



SNS COLLEGE OF TECHNOLOGY COIMBATORE-35



DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Staff in Charge: **S. Bharath** Course Code & Name: **19GET277 : Biology For Engineers.**
Semester: **VII** Class: **IV Year B.E – EEE** Academic Year: **2023-2024 (Odd Semester)**

TWO MARKS QUESTION BANK

UNIT 1

Characteristics of Living Organisms:

1. What are the seven fundamental characteristics that define living organisms?
 - The seven fundamental characteristics of living organisms are: organization, growth and development, reproduction, response to stimuli, homeostasis, utilization of energy, and adaptation to the environment.
2. Explain the concept of cellular organization in living organisms.
 - Cellular organization means that all living organisms are composed of one or more cells. Cells are the basic structural and functional units of life.
3. Why is homeostasis important for living organisms?
 - Homeostasis is important for maintaining a stable internal environment within living organisms. It ensures that vital processes like temperature, pH, and nutrient levels remain within a narrow range, allowing cells to function optimally.
4. How do living organisms obtain and use energy?
 - Living organisms obtain energy through various means, such as photosynthesis (in plants), ingestion of food (in animals), or chemosynthesis (in some microorganisms). They use this energy to carry out essential life processes.
5. Discuss the role of adaptation in the survival of living organisms.
 - Adaptation is crucial for the survival and success of living organisms. It involves the ability to evolve and change in response to environmental pressures and challenges.

Basic Classification:

6. What are the three main domains in biological classification, and how are they categorized?
 - The three main domains in biological classification are Bacteria, Archaea, and Eukarya. They are categorized based on cellular structure and genetic differences.
7. Differentiate between prokaryotic and eukaryotic organisms based on cell structure.
 - Prokaryotic organisms lack a true nucleus and membrane-bound organelles, while eukaryotic organisms have a defined nucleus and organelles contained within membranes.
8. How are organisms classified into different kingdoms in the Linnaean system of classification?
 - Organisms are classified into different kingdoms in the Linnaean system, such as Animalia, Plantae, Fungi, and Protista, based on their structural and functional characteristics.
9. Provide examples of vertebrates and invertebrates and explain their differences.
 - Vertebrates are animals with a backbone, such as fish, amphibians, reptiles, birds, and mammals. Invertebrates are animals without a backbone, including arthropods, mollusks, and worms.
10. What is the significance of binomial nomenclature in classification?
 - Binomial nomenclature is a standardized naming system where each species is given a unique two-part Latin name, consisting of the genus and species names. It helps in precise and universal identification of organisms.

Cell Theory:

11. Summarize the three key principles of the cell theory.
 - The three key principles of the cell theory are: a) All living organisms are composed of one or more cells. b) The cell is the basic structural and functional unit of life. c) All cells arise from pre-existing cells through cell division.
12. Who are the scientists credited with formulating the cell theory, and what were their contributions?
 - The cell theory was formulated by Matthias Schleiden, Theodor Schwann, and Rudolf Virchow. Schleiden and Schwann proposed the first two principles, while Virchow added the idea that cells can only come from existing cells.
13. Explain why the cell is considered the basic structural and functional unit of life.

- The cell is considered the basic structural and functional unit of life because it is the smallest unit that can perform all the functions necessary for life, such as growth, reproduction, and metabolism.

Structure of Prokaryotic and Eukaryotic Cells:

14. Describe the main differences between prokaryotic and eukaryotic cells.
 - Prokaryotic cells are simpler and lack a true nucleus and membrane-bound organelles. Eukaryotic cells are more complex, with a defined nucleus and various membrane-bound organelles.
15. What are the major organelles found in eukaryotic cells, and what are their functions?
 - Major organelles in eukaryotic cells include the nucleus, mitochondria, endoplasmic reticulum, Golgi apparatus, and lysosomes. Each organelle has specific functions in the cell.
16. Provide examples of prokaryotic organisms and their distinctive features.
 - Examples of prokaryotic organisms include bacteria and archaea. They lack a true nucleus and have a simple structure.
17. Explain the significance of the cell membrane in both prokaryotic and eukaryotic cells.
 - The cell membrane, also known as the plasma membrane, is a vital structure in both prokaryotic and eukaryotic cells. It separates the cell from its surroundings, controls the passage of substances, and plays a role in cell communication.

Introduction to Biomolecules:

18. Define biomolecules and their significance in living organisms.
 - Biomolecules are organic molecules that are essential for the structure and function of living organisms. They include carbohydrates, lipids, proteins, and nucleic acids.
19. Classify biomolecules based on their chemical composition, and give examples of each class.
 - Biomolecules are classified into four main categories: a) Carbohydrates: Serve as a primary source of energy and provide structural support in cells. b) Lipids: Function in energy storage, insulation, and cell membrane structure. c) Proteins: Play diverse roles in enzymatic reactions, structural support, and cell signaling. d) Nucleic acids: Store and transmit genetic information.

Vitamins and Enzymes, Genes and Chromosomes:

21. What are vitamins, and why are they essential for the body?
 - Vitamins are organic compounds that the body requires in small amounts to function properly. They serve as coenzymes or cofactors in various metabolic reactions and are essential for overall health.
22. Describe the role of enzymes in biochemical reactions in living organisms.
 - Enzymes are biological catalysts that facilitate chemical reactions in living organisms. They lower the activation energy required for reactions, increasing their speed and efficiency.
23. What are genes, and how do they relate to the characteristics of an organism?
 - Genes are segments of DNA that carry genetic information and determine specific traits in an organism. They are the basic units of heredity.
24. Explain the structure and function of chromosomes in the context of genetics.
 - Chromosomes are thread-like structures made of DNA and protein. They contain genes and play a crucial role in the storage, replication, and transmission of genetic information during cell division.
25. How does DNA store genetic information, and what is its significance in heredity?
 - DNA stores genetic information in its sequence of nucleotides, forming a double helix structure. It is significant in heredity because it passes on genetic instructions from one generation to the next, ensuring continuity and diversity in species.

16 Marks Questions

1. Explore and elaborate on the seven fundamental characteristics of living organisms. Provide specific examples and detailed explanations for each characteristic, highlighting their essential roles in the life processes of living organisms.
2. Discuss the three domains of life (Bacteria, Archaea, Eukarya) in biological classification in great detail. Explain the criteria used for categorization, and provide extensive examples from each domain, discussing their unique features and evolutionary significance.
3. Provide a comprehensive overview of the cell theory. Detail the three key principles, and discuss the historical context and contributions of Matthias Schleiden, Theodor Schwann, and Rudolf Virchow. Explain the significance of the cell theory in modern biology.
4. Conduct a thorough comparative analysis of prokaryotic and eukaryotic cells, highlighting their structural differences and similarities. Discuss the functions of

major organelles in eukaryotic cells, their interplay in cellular processes, and how these features contribute to the complexity of eukaryotic cells.

5. Present a detailed exploration of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids. Provide in-depth information on their chemical structures, functions, and essential roles in living organisms. Discuss the significance of each class of biomolecules in detail.