CHAPTER › 01

The Living World

NEET KEY NOTES

Biology is the science, which deals with the study of living organisms and their life processes. The term '**Biology**' was first introduced by **GR Treviranus** and **Jean Baptiste de Lamarck** (1802).

What is Living?

Living organisms show certain key characteristics which distinguish them from non-living things. These are

- **Growth** is shown by living organism by an increase in mass and an increase in the number of individuals. A multicellular organism grows by cell division.
- **Reproduction** is the process of producing offspring possessing features similar to those of their parents. It takes place by sexual or asexual mode.
- **Metabolism** comprises of both constructive reactions (anabolism) and destructive reactions (catabolism), continuously occurring in the body.
- **Cellular organisation** The cells are the building blocks of all living organisms may it be plants, animals or humans. Thus, organisms can be **unicellular** or **multicellular**.
- **Consciousness** is the ability of living organisms to sense their surroundings or environment and respond to these environmental stimuli, which could be physical, chemical and biological.

Diversity in the Living World

- **Biodiversity** refers to the number and types of organisms present on earth. Our earth possesses a wide range of living organisms. A number of plants and animals have been identified and described. However, a large number of organisms are still unknown to us.
- A rich diversity among organisms or biodiversity in terms of size, colour, habitat, physiological and morphological features can be observed on earth. Therefore, it is necessary to standardise the methods to identify and classify them on the basis of their defining characteristics.
- Certain rules and principles have been formulated for the **identification**, **nomenclature** and **classification** of organisms, which facilitate the study of vast diversity of organisms present on earth.
- **Identification** involves the process of finding the correct name and place of an organism. The morphological and anatomical characters are examined for proper identification.
- **Nomenclature** involves standardising appropriate naming of living organisms, so that they can be recognised and differentiated from others easily across the world.
- To ease the process of studying different organisms, a scientific name is assigned to each organism.
  The principles of naming have been established by **International Code for Botanical Nomenclature** (ICBN) and **International Code for Zoological Nomenclature** (ICZN) for plants and animals, respectively.
- Organisms are identified on the basis of their resemblance and distinct differences from others. They are assigned a correct **scientific/biological** name.
- **Binomial System of Nomenclature** was developed by **Carolus Linnaeus** in 1751 and was published in his book *Species Plantarum* (1753). As per this system, a biological name comprises of two words namely, **generic name** and the **specific epithet**.
- **Nomenclature of organisms** follows certain universal rules, which are as follows
  - Biological names are generally in Latin and are written in Italics. These are latinised or derived from Latin irrespective of their origin.
  - Both the words in a biological name, when handwritten are separately underlined or printed in Italics to indicate their Latin origin.
  - The first letter of the generic name is written in capital letter while that of specific epithet is written in small letter, e.g. *Mangifera indica.*
  - Name of the author appears after the specific epithet at the end of the biological name and is written in an abbreviated form, e.g. *Mangifera indica* Linn, where Linn is for Linnaeus.

- **Classification** is the process by which organisms are grouped into convenient categories based on some easily observable characters. The scientific term used for different categories is **taxa**.
- **Taxonomy** is the branch of science which deals with different aspects of identification, nomenclature and classification of organisms. **Linnaeus** is known as the Father of Taxonomy.
- **Systematics** is the study of systematic arrangement of organisms and the evolutionary relationships amongst them.

