

**EXERCISE – 1**

1. Amitosis is a division without spindle formation. For the simple division of bacteria and cyanobacteria, this phenomenon is used.
2. Metabolism is sum total of two reactions i.e., catabolism and anabolism. Catabolism is the phase in which complex substances are broken down into simpler molecules whereas anabolism is constructive phase in which more complex molecules are built from simpler complexes.
3. All living phenomenon are due to underlying interactions. Properties of tissues are not present in the constituent cells but arise as a result of interactions among the constituent cells and these are underlying interactions.
4. Living organisms are self-replicating, ever evolving and self regulating interactive systems capable of responding to external stimuli.
5. All living organisms present, past and future, are linked to one another by the sharing of the common genetic material, but to varying degrees.
6. Biological names are generally in Latin and written in italics. They are Latinised or derived from Latin irrespective of their origin.
7. Classification is the process by which organisms are grouped into convenient categories, based on some easily observable characters. Nomenclature is only possible when the organism is described and we know to what organism the name is attached to, and this is called identification. So the correct steps are characterization, identification, nomenclature and classification.
8. Systematics take into account evolutionary relationships between organisms which reflects that ststematics is a sum total of taxonomy and phylogamy.
9. Species is the taxonomic category in which the members can freely inbreed. It is a group of very similar organisms which are related by recent common ancestry and share highest common characters.
10. Species is the lowest category and greatest in common characters. Taxonomic studies of all known organisms have led to the development of common categories such as kingdom, phylum or division, class, order, family, genus and species. Each category referred to as a unit of classification and represents a rank which are distinct biological entity and not merely morphological aggregates. Family is a taxonomic category and characterized on the basis of both vegetative and reproductive features of plant species.
11. The famous botanical gardens in India are Indian Botanical Garden, Howrah and National Botanical Research Institute, Lucknow.
12. Biologist follow universally accepted principles to provide scientific names which are acceptable to all over the world and not country specific.
13. Families are characterized on the basis of both vegetative and reproductive features of plant species.
14. Keys are based on the contrasting characters generally in a pair called couplet, based on the similarities and dissimilarities. Separate taxonomic keys are required for each taxonomic category.

15. Biological museums are generally set up in educational institutes such as schools and colleges. Insects are preserved in insect boxes after collecting, killing and pinning. Larger animals like birds and mammals are usually stuffed and preserved. Museums often have collection of skeletons of animals too.
16. Name of the author appears after the specific epithet i.e. at the end of the biological name and is written in an abbreviated form.
17. Key is a taxonomic aid used for identification of plants and animals based on the similarities and dissimilarities.
18. Zoological parks and botanical gardens are important taxonomic aids for taxonomic studies. They have collection of only living organisms and are site of ex-situ conservation.
19. Herbarium serves as quick referral system in taxonomic studies. Zoological parks are the place to study food habits and behavior of animals. Keys are generally analytical in nature. Flora provides the index to the plant species found in a particular area.
20. Ernst Mayr has been called "The Darwin of the 20<sup>th</sup> Century". He almost single handedly made the origin of species diversity. He was awarded the three prizes widely regarded as the triple crown of biology.
21. Monographs contain information on any one taxon.
22. The sum total of all the chemical reactions occurring in the body of living organisms is known as metabolism. Metabolic reactions can be demonstrated outside the body in cell-free systems, so this can be said as metabolic reactions can take place in vitro.
23. In taxonomic hierarchy, as we move from species to kingdom, number of common characteristics goes on decreasing while the number of organisms goes on increasing.
24. Plant families like convolvulaceae, solanaceae are included in the order polymoniales. Poales is the order name of wheat as sapinadales is of mango. The animals order carnivore includes families like felidae and canidae.
25. Division is the highest taxonomic category among them and as we move higher in the taxonomic hierarchy, the number of common characteristics goes on decreasing.

