

Chapter - 2 Biological Classification

Question-1

Explain the artificial system of classification.

Solution:

An artificial system of classification is one in which different categories of organisms are recognized on the basis of one or few superficial resemblances and differences.

This system was first adopted by Pliny in the first century A.D. for the classification of Animals.

Question-2

Mention the characteristics of "New systematics".

Solution:

New systematics was introduced by Sir Julian Huxley (1940) to overcome the failure of classical systematics. It has the following features:

- (i) Species is regarded as a dynamic unit and not as the static unit of classical systematics.
 - (ii) The importance of species as such is reduced, since most of the work is done with sub-divisions of species, such as sub-species and population.
 - (iii) The morphological species definition has been replaced by a biological one, which takes ecology, genetics, geography, cytology, physiology, bio-chemistry and behaviour into consideration.
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Question-3

Write the importance of classification of organisms.

Solution:

The importance of classification of organisms have been listed below

- (i) More than a million animals and plants are known today. Thus, it is very essential to systematically study living beings in order to classify them. Without this, the study of different organisms would be in confusion.
- (ii) It is impossible to study these vast numbers of organisms without any classification.
- (iii) All types of organisms do not occur in a given locality.
- (iv) Classification helps in knowing the relationship among different groups of animals and plants.
- (v) Classification makes it easier to recognize and identify an individual organism.

Question-4

What do you know about the phylogenetic system of classification?

Solution:

This system was adopted by A. Engler Karl, A.E. Prantl and John Hutchinson in classifying plants. It is based on the evolutionary and genetic relationship of the organisms. It enables us to find out the ancestors of any taxon.

Question-5

What are the basics in classification?

Solution:

Classification refers to the ordering of organisms into groups. Taxonomy is a branch of Science that deals with the study of principles and procedures of biological classification.

(i) Nomenclature:

This refers to assigning of names to organisms. It is the determination of correct name as per established universal practices and rules.

(ii) Identification:

This is carried out for an organism to determine its similarity with an already known organism. It implies assigning an organism to a particular taxonomic group. Suppose, there are three plants say *a*, *b* and *c*. All represent different species. Another plant, say *d*, resembles *b*. The recognition of the plant *d* as identical to the already known plant *b* is its identification.

(iii) Classification:

This deals with the mode of arranging organisms or groups of organisms into categories according to a systematic plan or an order.

The categories used in the classification of animals and plants are Kingdom, Phylum, Class, Order, Family, Genus and Species. Each category is a unit. It is called a taxon.

Question-6

What are the demerits of artificial system of classification?

Solution:

Following are the demerits of the artificial system of classification:

- (i) The criteria used are arbitrary and do not reflect any relationship among organisms, which is a must for proper classification.
- (ii) Organisms closely resembling each other are placed in separate groups while those quite different are placed in the same group.
- (iii) The system does not give any idea about the origin of difference in living organisms.

Question-7

What is an ovule?

Solution:

An ovule is an integument mega sporangium. It forms female gametophyte internally and after fertilization ripens to form a seed.

Question-8

What are the two basic functions of biological classification?

Solution:

Biological classification facilitates two basic functions, namely,

- (i) Recognition and description of the species.
- (ii) Grouping the species on the basis of similarities and relationships.

Question-9

Who proposed the new five-kingdom classification? What are the four criteria for the five-kingdom classification of organisms?

Solution:

The new five-kingdom classification of life was proposed by Whittaker (1969). The five kingdoms are, Monera, Protista, Plantae, Fungi and Animalia.

The four criteria for the five-kingdom classification of organisms are

- (i) The complexity of cell structure.
- (ii) The complexity of organism's body.
- (iii) The mode of nutrition.
- (iv) Major ecological roles.

Question-10

Note the differences between taxon and genus.

Solution:

Taxon	Genus
(i) This refers to the grouping of organisms, which are similar and genetically related.	(i) A group of dissimilar species is called genus.
(ii) It is a classified unit of any rank or a taxonomic category of any rank, e.g. all tiger form the species taxon - Panthera.	(ii) It is a group of species, which are closely related. A genus may be monotypic having only one species, e.g. Homo.

Question-11

What do you mean by Cytotaxonomy?

Solution:

The classification of Plants and Animals on the basis of chromosome number is called Cytotaxonomy.



Question-12

Write the advantages of biological classification.

Solution:

The following are the advantages of biological classification

- (i) It is essential for a systematic study of organisms.
- (ii) Classification makes the study of organisms easier and gives a comparative account of them.

Question-13

Enlist the main salient features of protists.

Solution:

The following are the main features of protista

- (i) They have unicellular organization.
- (ii) Protists are eukaryotic.
- (iii) Cell organelles are present.
- (iv) Nutrition may be autotrophic, saprophytic or parasitic.
- (v) Reproduces sexually or asexually.

Question-14

What do you understand by binomial nomenclature?

Solution:

According to binomial system of nomenclature, the name of the organism has two words. The first word represents the genus and the second represents the species. **Example:** Homo sapiens for human beings.

Question-15

Enlist some important characters of fungi.

Solution:

The characteristic features of fungi are,

- (i) They are multi-cellular.
- (ii) They are decomposers.
- (iii) Their body consists of a mesh of hyphae called mycelium.
- (iv) They reproduce sexually or asexually.
- (v) They do not have chlorophyll hence they are heterotrophs.

Question-16

Write the ecological role of these kingdoms: Monera, Plantae and Fungi.

Solution:

- (i) Monera - Decomposers
- (ii) Plantae - Producers
- (iii) Fungi - Decomposers.

Question-17

Write the scientific names of Housefly, Mango, Tulsi and Wheat.

Solution:

Housefly – *Musca domestica*

Mango – *Mangifera indica*

Tulsi – *Ocimum sanctum*

Wheat – *Triticum aestivum*.

Question-18

To which kingdom does the multi-cellular producer belong to?

Solution:

The multi-cellular producer belongs to the kingdom Plantae.

Question-19

Who proposed the five-kingdom system of classification?

Solution:

Whittaker proposed the five-kingdom system of classification.

Question-20

Who wrote the books "Species Plantarum and Systema Nature?"

Solution:

Carolus Linnaeus wrote the books species Plantarum and Systema nature.

