

1 The Living World



1.1. Diversity in the Living World

- Select the correctly written scientific name of Mango which was first described by Carolus Linnaeus.
(A) *Mangifera indica* Linn.
(B) *Mangifera indica*
(C) *Mangifera Indica*
(D) *Mangifera indica* Car. Linn. [NEET 2019]
- Which of the following is against the rules of ICBN?
(A) Generic and specific names should be written starting with small letters.
(B) Hand written scientific name should be underlined.
(C) Every species should have a generic name and a specific epithet.
(D) Scientific names are in Latin and should be italicized. [NEET 2019]
- Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature?
(A) The first word in a biological name represents the genus name and the second is a specific epithet.
(B) The names are written in Latin and are italicized.
(C) When written by hand, the names are to be underlined.
(D) Biological names can be written in any language. [NEET Phase-I 2016]
- Which one of the following organisms is scientifically correctly named, correctly printed according to the International Rules of Nomenclature and correctly described?
(A) *Musca domestica*—The common house lizard, a reptile
(B) *Plasmodium falciparum*—A protozoan pathogen, causing the most serious type of malaria
(C) *Felis tigris*—The Indian tiger, well protected in Gir forests
(D) *E.coli*—Full name *Entamoeba coli*, a commonly occurring bacterium in human intestine [AIPMT Mains 2012]

5. ICBN stands for:

- (A) International Code of Botanical Nomenclature
- (B) International Congress of Biological Names
- (C) Indian Code of Botanical Nomenclature
- (D) Indian Congress of Biological Names

[AIPMT 2007]

6. Biosystematics aims at:

- (A) the classification of organisms based on broad morphological characters.
- (B) delimiting various taxa of organisms and establishing their relationships.
- (C) the classification of organisms based on their evolutionary history and establishing their phylogeny on the totality of various parameters from all fields of studies. @THE_RDX_07
- (D) identification and arrangement of organisms on the basis of their cytological characteristics.

[AIPMT 2003]

7. What is true for individuals of same species?

- (A) Live in same niche (B) Live in same habitat
- (C) Interbreeding (D) Live in different habitat

[AIPMT 2002]

8. The book '*Genera Plantarum*' was written by:

- (A) Engler and Prantl (B) Bentham and Hooker
- (C) Bessey (D) Hutchinson.

[AIPMT 1999]

9. Linnaeus is credited with:

- (A) binomial nomenclature
- (B) theory of biogenesis
- (C) discovery of microscope
- (D) discovery of blood circulation.

[AIPMT 1993]

10. The term "New Systematics" was introduced by:

- (A) Bentham and Hooker
- (B) Linnaeus
- (C) Julian Huxley
- (D) A.P. de Candolle

[AIPMT 1988]

1.2. Taxonomic Categories

11. In the taxonomic categories which hierarchical arrangement in ascending order is correct in case of animals?
 (A) Kingdom, Phylum, Class, Order, Family, Genus, Species
 (B) Kingdom, Class, Phylum, Family, Order, Genus, Species
 (C) Kingdom, Order, Class, Phylum, Family, Genus, Species
 (D) Kingdom, Order, Phylum, Class, Family, Genus, Species [NEET 2022]

12. Which one of the following belongs to the Family Muscidae?

- (A) House fly (B) Fire fly
 (C) Grasshopper (D) Cockroach [NEET 2021]

13. Match Column I with Column II for housefly classification and select the correct option using the codes given below.

Column I	Column II
(a) Family	(i) Diptera
(b) Order	(ii) Arthropoda
(c) Class	(iii) Muscidae
(d) Phylum	(iv) Insecta

Select the correct option.

- (a) (b) (c) (d)
 (A) (iii) (i) (iv) (ii)
 (B) (iii) (ii) (iv) (i)
 (C) (iv) (iii) (ii) (i)
 (D) (iv) (ii) (i) (iii) [NEET Phase-II 2016]

14. Study the four statements (I-IV) given below and select the two correct ones out of them.

- (I) Definition of biological species was given by Ernst Mayr.
 (II) Photoperiod does not affect reproduction in plants.
 (III) Binomial nomenclature system was given by R.H. Whittaker.
 (IV) In unicellular organisms, reproduction is synonymous with growth.

The two correct statements are:

- (A) (II) and (III) (B) (III) and (IV)
 (C) (I) and (IV) (D) (I) and (II)

[NEET Phase-II 2016]

15. The common characteristics between tomato and potato will be maximum at the level of their:

- (A) family (B) order
 (C) division (D) genus

[NEET Karnataka 2013]

16. Which one of the following animals is correctly matched with its particular taxonomic category?

- (A) Tiger — *tigris*, the species
 (B) Cuttle fish — mollusca, a class
 (C) Humans — primata, the family
 (D) Housefly — musca, an order

[AIPMT 2011]

17. Species are considered as:

- (A) real basic units of classification
 (B) the lowest units of classification
 (C) artificial concept of human mind which cannot be defined in absolute terms
 (D) real units of classification devised by taxonomists.