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## ASSERTION – REASON

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1. Phylogeny is the developmental history of a species which includes evolutionary relationships between organism, while species is the lowest category and basic unit of classification. Systematics takes into account evolutionary relationships i.e., phylogeny while characterization, identification, nomenclature and classification are the processes that are basic to taxonomy.
2. Each category referred to as a unit of classification, in fact, represents a rank and is commonly termed as taxon. All categories together constitute the taxonomic hierarchy.
3. Flora is one of the means of recording descriptions. An enumeration of all the species that grow in a region, also, the collective term for all the species that grown in a region is flora. It contains actual account of habitat and distribution of plants of a given area. It provides the index to the plant species found in a particular area.
4. Growth exhibited by non-living objects is by accumulations of materials on the surface i.e., extrinsic. In living organisms, growth is from inside i.e., intrinsic. Growth occurs in both non-living and living organisms, therefore, cannot be taken as a defining property of living organisms.
5. An isolated metabolic reactions outside the body of an organism, performed in a test tube is neither living nor non-living. Hence, while metabolism is a defining feature of all living organisms without exception, isolated metabolic reactions in vitro are not living things but surely living reactions. Hence, cellular organization of the body is the defining feature of life forms.
6. Living organisms are self replicating, evolving and self regulating interactive systems capable of responding to external stimuli. All living phenomenon are due to underlying interactions. This is proved as properties of tissues are not present in the constituent cells but arise as a result of interactions among the constituent cells.
7. Both statements are true but there is a need to standardize the naming of living organism such that a particular organism is known by the same name all over the world. That is the reason of nomenclature. It is obvious that naming is only possible when the organism is described correctly.
8. A group of individual organisms with fundamental similarities is considered as species. One species is distinguishable from the other closely related species based on distinct morphological differences due to the absence of fundamental similarities.
9. At higher category in taxonomic hierarchy, number of common characters among organisms keeps on decreasing, therefore, problem of classification becomes complex. Hence, higher the category, greater is the difficulty of determining the relationship to other taxa at the same level.
10. Zoological parks are the places where wild animals are kept away from their natural habitat but as far as possible, conditions are similar to their natural habitats. Therefore, it is a site of ex-situ conservation due to the reason of organisms are kept away from their natural habitat.

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## PREVIOUS YEAR QUESTIONS

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1. Numerical taxonomy is also called Phenetics classification of organism which is based on observable characteristics of existing organism.
2. Binomial nomenclature is given by Carolus Linnaeus which is being practiced by biologists all over the world.
3. Botanical gardens are specialized site which have collections of living plants for identification purpose. Therefore, botanical gardens are site of ex-situ conservation of germplasm.
4. Species is group of individuals which are productively isolated and can freely inter breed and produce fertile offspring. Therefore, gene flow occurs between the populations of a species.
5. Species is group of individuals which are productively isolated and can freely interbreed and produce fertile offsprings. The members of one species can not interbreed with members of the other species.
6. Species, genus and family all are categories of taxonomic hierarchy. Malvaceae is taxon.
7. ICBN stands for International Code of Botanical Nomenclature.
8. Consciousness is defining property of living organisms, therefore, responsiveness to touch can be said unexceptionally distinguishable characteristic among living and non-living things.
9. According to the classical definition of species, two plants can be conclusively said to belong to the same species if they can reproduce freely with each other and form seed [fertile offsprings].
10. National Botanical Research Institute [NBRI] is located at Lucknow in India.
11. Species is the lowest category in taxonomic hierarchy and contains most similar characteristics of organisms.
12. Biological concept of species, proposed by Ernst Mayr is mainly based on reproductive isolation among members of two species.
13. Taxonomic hierarchy refers to stepwise arrangement of all categories for classification of plants and animals.
14. The famous botanical garden of Kew is located in England.
15. A group of interconnected or related genera is called family which has still less number of similarities as compared to genus and species.
16. The correct combination for wheat is Genus : Triticum, Family : Poaceae, Order : Poales, Class : Monocotyledonae.
17. A group of related genera with still less number of similarities as compared to genus and species is family.
18. Binomial nomenclature are given by Linnaeus.
19. Family is placed between order and genus.

20. Arrangement of categories in ascending order of Linnaean hierarchy is :  
Species → Genus → Family → Order → Class → Phylum → Kingdom.
21. Species is the basic unit of classification.
22. Grouping of organisms of any rank with similar traits is taxon. Each category referred to as a unit of classification, in fact, represents a rank and is commonly termed as taxon.
23. Perception of events happening in the environment and memories them is an exclusive characteristic of living things.