Taxonomic Categories

- The system of arranging different categories or ranks, which are referred to as **taxonomic categories** in a proper ascending or descending order is called as **taxonomic hierarchy**. Every organism occupies a distinct position in a taxonomic hierarchy.
- Each category in taxonomical hierarchy is commonly called **taxon**. The term 'taxon' was first introduced by ICBN during 1956 and it is the basic unit of classification.
- Taxonomic hierarchy was first proposed by **Linnaeus** and thus it is also called as **Linnaeus hierarchy**. This hierarchy constitutes the following components in an ascending order.
  - **Species** It is the smallest unit of taxonomic hierarchy consisting of groups of morphologically similar individuals which can interbreed to produce offspring, e.g. *nigrum* and *melongena* are the two species of genus–*Solanum*.
  - **Genus** It comprises of a group of related species having more characters in common in comparison to species of other genera, e.g. lion, leopard and tiger are all species of the genus–*Panthera*, while cats belong to the genus–*Felis*.
  - **Family** It is a group of related genera with a few common features but less number of similarities as compared to genus and species. Plant families are categorised on the basis of both vegetative and reproductive features of species, e.g. family–Solanaceae possesses different genera like *Solanum*, *Petunia* and *Datura*. Similarly, in animals, cats and dogs belong to two different families–Felidae and Canidae, respectively.
  - **Order** It is the assemblage of families which exhibit a few similar characters, e.g. order–Polymoniales contains different plant families like Solanaceae and Convolvulaceae. In animals, order–Carnivora includes families Felidae and Canidae.
  - **Class** It includes one or more related orders, e.g. class–Mammalia includes order–Primata and Carnivora.
  - **Phylum** or **Division** It includes classes with a few similar characters, e.g. phylum–Chordata includes animals possessing notochord and dorsal neural system. In plants, classes with few similar characters are placed under higher category called **division**, e.g. the division–Angiospermae includes wheat, onion, etc.
  - **Kingdom** It is the highest taxonomic category. All animals belong to the kingdom–Animalia, while all plants belong to the kingdom–Plantae.

Taxonomical Aids

Biologists have established certain procedures and techniques to store and preserve information as well as the specimens which are useful in identification and classification of organisms. These techniques stored information and procedures are called **taxonomic tools** or **taxonomic aids**. Following are some of the main taxonomical aids used to study taxonomy

- **Herbarium** is the storehouse of collected plant specimens that are dried, pressed and presserved on herbarium sheets. The biggest herbarium of the world is the Royal Botanical Garden in Kew (England), while the biggest herbarium of India is the Central National Herbarium at Shibpur (Kolkata).
- **Botanical garden** is essentially a collection of living plants maintained for both pure and applied studies. The famous botanical gardens are Royal Botanical Garden in Kew (England), Indian Botanical Garden, Howrah (India) and National Botanical Research Institute, Lucknow (India).
- **Museums** have a collection of preserved plants and animals for study and reference purposes. Specimens are preserved in containers or jars in preservative solutions. Insects are preserved in insect boxes after collecting, killing and pinning them. Larger animals like birds and mammals are usually stuffed and preserved.
- **Zoological parks** are the places where wild animals are kept in protected environments under human care. This enables us to learn about their food habits and behaviour.
- **Keys** are used for identification of plants and animals based on similarities and dissimilarities. The keys are based on the contrasting characters generally in a pair called **couplet**. Each statement in the key is called a **lead**. Keys are generally analytical in nature.
- **Monograph** contains information on any one taxon.
- **Manuals** are useful in providing information for identification of names of species found in an area.
- **Flora** contains the actual account of habitat and distribution of plants of a given area.
- **Catalogue** is a list that enumerates methodically all the species found in an area with brief description aiding identification.

Mastering NCERT

MULTIPLE CHOICE QUESTIONS

TOPIC 1 ~ *What is Living?*

1 The characteristics of growth include
(a) increase in mass
(b) increase in number of individuals
(c) Both (a) and (b)
(d) ability to reproduce

2 Plants grow throughout life by which method?
(a) Cell dedifferentiation
(b) Cell differentiation
(c) Cell division
(d) None of the above

3 Growth in unicellular organisms can be observed by
(a) counting the mass of cultured cells
(b) analysing the amount of nutrients absorbed by living organism
(c) growth cannot be observed
(d) simply counting the number of cells under microscope during *in vitro* culture

4 In majority of higher animals and plants, reproduction and growth are
(a) mutually exclusive events
(b) synonymous events
(c) synonymous events during *in vitro* culture
(d) None of the above

5 Among the following, which is a common phenomenon exhibited by living and non-living organisms to show the feature of growth?
(a) Increase in mass
(b) Cell division
(c) Increase in replication rate
(d) Cell differentiation

6 What kind of growth is exhibited by non-living organisms?
(a) Accumulation of material on surface
(b) Accumulation of material inside
(c) Growth from inside
(d) None of the above

7 A true regeneration was observed in
(a) *Hydra* (b) *Planaria*
(c) Sponges (d) *Amoeba*

8 Which of the following set of organisms reproduce by fragmentation (asexual mode of reproduction)?
(a) *Amoeba*, fungi and earthworm
(b) Fungi, filamentous algae and protonema of mosses
(c) *Hydra*, fungi, *Amoeba* and bacteria
(d) Earthworm, bacteria and fungi

