Exercise

A. Multiple Choice Questions (✓ Correct Option Marked)

1. **Which of the following taxonomic ranks represents the broadest rank?**
   ✓ d) Domain
2. **Which characteristic is unique to organisms in the domain Archaea?**
   ✓ c) Ability to live in extreme environments
3. **Which of these statements is NOT related to bacteria?**
   ✓ d) Have chlorophyll in their chloroplast.
4. **Which of these organisms belongs to the domain Eukarya?**
   ✓ b) Yeast
5. **Which of the following is a key characteristic that distinguishes eukaryotic cells from prokaryotic cells?**
   ✓ b) Presence of a nucleus
6. **Which kingdom includes organisms that are primarily unicellular, eukaryotic, and often heterotrophic?**
   ✓ b) Protista
7. **Why are fungi included in heterotrophic organisms?**
   ✓ d) Cannot prepare food
8. **Why is it impossible to classify viruses within traditional biological kingdoms?**
   ✓ a) They lack cellular structure and organelles.
9. **Which of the following is the correct way for writing the scientific name of humans?**
   ✓ a) Homo sapiens
10. **Which information can you get if you know the scientific name of an organism?**
    ✓ c) Genus and species

B. Short Answer Questions

1. **What is the term used to describe the variety of organisms in ecosystems?**
   → Biodiversity.
2. **How is biodiversity crucial for humans and the planet Earth?**
   → It provides food, medicine, clean air, and helps maintain balance in nature.
3. **What are the seven taxonomic ranks used in the Linnaean system?**
   → Kingdom, Phylum, Class, Order, Family, Genus, Species.
4. **Write the taxonomic ranks of lion and corn.**
   → Lion: Kingdom Animalia, Phylum Chordata, Class Mammalia, Order Carnivora, Family Felidae, Genus Panthera, Species leo.
   → Corn: Kingdom Plantae, Phylum Angiospermae, Class Monocotyledonae, Order Poales, Family Poaceae, Genus Zea, Species mays.

5. **What are the basic differences between archaea and bacteria?**
   → Archaea live in extreme environments and have different cell walls. Bacteria have peptidoglycan in their cell walls.
6. **What are the shortcomings of the three-kingdom classification system?**
   → It could not explain differences among microorganisms like fungi, algae, and bacteria properly.
7. **Which kingdom includes organisms that are multicellular, heterotrophic, and lack cell walls?**
   → Kingdom Animalia.
8. **Enlist the distinguishing characteristics of fungi.**
   → Multicellular (except yeast), heterotrophic, have chitin in their cell wall, reproduce by spores, absorb nutrients.
9. **List the three domains that encompass all living organisms.**
   → Bacteria, Archaea, and Eukarya.
10. **How does binomial nomenclature facilitate clear communication across different languages?**
    → It gives a unique scientific name (in Latin) to each organism which is used and understood worldwide.
11. **Why can't we classify viruses in any kingdom?**
    → Because they are not made of cells and cannot live or reproduce without a host.

C. Long Answer Questions

1. **Discuss biodiversity and its significance in maintaining the health of ecosystems.**
   → Biodiversity means the variety of living organisms in an ecosystem. It helps keep nature balanced. Different species play different roles. Plants give oxygen, animals help in pollination and food chains. Losing biodiversity can harm the environment and humans too.
2. **Explain the importance of classification in biology and how it helps us understand the relationships between different organisms.**
   → Classification arranges organisms in groups based on similarities. It helps scientists study and understand organisms better. It shows relationships and evolution among species. It also makes naming and identification easier.
3. **Describe the Linnaean system of classification in detail, stating the seven taxonomic ranks and their relationships.**
   → The Linnaean system is a method to classify organisms into 7 ranks: Kingdom → Phylum → Class → Order → Family → Genus → Species. Kingdom is the largest group; species is the smallest. As we go down the ranks, organisms become more similar.
4. **Compare and contrast the domains Archaea and Bacteria, focusing on their key characteristics.**
   → Both are unicellular and have no nucleus. But archaea live in extreme environments (hot springs, salty lakes), while bacteria live in normal environments. Archaea have different cell wall structure than bacteria.

5. **Describe the diagnostic characteristics of the four kingdoms within the domain Eukarya.**
   →

- **Protista**: Mostly unicellular, some autotrophic and some heterotrophic.
- **Fungi**: Multicellular (except yeast), heterotrophic, absorb food, have chitin in cell wall.
- **Plantae**: Multicellular, autotrophic (make food by photosynthesis), have cell walls.
- **Animalia**: Multicellular, heterotrophic, no cell wall.

6. **Discuss the challenges of classifying viruses within the traditional three domains of life.**
   → Viruses are not living cells. They do not perform life processes on their own. They need a host cell to reproduce. They do not fit in any domain (Bacteria, Archaea, or Eukarya), so they cannot be classified like living organisms.
7. **Explain the rules and guidelines for suggesting scientific names to organisms.**
   → Scientific names are written in Latin. They have two parts: Genus (first, capitalized) and Species (second, lowercase). The whole name is italicized or underlined. Example: *Homo sapiens*.

D. Inquisitive Questions (Suggested Answers)

1. **How might placing an organism in the incorrect taxonomic group affect conservation or scientific studies?**
   → Misclassification can lead to wrong conservation plans. It may cause confusion in identifying species, studying diseases, or protecting endangered species.
2. **Imagine you discover a new organism. What steps would you take to classify and name it according to the principles of binomial nomenclature?**
   → Study its structure and features, compare with known organisms, place it in the correct group, and give it a two-part Latin name (Genus + Species) according to binomial rules.
