9th Biology Unit 5: Tissues, Organs and Organ Systems
Short Answer Questions (Exercise)

Q. 1 Enlist the levels of organization from cells to organ systems.
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?
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?
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?
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?
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?
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?
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 center in your brain. The control center 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:

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

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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 functions.
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 shoot system consists of two portions: the vegetative and reproductive parts of the plant.
The root system anchors the plant and absorbs water and nutrients.	The shoot system components—stems, leaves and reproductive structure like flower—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).	This tissue lies between the upper and lower epidermis.
The upper epidermis is usually covered by waxy cuticle, which reduces water loss and provides protection.	It consists of cells rich in chloroplasts.
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.	It is the site of photosynthesis. It is divided int two distinct regions: Palisade mesophyll and Spongy mesophyll.

iv) Palisade and spongy mesophyll

Palisade Mesophyll	Spongy Mesophyll
It is located just beneath the upper epidermis.	It is present below the palisade mesophyll.

Palisade Mesophyll	Spongy Mesophyll
It consists of tightly packed elongated cells.	It is composed of loosely arranged cells with air spaces between them.
Their cells are rich with chloroplasts and have major role in photosynthesis.	These air spaces facilitate the diffusion of gases throughout the leaf.

Short Answer Questions (Additional)

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.
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.
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, esophagus, stomach, small intestine, large intestine, liver and pancreas.

Q. 12 Define organelles with examples.
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.
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.
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 secreted out of cell.