9 Reproduction is synonymous with growth in which of the following set of organisms?
(a) Bacteria, unicellular algae and *Amoeba*
(b) Bacteria, *Amoeba* and fungi
(c) Unicellular algae and fungi
(d) Unicellular algae and filamentous algae

10 Why reproduction cannot be considered as an inclusive defining characteristic of all living organisms?
(a) Non-living organisms also reproduce
(b) Many living organisms are sterile
(c) Reproduction is synonym to growth in all organisms
(d) Both (a) and (b)

11 Which of the following characteristics is not a defining character of living organisms?
(a) Growth
(b) Growth and reproduction
(c) Reproduction
(d) Growth and metabolism

12 Metabolism can be best defined as
(a) the process in which a chemical is formed inside the body
(b) the process in which a chemical is destroyed inside the body
(c) the sum total of all chemical reactions occurring in the body
(d) a complex construction process only

13 In which of the following, metabolic reactions take place?
(a) In living organisms only
(b) Both in living and non-living organisms
(c) In cell-free systems
(d) Both (a) and (c)

14 Consciousness is the defining property of living organisms because
(a) photoperiod affects reproduction in seasonal breeders in both plants and animals
(b) plants respond to external factors like temperature and light
(c) human is aware of himself
(d) All of the above

15 Higher level of organisation emerges from
(a) a tissue itself
(b) interactions among organelles
(c) molecular constituent of an organelle
(d) None of the above

16 Hierarchy of biological organisation in living beings can be represented as
(a) Subcellular → Cellular → Individual → Population
(b) Atomic → Molecular → Cellular → Tissue → Organ → Organ system → Individual
(c) Organ system → Tissue → Cellular → Molecular → Atomic
(d) Individual → Molecular → Tissue → Organ system → Population

TOPIC 2 ~ *Diversity and Classification*

17 Biodiversity can be best defined as
(a) occurrence of the number and types of organisms
(b) species and ecosystem of a region
(c) variety of life in an ecosystem
(d) totality of genes, species and ecosystem of a given region

18 The number of species that are known and described ranges between
(a) 1.7-1.8 million (b) 1 million
(c) 50 million (d) 2 million

19 Standardising the name of living organism is known as
(a) classification (b) identification
(c) nomenclature (d) Both (a) and (c)

20 Which is first step in taxonomy?
(a) Description of the organism
(b) Identification of the organism
(c) Nomenclature of the organism
(d) Classification of the organism

21 ICBN stands for ***CBSE-AIPMT 2011***
(a) Indian Congress of Biological Name
(b) International Code for Botanical Nomenclature
(c) International Congress of Biological Name
(d) Indian Code of Botanical Nomenclature

22 Expand ICZN
(a) International Code for Zoological Nomenclature
(b) Intranational Code for Zoological Nomenclature
(c) International Code for Zoological Naming
(d) Interregional Code for Zoological Naming

23 Organisms are given scientific names because
(a) it ensures that each organism has only one name
(b) it ensures that no name is used twice
(c) it ensures desired name for the organisms
(d) Both (a) and (b)

24 According to the binomial nomenclature, scientific name of an organism consists of
(a) generic name (b) specific epithet
(c) Both (a) and (b) (d) None of these

25 The bionomial nomenclature system was given by
(a) Carol Linnaeus
(b) Carolus Linnaeus
(c) Aristotle
(d) Whittaker

26 In *Mangifera indica*, the word *Mangifera* is a
(a) genus (b) species
(c) variety (d) order

27 Scientific names are printed in …… and are derived from …… .
(a) Bold and English
(b) Italics and Latin
(c) Italics and German
(d) Italics and French

28 Which of the following is against the rules of ICBN? ***NEET (Odisha) 2019, NEET 2016***
(a) Handwritten scientific names should be underlined
(b) Every species should have a generic name and a specific epithet
(c) Scientific names are in Latin and should be italicised
(d) Generic and specific names should be written starting with small letters

29 Which one is the incorrectly written scientific name?
(a) *Panthera tigris* (b) *Mangifera indica*
(c) *Panthera leo* (d) *Columba LIVEA*

30 In binomial nomenclature, the name of author appears after the
(a) genus (b) family
(c) species (d) taxa

31 Select the correctly written scientific name of mango which was first described by Carolus Linnaeus. ***NEET 2019***
(a) *Mangifera indica* Linn.
(b) *Mangifera indica*
(c) *Mangifera Indica*
(d) *Mangifera indica* Car. Linn.

