IMPORTANT QUESTIONS CLASS – 11 BIOLOGY CHAPTER -1 THE LIVING WORLD

1. Why are living organisms classified?

Sol. Living organisms are classified because of the following reasons:
(i) Easy identification.
(ii)Study of organisms of other places.
(iii)Study of fossils
(iv)Grouping helps in study of all types of organisms while it is impossible to study individually all of them.
(v) Itbringsoutsimilaritiesanddissimilarities. They help in knowing relationships among different groups.
(vi)Evolution of various taxa can be known.

2. Why are the classification systems changing every now and then?

Sol. From very early days till now biologists use several characters for classification system. These are morphology, anatomy, cytology, physiology, ontogeny, phylogeny, reproduction, biochemistry, etc. But day by day biologists are learning something new about organisms from their fossil records and using" advanced study techniques such as molecular phylogeny, etc. So their point of view about classification keeps changing. Thus the system of classification is modified every now and then.

3. What different criteria would you choose to classify people that you meet often?

Sol. The various criteria that may be chosen to classify people whom we meet often include behaviour, geographical location, morphology, family members, relatives, friends etc.

4. What do we learn from identification of individuals and populations?

Sol. The knowledge of characteristic of an individual or its whole population helps in identification of similarities and dissimilarities among the individuals of same kind or between different types of organisms. It helps us to classify the organisms in various categories depending upon these similarities and dissimilarities.

5. Given below is the scientific name of mango. Identify the correctly written name.
Mangifera Indica Mangifera indica

Sol. The correctly written scientific name of mango is Mangifera indica.

6. Define a taxon. Give some example of taxa at different hierarchical levels.

Sol. A taxonomic unit in the biological system of classification of organism is called taxon (plural taxa). For example a phylum, order, family, genus or species represents taxon. It represents a rank. For example, all the insects form a taxon. Taxon of class category for birds is Aves and taxon of Phylum category for birds is Chordata. The degree of relationship and degree of similarity varies with the rank of the taxon. Individuals of a higher rank, say Order or Family, are less closely related than those of a lower rank, such as Genus or Species.

7. Can you identify the correct sequence of taxonomical categories?
(a) Species —> Order —> Phylum —> Kingdom
(b) Genus—) Species—> OrderKingdom
(c) Species —> Genus —>Order —> Phylum

Sol. The correct sequence of taxonomical categories is
(c) i.e., Species —>Genus —> Order —> Phylum.

8. Try to collect all the currently accepted meanings for the word 'species'. Discuss with your teacher the meaning of species in case of higher plants and animals on one hand, and bacteria on the other hand.

Sol. Species occupies a key position in classification. It is the lowest taxonomic category. It is a natural population of individuals or group of populations which resemble one another in all essential morphological and reproductive characters so that they are able to interbreed freely and produce fertile offsprings. Each species is also called genetically distinct and reproductively isolated natural population. Mayr (1964) has defined species as "a group of actually or potentially interbreeding populations that are reproductively isolated from other such groups".
In higher plants and animals the term 'species' refers to a group of individuals that are able to interbreed freely and produce fertile offsprings. But, in case of bacteria interbreeding cannot serve as the best criteria for delimiting species because bacteria usually reproduce asexually. Conjugation, transformation and transduction, which are termed as sexual reproduction methods in bacteria, also do not correspond to true interbreeding. Thus, for bacteria many other characters such as molecular homology, biochemical, physiological, ecological and morphological characters are taken into consideration while classifying them.

9. Define and understand the following terms:
(i) Phylum (ii) Class (iii) Family
(iv) Order (v) Genus

Sol. (i) Phylum – Phylum is a category higher than that of Class. The term Phylum is used for animals. A Phylum is formed of one or more classes, e.g., the Phylum Chordata of animals contains not only the class Mammalia but also Aves (birds), Reptilia (reptiles),

Amphibia (amphibians), etc. In plants the term Division is used in place of Phylum.
(ii) Class – A Class is made of one or more related Orders. For example, the Class Dicotyledoneae of flowering plants contains all dicots which are grouped into several orders (e.g., Rosales, Sapindales, Ranales, etc.).
(iii) Family, – It is a taxonomic category which contains one or more related genera. All the genera of a family have some common features or correlated characters. They are separable from genera of a related family by important and characteristic differences in both vegetative and reproductive features. E.g., the genera of cats (Fells) and leopard (Panthera) are included in the Family Felidae. The members of Family Felidae are quite distinct from those of Family Canidae (dogs, foxes, wolves).
Similarly, the family Solanaceae contains a number of genera like Solanum, Datura, Petunia and Nicotiana. They are distinguishable from the genera of the related family Convolvulaceae (Convolvulus, Ipomoea).
(iv) Order – The category includes one or more related families. E.g., the plant Family Solanaceae is placed in the Order Polemoniales alongwith four other related families (Convolvulaceae, Boraginaceae, Hydrophyllaceae and Polemoniaceae). Similarly, the animal families Felidae and Canidae are included under the Order Carnivora alongwith Hyaenidae (hyaenas) and Ursidae (bears).
(v) Genus – It is a group or assemblage of related species which resemble one another in certain correlated characters. Correlated characters are those similar or common features which are used in delimitation of a taxon above the rank of species. All the species of genus are presumed to have evolved from a common ancestor. A genus may have a single living species e.g., Genus Homo. Its species is Homo sapiens – the living or modem man. The Genus Felis has many species, e.g., F. domestica – common cat, F. chaus (jungle cat) etc.

10.How is a key helpful in the identification and classification of an organism?

Sol.'Key is an artificial analytic device having a list of statements with dichotomic table of alternate characteristics. Taxonomic
keys are aids for rapid identification of unknown plants and animals based on
the similarities and dissimilarities. Keys are primarily based on stable and reliable characters. The keys are helpful in a faster preliminary identification which can be backed up by confirmation through comparison with detailed description of the taxon provisionally identified with. Separate taxonomic keys are used for each taxonomic category like Family, Genus and Species.