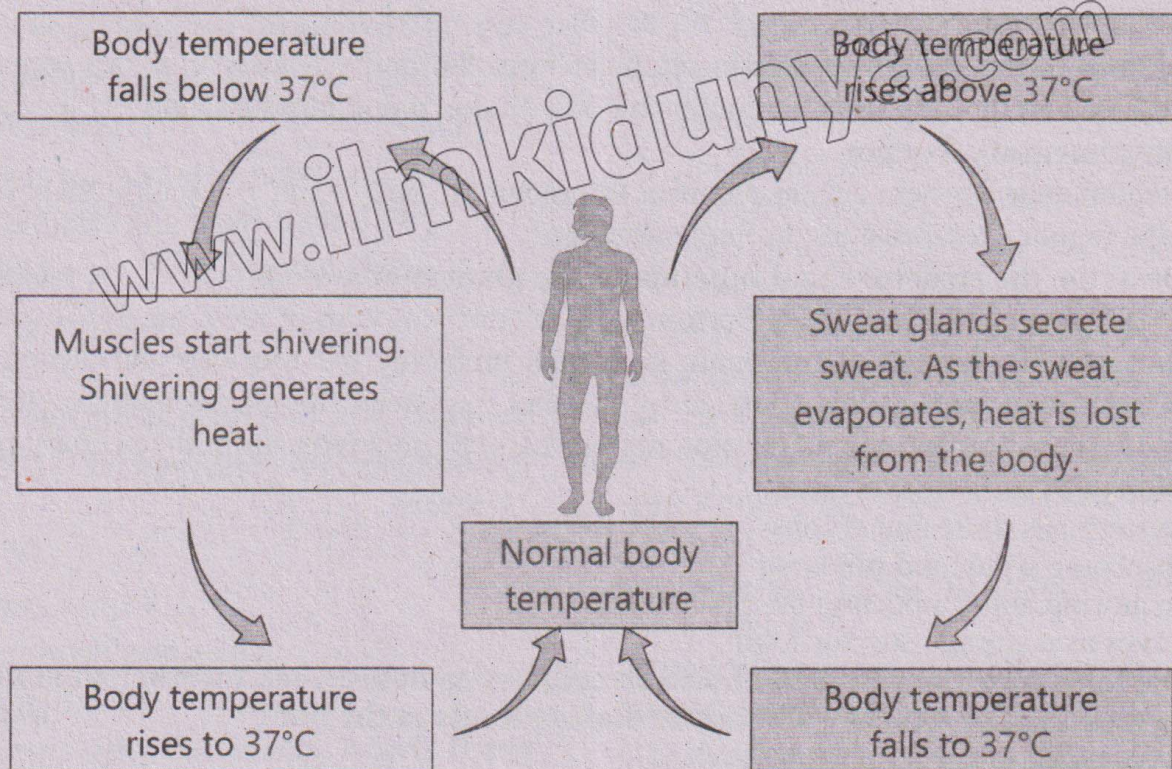


Figure 5.6: Homeostasis of Body Temperature

- When we drink juice, blood glucose level rises. Special glands (pancreas) in the body release a hormone insulin in blood. This hormone lowers the blood glucose level to normal.
- When we do hard exercise, our muscles need more oxygen. In such condition, the rate of respiration and heartbeat are increased. Accelerated respiration and heartbeat supply more oxygen and food to the muscles for continuous work.

Role of Organ Systems in Homeostasis

(a) Introduction

Several organ systems work together to maintain homeostasis.

(b) Examples

1. Nervous system and Endocrine system

Nervous system and endocrine system regulate and coordinate activities such as heart rate, respiration, metabolism, and response to stress.

2. Respiratory System

Respiratory system ensures that the body receives enough oxygen for cellular respiration. It also expels excess carbon dioxide from the body.

3. Cardiovascular System

Cardiovascular system regulates body temperature and pH levels. It also ensures that all cells receive the necessary substances for proper function.

4. Digestive System

Digestive system works for proper distribution of nutrients to cells for energy, growth, and repair.