32 The process by which anything is grouped into convenient categories based on some easily observable characters is
(a) identification
(b) classification
(c) sorting
(d) grouping

33 The scientific term for different categories like plants and mammals is
(a) phylum (b) taxa
(c) genus (d) epithet

34 What are the basis of modern taxonomic studies?
(a) Internal structure
(b) Ecological information
(c) Structure of cell
(d) All of the above

35 Earliest classifications were based on
(a) 'uses' or basic amenities of organisms
(b) morphological features of organisms
(c) ecological interactions of organisms
(d) phylogenetic relations of organisms

36 All the given options respresent the basic process of taxonomy except
(a) nomenclature (b) identification
(c) speciation (d) classification

37 Diversity of organisms and their evolutionary relationship is studied scientifically under
(a) morphology (b) anatomy
(c) taxonomy (d) systematics

38 Who had written *Systema Naturae*?
(a) Ernst Mayr (b) Carolus Linnaeus
(c) RH Whittaker (d) WM Stanley

TOPIC 3 ~ *Taxonomic Categories*

39 Ascending or descending arrangement of taxonomic categories is known as
(a) classification (b) key
(c) taxonomy (d) hierarchy

40 A taxon is a
(a) group of related species
(b) group of related families
(c) type of living organisms
(d) taxonomic group of any ranking

41 A 'taxa' differs from 'taxon' due to
(a) being a higher taxonomic category than taxon
(b) being a lower taxonomic category than taxon
(c) being plural of taxon
(d) being singular of taxon

42 What is the basic unit of classification?
(a) Family (b) Order
(c) Species (d) Genus

43 Species is considered as
(a) the largest taxon of taxonomy/classification
(b) the smallest taxon of taxonomy/classification
(c) Both smallest and the largest unit of taxonomy/classification
(d) None of the above

44 Individuals of which taxa can interbreed freely?
(a) Genus (b) Species
(c) Family (d) Order

45 Which one is species?
(a) *Cannis* (b) *Pisum*
(c) *leo* (d) Carnivora

46 In *Solanum tuberosum,* first and second words stand for, respectively
(a) genus, generic name
(b) specific epithet, species
(c) specific name and generic name
(d) genus and species

47 *Solanum* and *Panthera* are
(a) genus and species
(b) genus and genus
(c) species and species
(d) only species

48 Choose the organism which does not belong to genus *Solanum*.
(a) Potato
(b) Tomato
(c) Brinjal
(d) Bottle gourd

49 A group of related genera is called a
(a) family (b) class
(c) phylum (d) order

50 For naming different families in taxonomy.
(a) Animal families ends with suffix – idea
(b) Plant families ends with suffix – aceae
(c) both vegetative and reproductive features are taken as the basis of plant classification
(d) All of the above

51 Which is not a taxonomic category?
(a) Asteraceae/Fabaceae (b) Species
(c) Phylum (d) Class

52 The plant family–Solanaceae is included in which order?
(a) Felidae (b) Conidae
(c) Polymoniales (d) Dimoniales

53 The order–Carnivora includes family
(a) Felidae
(b) Convolvulaceae
(c) Felidae and Canidae
(d) Canidae

54 In hierarchical classification, class is placed between
(a) kingdom and phylum
(b) order and family
(c) phylum and order
(d) family and genus

55 The taxonomic category assigned to Mammalia is
(a) Family (b) Genus
(c) Class (d) Order

56 Which of the following taxonomic categories includes all the other categories?
(a) Class (b) Order
(c) Family (d) Genus

57 Higher taxa share
(a) least common characters
(b) maximum common characters
(c) no common characters
(d) exactly similar common characters

58 Which one of the following taxonomic categories top the hierarchy of categories?
(a) Order (b) Division
(c) Class (d) Family

59 In case of plants, classes with a few similar characters are assigned to higher category called
(a) division (b) phylum
(c) order (d) family

60 Which one of the following categories contains the least similar characteristics?
(a) Class (b) Order
(c) Family (d) Division

61 Choose the incorrect match.
(a) Order – a group of related families
(b) Genus – a group of related species
(c) Class – a group of related orders
(d) Division – a group of related phyla