[AIPMT 2003, 1994]

18. The practical purpose of classification of living organisms is to:

- (A) explain the origin of living organisms
 (B) trace the evolution of living organisms
 (C) name the living organisms
 (D) facilitate identification of unknown organisms

[AIPMT 1999]

19. 'Taxon' is the unit of a group of:

- (A) order (B) taxonomy
 (C) species (D) genes.

[AIPMT 1996]

20. Sequence of taxonomic categories is:

- (A) class-phylum-tribe-order-family-genus-species
 (B) division-class-family-tribe-order-genus-species
 (C) division-class-order-family-tribe-genus-species
 (D) phylum-order-class-tribe-family-genus-species.

[AIPMT 1992]

21. The term phylum was given by:

- (A) Cuvier (B) Haeckel
 (C) Theophrastus (D) Linnaeus.

[AIPMT 1992]

22. A group of plants or animals with similar traits of any rank is:

- (A) species (B) genus
 (C) order (D) taxon.

[AIPMT 1992, 91]

23. Static concept of species was put forward by:

- (A) de Candolle (B) Linnaeus
 (C) Theophrastus (D) Darwin.

[AIPMT 1988]

*1.3. Introduction

24. Which one of the following aspects is an exclusive characteristic of living things?

- (A) Isolated metabolic reactions occur *in vitro*.
 (B) Increase in mass from inside only.
 (C) Perception of events happening in the environment and their memory.

- (D) Increase in mass by accumulation of material both on surface as well as internally.

[AIPMT Mains 2011]

25. Biological organization starts with:

- (A) cellular level
- (B) organismic level
- (C) atomic level
- (D) submicroscopic molecular level [AIPMT 2007]

26. The living organisms can be unexceptionally distinguished from the non-living things on the basis of their ability for:

- (A) interaction with the environment and progressive evolution
- (B) reproduction
- (C) growth and movement
- (D) responsiveness to touch [AIPMT 2007]

27. The most important feature of all living systems is to:

- (A) utilize oxygen to generate energy
- (B) replicate the genetic information
- (C) produce gametes
- (D) utilize solar energy for metabolic activities [AIPMT 2000]

SOLUTIONS

1. (A) As per the binomial nomenclature rules, the name of an organism contains a generic name and the specific epithet. The former begins with a capital letter, while the latter begins with a small letter. The scientific name is written in italics. The name of the taxonomist is written in Roman script and in abbreviated form after the specific epithet.

2. (A) As per the rules of ICBN:

- (1) Biological names are typically written in Latin and are italicized.
Irrespective of where they came from, they are Latinized or derived from Latin.
- (2) The genus is represented by the first word in a biological name, and the specific epithet is indicated by the second word.
- (3) To indicate their Latin roots, the two words in a biological name are printed in italics or underlined, when they are written by hand.
- (4) The specific epithet begins with a small letter, while the first word naming the genus begins with a capital letter.

3. (D) Biological names originated from the Latin language only because it was a dead language. No person or nation uses it as an official language. The use of scientific names eliminates confusion between nationalities that may have different common names for organisms by assigning them a universal name that acts as a code.

4. (B) According to binomial nomenclature the scientific name consists of genus and species. The genus name starts with capital letter and both the words are latinised and written in italics. *Musca domestica* is European housefly. It belongs to phylum Arthropoda. *E. coli* (*Escherichia coli*) is a commonly occurring bacterium in human intestine. *Panthera tigris* is an Indian tiger. Asiatic lions are protected in Gir forests.

5. (A) **ICBN (International Code of Botanical Nomenclature):** It is one of the code of nomenclature that is independent of zoological and bacteriological nomenclature. The code applies equally to the names of taxonomic groups treated as plants, whether or not these groups were originally that so treated.

6. (C) Biosystematics is the classification of organisms based on the study of genetic evolution of plant and animals. Hence, it considers the evolutionary history of organisms and establishes their phylogeny on the basis of different parameters.

7. (C) Individuals of the same species can interbreed. No two individuals share the same ecological niche.

8. (B) Bentham and Hooker gave the biggest and natural classification of spermatophyta in their book '*Genera Plantarum*'.



Related Theory

↳ A drawback of this system is that neither it does provide any clue as to the evolutionary history of any genus, order or family nor does it give any idea of the phylogenetic relationship between them.

9. (A) Binomial nomenclature is related to scientific naming of organisms. It was first introduced by Carolus Linnaeus (1735) in his book *Systema Naturae* and later in '*Species Plantarum*' (1753). While naming of an organism, he used two Latin words, the first being generic name and the second is specific epithet. The generic name begins with capital letter and the species name begins with small letter.

10. (C) The term "New Systematics" or "Neo-Systematics" was coined by Sir Julian Huxley. In this approach, the points which are related with evolutionary, genetic and morphological traits are considered upon which the new taxonomic affinities are brought.

11. (None of the options is correct).

The ascending order of the taxonomic categories will be: Species, Genus, Family, Order, Class, Phylum, and Kingdom. Reverse of this sequence will be the descending order.