5. Muscular and Skeletal Systems

Muscular and skeletal systems help and maintain body posture, support and movement.

6. Urinary System

Urinary system eliminates waste products from the body. It also regulates water and salt balance. In this way, it maintains blood volume, blood pressure, and PH levels.

7. Integumentary System

Integumentary system acts as a barrier to protect the body from external factors. It also helps regulate temperature through sweating.

Q.6 Describe the structure and function of the plant root system.

09405006

Ans. Structure of Plant Root System

The root system consists of two main structures including the root cap and the primary root. The primary root is characterized by the root meristem, the meristematic region, the region of elongation and the maturation region. Lateral roots grow from the primary root.

Functions of Plant Root System

This system has three major Jobs:

- Absorbing water and minerals
- Anchoring and supporting the plant
- Serves as a storage site for food.

Q.7 Describe how the respiratory and circulatory systems work together to maintain homeostasis of oxygen and carbon dioxide levels in the body?

09405007

Ans. Working of Organ system

The respiratory system and the circulatory system work closely together to deliver oxygen to cells and get rid of the carbon dioxide that these cells produce. The circulatory system picks up oxygen in the lungs and drops it off in the tissues, then performs the reverse function for carbon dioxide. The lungs expel the carbon dioxide and bring in new oxygen containing air. Only when both systems are working together can oxygen and carbon dioxide be successfully exchanged between cells and environment.

Q.8 Describe the roles of the digestive system and urinary system in homeostasis.

09405008

Ans.

- Digestive system works for proper distribution of nutrients to cells for energy, growth, and repair.
- Urinary system eliminates waste products from the body. It also maintains blood volume, blood pressure, and pH levels.

Multiple Choice Questions (Exercise)

1. A higher level of organization exhibits emergent properties when:

09405009

- Its parts function independently.
- The sum of its parts is greater than the whole.
- The individual parts are more important than the whole.
- Its parts interact to perform more function.

2. Which of the following demonstrates the levels of organization of the body, from simplest to most complex?

09405010

- Cell → Organ → Tissue → Organelle → Organ system
- Organelle → cell → Tissue → Organ → Organ system
- Tissue → Cell → Organelle → Organ → Organ system
- Organ system → Tissue → Cell → Organelle → Organ

3. At which level of organization gas exchange occurs between body and environment? 09405011

- a) Organelle level in mitochondria
- b) Cellular level in alveolar cells
- c) Tissue level in epithelial tissues
- d) Organ system level in the respiratory system

4. The epithelial tissue in the stomach wall is responsible for producing: 09405012

- a) Mucus
- b) Pepsinogen
- c) Hydrochloric acid
- d) All of these

5. In the wall of stomach, which tissue also contains blood vessels and nerves? 09405013

- a) Epithelial
- b) Muscle
- c) Inner Connective
- d) Phloem

6. In a leaf, which tissue is primarily responsible for photosynthesis? 09405014

- a) Xylem
- b) Mesophyll
- c) Epidermis
- d) Phloem

7. What is the primary function of the xylem tissue in a leaf? 09405015

- a) To transport sugars to other parts
- b) To transport water to parts of leaf
- c) To synthesize chlorophyll
- d) To control the opening and closing of stomata

8. Which of these is a function of the human skeletal system? 09405016

- a) Storing minerals and producing blood cells
- b) Removing carbon dioxide from blood
- c) Filtering blood to remove waste products
- d) Breaking down food for energy

9. Which structures are responsible for the transport of food in plant body? 09405017

- a) Xylem tissue
- b) Palisade mesophyll
- c) Phloem tissue
- d) Spongy mesophyll

10. In a plant, which of the following is the primary function of the flower? 09405018

- a) Transporting water and minerals
- b) Supporting leaf growth
- c) Facilitating reproduction through pollination
- d) Regulating gas exchange

Multiple Choice Questions (Additional)