62 Arrange the following in ascending order of similar characteristics.
I. Family II. Genus
III. Class IV. Species
(a) Class < Family < Genus < Species
(b) Family < Class < Genus < Species
(c) Species < Order < Family < Class
(d) Class < Genus < Species < Family

63 Sapindales represents one of the taxonomic category of mango. The similar taxonomic categroy of man is
(a) Mammalia (b) Chordata
(c) Primata (d) Eutheria

64 The scientific name of wheat is
(a) *Mangifera indica* (b) *Triticum aestivum*
(c) *Triticum poales* (d) None of these

65 The housefly belongs to which family in taxonomical classification?
(a) Musca (b) Diptera
(c) Muscidae (d) Insecta

66 Which taxonomic category of mango and wheat is similar?
(a) Order and Family (b) Only Division
(c) Division and Class (d) Division, Class and Order

67 The odd taxonomic category among the given options is
(a) *Triticum* (b) *Homo*
(c) *Musca* (d) Poaceae

68 Why hierarchical taxonomic system is used?
(a) As each higher taxonomic category contains groups/categories below it
(b) It is helpful to establish classifications
(c) All taxonomic categories reflect common habitats
(d) Taxonomic groups show similar characters and have no evolutionary relationship

69 Which one of the following features is shared by all the living organisms at all the hierarchical levels?
(a) Mode of nutrition
(b) Cellular organisation
(c) Nature of protoplasmic composition
(d) Growth by cell division

70 Poales and Sapindales represent
(a) Genus (b) Class
(c) Order (d) Species

TOPIC 4~ *Taxonomic Aids*

71 What is the prime source of taxonomic studies?
(a) Collection of actual specimen of organism
(b) Identification of actual specimen of organism
(c) Both (a) and (b)
(d) None of the above

72 The taxonomical aids in which dried pressed plant specimens are preserved is
(a) botanical garden (b) herbarium
(c) sheets (d) specimen sheets

73 The label of a herbarium sheet does not carry information on ***NEET 2016***
(a) date of collection (b) name of collector
(c) local names (d) height of plant

74 Largest herbarium in India is
(a) Madras Herbarium, Coimbatore (Tamil Nadu)
(b) Central National Herbarium (Indian Botanical Garden) Shibpur, Kolkata (WB)
(c) Herbarium of National Botanical Research Institute, Lucknow (UP)
(d) Forest Research Institute, Dehradun (UK)

75 A taxonomical aid having collection of living plants for reference is
(a) herbarium (b) zoological park
(c) botanical garden (d) museum

76 In a botanical garden, labelling of plants indicates
(a) scientific name only
(b) scientific name and family
(c) common name, scientific name and order
(d) common name only

77 Which of the following is an advantage of establishing botanical gardens?
(a) These have collections of living plants for reference
(b) These are *ex situ* conservation strategy
(c) These contain labelled plants indicating its botanical/scientific name and family
(d) All of the above

78 The Indian Botanical Garden is located at
(a) Howrah (b) London (c) Lucknow (d) Kew

79 Largest botanical garden in the world is
(a) Conservatory and Botanical Garden, Geneva
(b) New York Botanical Garden
(c) Royal Botanical Garden, Kew (London)
(d) British Museum of Natural History

80 Museums have the collection of
(a) living plants
(b) living animals and plants
(c) dead plant and animal remains
(d) preserved plant and animal specimens

81 Insects are preserved in museums
(a) in preservative solutions
(b) as dry specimens
(c) by collecting, killing and pinning
(d) Both (b) and (c)

82 Zoological park is a place
(a) where wild animals are kept in protected environment under human care
(b) which enable us to learn about the food habits and behaviour of wild animals
(c) where conditions similar to natural habitat of wild animal is provided
(d) All of the above

83 The taxonomical aid used for identification of plants and animals by applying diagnostic features is
(a) herbarium
(b) key
(c) museum
(d) monograph

84 The contrasting characteristics generally in a pair used for identification of animals in a taxonomic key are referred to as ***NEET (Odisha) 2019***
(a) lead (b) couplet (c) doublet (d) alternate

85 Statement in the key is referred to as
(a) lead (b) clue
(c) proof (d) Both (a) and (b)

86 A book containing information about the habitat, climate, description and index of plants found in a specific area is
(a) flora (b) key
(c) manual (d) monograph