12. (A) Housefly (*Musca domestica*) belongs to the family Muscidae.
13. (A) Family – Muscidae
Order – Diptera
Class – Insecta
Phylum – Arthropoda



Related Theory

→ Taxonomy is a branch of study that deals with principles and procedures of identification, nomenclature and classification of organisms. Taxonomic hierarchy is the framework by which taxonomic groups are arranged in definite order from higher to lower categories (descending order) or lower to higher (ascending). The hierarchical order of classifying organisms is: Kingdom → Phylum/Division → Class → Order → Family → Genus → Species.

In this, different form of life having gross similarities are placed together into larger groups. Then, each large group is sub-divided into smaller groups in which greater similarities exist. This division of organisms among different groups follow certain rules.



Caution

→ Most students are aware of phylum and class but could not recognize the family or order for the particular organism. Thus, in such questions, eliminating the wrong options plays a crucial role. Simply, eliminate the option that does not have correct information about the particular point/topic. This helps in reducing the chances of error.

14. (C) According to Ernst Mayr, "Biological Species are groups of actually or potentially interbreeding natural populations, which are reproductively isolated from other such groups." In unicellular organisms, reproduction and growth are synonymous to each other. The unicellular organisms grow only when they reproduce. Photoperiodism affects reproduction in plants by regulating the flowering timing of the plants. Binomial nomenclature was given by Carolus Linnaeus, while R.H. Whittaker gave five kingdom system of classification.
15. (A) Potato (*Solanum tuberosum*) and tomato (*Lycopersicum esculentum*) both belong to the same family Solanaceae.



Mnemonics

→ To remember the order of taxa in biology following mnemonic can be used by students to memorise the taxonomic classification of system.

Sab Gaye Family Old Cold Drink Pee Ke

Species → Genus → Family → Order → Class → Division/
Phylum → Kingdom

Now reverse it.

Or

Keep Plates Clean Or Family Get Sick

Kingdom → Phylum/Division → Class → Order → Family →
Genus → Species

16. (A) The correctly matched pair is: Tiger — *tigris*, species.
17. (A) In biology, a species is one of the basic units of biological classification and a taxonomic rank. A species is often defined as the largest group of organisms capable of interbreeding and producing fertile offspring. As they share more common characters, it is the basic unit of classification.
18. (D) The term "biological classification" refers to the hierarchical order in which an organism is arranged scientifically. It divides the organism into several groups based on their shared characteristics. The technique of biological classification aids in understanding the evolutionary links between organisms and it also helps in the identification of novel organisms based on the traits of existing groupings and subgroups of organisms.
19. (B) Taxon refers to one or more categories of an organism taken by taxonomists as a unit. It may be a kingdom, class, order, family, genus or species. It is any level of grouping of organisms. Further, each of these categories has been divided into intermediate categories like subkingdom, subdivision, superclass, subgenus, subspecies, etc.
20. (C) As per Linnaean hierarchy, there are seven main taxonomic ranks: kingdom, phylum or division, class, order, family, genus and species.
21. (B) The term 'phylum' was coined by Haeckel, in 1866. It is originated from the Greek word *phylon* meaning race.
22. (D) A taxon or a taxonomic unit, is a name designating an organism or group of organisms. All the organisms belonging to a similar taxon share similar traits. For example, the basic level of classification is species, followed by genus, family, order, class, phylum or division, and then kingdom in an ascending order.
23. (B) The static concept of species was proposed by Carolus Linnaeus. According to him, species are fixed and immutable units, there is no change in the species and do not vary in terms of form, size or shape.
24. (C) The perception of events happening in the environment and their memory or consciousness is the most exclusive characteristic of living beings.



Related Theory

→ Consciousness is characterized by the ability of the body to respond to a stimulus, i.e., physical, chemical or biological. If an organism can respond to stimuli, this implies that it is

conscious. All organisms, from primitive prokaryotes to most advanced and complex eukaryotes, are able to sense and respond to environmental factors. Consciousness is thus said to be the defining property of living organisms.

25. (D) Biological organization starts at the submicroscopic molecular level, like viruses, bacteria, etc. These organisms are unable to be seen with naked eyes without the help of a microscope or even an electron microscope. Different elements combine to form four basic types of molecules: carbohydrates, lipids, proteins, and nucleic acids. Later, these are organized into the organelles of the cell. The cell is generally known as the basic unit of all living beings.
26. (A) Reproduction cannot be an all-inclusive defining characteristic of living organisms because there are many organisms that do not reproduce (mules, sterile worker bees, infertile human couples, etc.). An increase in body mass is considered growth. Mountains, boulders, and sand mounds (non-

living things) do grow; therefore, growth cannot be taken as the defining property of living organisms. Responsiveness to touch can also not be considered an exclusive property of all living organisms, as the patients in coma do not react to touch. While interaction with the environment or consciousness becomes the defining property of living organisms because all living organisms are aware of their surroundings.



Caution

→ Most students are aware of the characteristics of living organisms, but could not recognize the correct answer among the following options. Most of them might choose responsiveness (also known as 'respond to stimuli') as the defining property.

27. (B) Replication of genetic information is the most important feature of all the living systems. Living organisms have their own specific form and structure. Thus, living organisms are considered as self-replicating, evolving and self regulating.