Levels of Organization

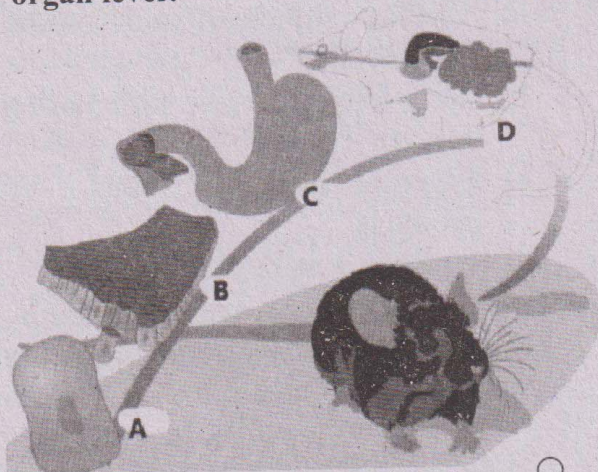
11. The table shows three functions of cells which row is correct? 09405019

	Absorption	Support	Transport
(a)	Red blood cell	Muscle cells	Root hair cell
(b)	Root hair cell	Xylem vessel	Red blood cell
(c)	Muscle cell	Red blood cell	Xylem vessel
(d)	Xylem vessel	Root hair cell	Muscle cell

12. If tissue level is not developed in the levels of organization, which of the next level will not be formed? 09405020

- (a) Molecular level
- (b) Atomic level
- (c) Organ level
- (d) Organelle level

13. Following diagram shows level of organization in a rat. Which one is the organ level? 09405021



14. Which of the following lists the levels of body organization from smallest to largest? 09405022

- (a) Organism, organ system, organ, tissue, cell
- (b) Tissue, cell, organ, organ system, organism
- (c) Organ, organ system, organism, tissue, cell
- (d) Cell, tissue, organ, organ system, organism

15. Which structure is at a different level of organization from the other three? 09405023

- (a) Kidney
- (b) Liver
- (c) Neuron
- (d) Lung

16. Biological organization means. 09405024

- (a) Study of different organisms
- (b) Study of different branches of biology
- (c) Study of all the subjects of science
- (d) Study of biology at different levels

17. The level of organization which is represented by the heart of frog is: 09405025

- (a) Organ
- (b) Tissue
- (c) Organism
- (d) Organelle

Organ and Organ Systems in Plants

18. You can observe spongy mesophyll and xylem in the cross section of leaf. These are part of the same: 09405026

- (a) Cell and organism
- (b) Organ and organism
- (c) Cell and tissue
- (d) Tissue and organ

19. Which structure is not an organ? 09405027

- (a) Artery
- (b) Flower
- (c) Spinal cord
- (d) Xylem

20. Which description of xylem is correct? 09405028

- (a) A cell used for absorption
- (b) An organ system used for conduction
- (c) A tissue used for transport
- (d) An organ used for transport

21. What is the primary function of the root system in plants? 09405029

- (a) Photosynthesis
- (b) Gas exchange
- (c) Absorbing water
- (d) Reproduction

22. Which part of the plant is primarily involved in photosynthesis? 09405030

- (a) Root
- (b) Stem
- (c) Leaf
- (d) Flower

23. Which tissue transports water in plants? 09405031

- (a) Xylem
- (b) Phloem
- (c) Epidermal
- (d) Mesophyll

24. What are the functions of xylem and phloem in green plants?

09405032

	Xylem	Phloem
(a)	Support and transport of sugars	Transport of water
(b)	Transport of sugars	Support and transport of water
(c)	Support and transport of water	Transport of sugars
(d)	Transport of water	Support and transport of sugars

Organs and Organ Systems in Humans

25. Which organ system is responsible for circulating blood in the human body?

09405033

- (a) Digestive (b) Respiratory
(c) Circulatory (d) Nervous

26. What type of tissue lines the inner surface of the stomach?

09405034

- (a) Muscular (b) Epithelial
(c) Connective (d) Nervous

27. What is the main function of the nervous system?

09405035

- (a) Digesting food
(b) Circulating blood
(c) Controlling and coordinating
(d) Plastids

Homeostasis

28. This statement about homeostasis is incorrect:

09405036

- (a) Because of this, the fluctuations of the internal environment are of extremely narrow range as compared to that of the external environment.
(b) There is one system regulating the homeostatic activities.
(c) Homeostatic mechanisms keep the internal environment constant despite wide changes in the external environment

(d) Homeostasis is necessary for the survival of cells.