87 What is true about manual?
(a) It is a list that enumerates all species
(b) It is a book containing information for identification of names of species in a particular area
(c) It is based on similarities and dissimilarities
(d) Both (a) and (b)

88 Which taxonomical aid provides all information about a particular taxon like order or family? ***CBSE-AIPMT 2011***
(a) Herbarium (b) Catalogue
(c) Taxonomic key (d) Monograph

89 List containing names of all the species found in a particular area is referred to as
(a) monograph
(b) herbarium
(c) catalogue
(d) couple

NEET

SPECIAL TYPES QUESTIONS

I. Assertion and Reason

Direction (Q. No. 90-99) *In each of the following questions, a statement of Assertion (A) is given followed by corresponding statement of Reason (R).*
Of the statements, mark the correct answer as

(a) If both A and R are true and R is the correct explanation of A.
(b) If both A and R are true, but R is not the correct explanation of A.
(c) If A is true, but R is false.
(d) If A is false, but R is true.

90 **Assertion** (A) Death is considered as the regulatory process on earth.

Reason (R) It prevents an increase in population caused by continuous reproduction.

91 **Assertion** (A) Consciousness or response to stimuli is a defining property of living organism.

Reason (R) Human being is the only creature to possess self-consciousness.

92 **Assertion** (A) Metabolism is the sum total of anabolism and catabolism.

Reason (R) Diverse types of metabolic reactions occur simultaneously in a living organism.

93 **Assertion** (A) The living organisms are self-replicating, evolving and self-regulating interactive systems capable of responding to external stimuli.

Reason (R) Hierarchy of organisational complexity is shown at all levels.

94 **Assertion** (A) Alpha taxonomy and omega taxonomy are the modern approaches of taxonomy.

Reason (R) Alpha taxonomy is based on morphology and omega taxonomy is multidisciplinary.

95 **Assertion** (A) Linnaeus' binomial system of animal classification is essentially an artificial system, yet it has become a natural system.

Reason (R) Similarities forming the basis of Linnaeus system are indicative of genetic relationship.

96 **Assertion** (A) There are seven obligate categories in hierarchy of taxonomy.

Reason (R) Other categories of similar type can be called as intermediate categories.

97 **Assertion** (A) Hierarchical system of classification is useful to reduce volume's description in a catalogue of organisms.

Reason (R) Characters of a larger category (like division) are not repeated for smaller/ lower categories (family and order).

98 **Assertion** (A) Taxonomic studies require correct classification and identification of organisms.

Reason (R) Taxonomic studies are useful in knowing our bioresources and their diversity.

99 **Assertion** (A) Museums are places/institutions, where preserved plants and animals as well as artistic and educational materials are exhibited to the public.

Reason (R) Museums are of different kinds, like art, history, science and general museum, which exhibit their material for public awareness.

II. Statement Based Questions

100 Which of the following statements are correct regarding the response of living beings to any external stimuli?

I. All organisms from most simple to the most complex, sense and respond to the external stimuli.
II. The external stimuli can be physical, chemical or a biological entity.
III. Responding to an external stimulus is the characteristic feature of living beings.
IV. Living organisms are self-replicating, evolving and self-regulating interactive systems capable of responding to external stimuli.

(a) Only I (b) Only II
(c) I and II (d) I, II, III and IV

101 Consider the following statements.

I. Along with conciousness, growth and reproduction are the defining characteristics of living organisms.
II. Reproduction is an all inclusive characteristics of living organisms.

Select the correct option.

(a) I is true, II is false
(b) Both I and II are false
(c) I is false, II is true
(d) Both I and II are true

102 Select the correct statement from the following.

I. Increase in mass and increase in number of individuals are twin characteristics of growth.

II. Metabolic reactions can also be demonstrated outside the body in isolated cell-free systems.

III. 'Response to stimuli' is a defining property of living organisms.

(a) I and II (b) II and III
(c) I and III (d) I, II and III

103 Identify the correct statement given below.

(a) Cellular organisation of the body is the defining feature of non-living forms
(b) Consciousness is the property shared by non-living organisms
(c) A patient with dead brain has no self-consciousness yet it is alive
(d) Human beings are the only organisms, who is aware of himself, i.e. self-conscious

104 Select the correct statement from the following.

(a) Mules can reproduce
(b) Worker bee undergoes reproduction to generate new progeny
(c) Mule and worker bees are both sterile
(d) None of the above

105 Consider the following statements.

I. In binomial nomenclature, the name of an organism consists of two components.

II. The first name of organism represents the specific name and the second name is generic name.

Choose the correct option.