29. Which of the following statements best describes homeostasis?

09405037

- (a) Keeping the body in a fixed and unaltered state.
(b) Dynamic equilibrium
(c) Maintaining a near-constant internal environment
(d) Altering the external environment to accommodate the body's needs.

30. Organisms have the ability to change and modify their internal conditions according to the environment through:

09405038

- (a) Osmoregulation
(b) Excretion
(c) Thermoregulation
(d) All of the above

31. What is homeostasis?

09405039

- (a) A type of hormone
(b) Digestive process
(c) The body's way of maintaining a stable internal environment
(d) A respiratory function

Answer Key

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

Short Answer Questions (Exercise)

Q.1 Enlist the levels of organization from cells to organ systems. 09405040

Ans. The levels of organization from cells to organ systems are as follows:

1. Cell
2. Tissue
3. Organ
4. Organ system

Q.2 What are the major roles of the epithelial tissue present in the stomach? 09405041

Ans. The inner wall is made up of epithelial tissue. It is glandular in nature and secretes mucus. The mucus lines the inner wall and protects it from acids. This tissue also secretes gastric juice that contains enzyme pepsinogen for protein digestion and hydrochloric acid for activating pepsinogen to pepsin enzyme.

Q.3 How do the smooth muscles contribute to the stomach's function? 09405042

Ans. The smooth muscle in the stomach is primarily responsible for:

- i. Churning and mixing food with stomach acid.
- ii. Producing chyme by contracting and relaxing in a coordinated manner which helps with digestion and propels the partially digested food into the small intestine through a process called peristalsis.
- iii. It facilitates the movement and mechanical breakdown of food within the stomach.

Q.4 What is the function of the palisade mesophyll in the leaf? 09405043

Ans. Palisade mesophyll in a leaf is responsible for photosynthesis. It consists of tightly packed elongated cells with large number of chloroplasts to absorb light and produce food for plants.

Q.5 What is the role of shoot system in plants? 09405044

Ans. The shoot system consists of two portions: the vegetative (non-reproductive) parts of the plant, such as the leaves and the

stems, and the reproductive parts of the plant, which include flowers and fruits. The shoot system generally grows above ground, where it absorbs the light needed for photosynthesis.

Q.6 What is homeostasis and why is it important for organisms? 09405045

Ans. Homeostasis is defined as the body's ability to maintain a stable internal environment despite the changes in the external environment.

Importance

Homeostasis is important for organisms because it regulates the body temperature, blood pressure, blood sugar and pH levels.

Q.7 How does the human body maintain a stable internal temperature? 09405046

Ans. First, high temperature will be detected by sensors—primarily nerve cells with endings in your skin and brain and relayed to a temperature-regulatory control centre in your brain. The control centre will process the information and activate effectors such as the sweat glands whose job is to oppose the stimulus by bringing body temperature down.

Q.8 Differentiate between the following. 09405047

- i. Tissue and organ
- ii. Root system and shoot system
- iii. Epidermal and mesophyll tissue
- iv. Palisade and spongy mesophyll

Ans.

i) **Tissue and organ**

Tissue	Organ
In multicellular organism, cells make tissue. A tissue is a group of similar cells that work together to perform one or more specific functions.	An organ is a structure made up of related tissues working together to perform specific function.
Example Muscle tissue, epithelial tissue.	Example Stomach, heart and kidney.

ii) Root system and shoot system

Root System	Shoot System
- The root system consists of two main structures including the root cap and the primary root. - The root system anchors the plant and absorbs water and nutrients.	- The shoot system consists of two portions: the vegetative and reproductive parts of the plant. - The shoot system components stems, leaves and reproductive structures like flowers work together to enable processes like photosynthesis and reproduction.

iii) Epidermal and mesophyll tissue.

Epidermal tissue	Mesophyll tissue
- The outermost layer of leaf is made of epidermal tissue (epidermis). - The upper epidermis is usually covered by waxy cuticle, which reduce water loss and provides protection. - The lower epidermis often contains guard cells. Two guard cells enclose a	- This tissue lies between the upper and lower epidermis. - It consists of cells rich in chloroplasts. - It is the site of photosynthesis. It is divided into two distinct regions. Palisade mesophyll and

stoma (plural stomata) are tiny pores that regulate gas exchange and water vapour loss.

Spongy mesophyll.

iv) Palisade and spongy mesophyll

Palisade Mesophyll	Spongy Mesophyll
- It is located just beneath the upper epidermis. - It consists of tightly packed elongated cells. - Their cells are rich with chloroplasts and has major role in photosynthesis.	- It is present below the palisade mesophyll. - It is composed of loosely arranged cells with air spaces between them. - These air spaces facilitate the diffusion of gases throughout the leaf.

Short Answer Questions (Additional)

Levels of Organization 09405048

Q.9 How different tissues form stomach?

Ans. (i) Stomach is an organ specialized for the digestion of proteins and storing food.

(ii) Stomach has;

(a) Epithelial (glandular) tissues which secrete the gastric juice.

(b) Muscular tissues which perform contractions of stomach walls for grinding of food, mixing enzyme with food and moving food to posterior end.

Q.10 Following are the examples of different levels of organization. Sort them in tabular form according to levels of organization.

Root system, Neuron, Protein, Nitrogen, Cat, Epidermis, Brain, Carbon dioxide, Zinc, Cilia, Rose plant, Xylem, Leaf, Guard cell.

09405049

Ans.

Level of organizations	Examples
Atomic level	Zinc, nitrogen

Molecular level	Carbon dioxide, protein
Organelle level	Cilia
Cellular level	Neuron, Guard cell
Tissue level	Xylem, epidermis
Organ level	Brain, leaf
Organ system level	Root system
Organism level	Rose plant, cat

Q.11 What is organ system? Give examples. 09405050

Ans. In higher multicellular organisms, particularly in animals, different organs performing related functions are organized together in the form of an organ system. For example, digestive system carries out process of digestion. It consists of oral cavity, stomach, small intestine, large intestine, liver and pancreas.

Q.12 Define organelles with examples. 09405051

Ans. An enormous number of biomolecules become associated in a particular way and form organelles. The organelles are actually

sub-cellular structures, e.g. mitochondria, ribosomes etc.

Q.13 What is tissue level? Give one example. 09405052

Ans. A group of similar or different types of cells performing same function e.g. xylem and phloem in plants, are composed of different cells while nervous tissues are composed of same type of cells.

Q.14: A cell works as an open system. Comment on it. 09405053

Ans. A cell works as an open system i.e. it takes in substances needed for its metabolic activities through its cell membrane. It takes up food, oxygen, water and salts for survival, growth and division, and energy for metabolic processes. Products and by-products are formed in metabolism. Cell either utilizes the products or transport them to other cells. The by-products are either stored or are excreted out of cell.

Inquisitive Questions

Q1. How does the structure of epithelial tissue related to its function in different parts of body? 09405054

Ans: The structure of epithelial tissue matches with its function in different parts of body. As in the skin it provides protection as it has multiple layers to protect against injury and germs. In the lungs it plays role in diffusion and filtration by allowing oxygen and carbon dioxide exchange. It also plays role in secretions (found in sweat glands, salivary glands, and the stomach) and absorption in the intestines, it has tiny folds to absorb nutrients efficiently.

Q2. Evaluate the importance of organ systems working in harmony and predict the consequences if a failure in one system on the others. 09405055

Ans: Organ systems need to collaborate to maintain proper body functioning. While each system has its own role, they are all interconnected. For example, the circulatory system supplies oxygen from the respiratory system to brain and all body cells. If the circulatory system fails, the other systems (e.g., respiratory and muscular) cannot get oxygen and nutrients, leading to malfunction and affecting the entire body.