(a) I is true, but II is false
(b) Both I and II are false
(c) I is false, but II is true
(d) Both I and II are true

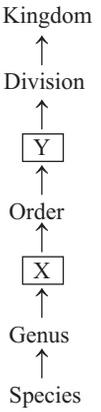
106 The scientific name of mango is written as *Mangifera indica L*. Which of the following statements is correct regarding this ?

(a) Letter L signifies Latin language
(b) The name should be written reverse with *Indica* preceding *Mangifera*
(c) Letter L signifies the author Linnaeus
(d) *Indica* is the generic name

107 Which one of the following statement has organism scientifically correctly named, correctly printed according to the International Rules of Nomenclature and correctly described?

(a) *Musca domestica*, the common lizard is a reptile
(b) *Plasmodium falciparum* is a protozoan pathogen causing the most serious type of malaria
(c) *tigris* is the Indian tiger, well-protected in Gir forests
(d) *E. coli*, full name *Entamoeba coli*, is a commonly occurring bacterium in human intestine

108 Observe the gradation of taxonomic categories and identify the missing categories according to the statement given below.



I. X is a group of related species.
II. Y is a group of related divisions.
III. X is a group of related genera.
IV. Y is a group of related kingdoms.
V. Y is a group of related orders.

The correct options are

(a) II and IV
(b) I and II
(c) I, II, IV and V
(d) III and V

109 Two different genera are classified in the same taxonomic category, family. Which of the following statement is correct about their classification?

(a) The same class but different species
(b) A different class and different order
(c) The same phylum but different class
(d) A different kingdom and different phylum

110 Which one of the following is not a correct statement? ***NEET 2013***

(a) Herbarium houses dried, pressed and preserved plant specimens
(b) Botanical gardens have collection of living plants for reference
(c) A museum has collection of photographs of plants and animals
(d) Key is a taxonomic aid for identification of specimens

111 Read the following statements about various taxonomic aids.

I. Herbaria serve as quick referral system in taxonomical studies.

II. In museums, large animal like birds and mammals are usually stuffed and preserved.

III. Museums have dry specimens of plants and animals as well as some specimens are preserved in solutions in jars or containers.

IV. Herbarium sheets are arranged according to universally accepted system of classification and these serve as a repository for future use.

Choose the correct statements.

(a) I and II (b) III and IV
(c) II and IV (d) I, II, III and IV

112 Consider the following statements.

I. Couplet in a key represents a pair of similar characters among organisms.

II. Keys are generally analytical in nature.

Select the correct option.

(a) I is true, but II is false (b) Both I and II are false
(c) I is false, but II is true (d) Both I and II are true

113 Select true statements from the following and choose the right answer from the options given below.

I. Human's scientific name is *Homo sapiens*.
II. *Genera Plantarum* is written by John Ray.
III. Highest taxonomic category is division.
IV. Taxonomic group of any rank is taxon.
V. A group of closely related species of an organism represents genus.
VI. The term 'Systematics' was coined by de Candolle.

(a) II, III, IV and VI (b) I, III, V and VI
(c) I, IV and V (d) II, III and VI

114 Select true and false statements and choose the correct answer from the options given below.

I. Taxon is a group of related organisms.
II. Royal Botanical Garden is located in Bristol (England).
III. Dudhwa National Park is located at Lakhimpur in UP.
IV. There are about 89 Wildlife Sanctuaries and 492 National Parks in India.
V. When specific name is identical to generic name, it is an example of tautonym.

(a) True–I, II, IV False–III, V
(b) True–I, II False–III, IV, V
(c) True–III, V False–I, II, IV
(d) True–III, VI, V False–I, II

III. Matching Type Questions

115 Match the following columns.

	Column I		Column II
A.	*Ex situ* conservation	1.	Central National Herbarium
B.	Quick referral system	2.	Flora
C.	Actual account of habitat and distribution of plants of a given area	3.	Royal Botanical Garden

Codes

	A	B	C
(a)	1	2	3
(b)	3	1	2
(c)	2	3	1
(d)	3	2	1

116 Match the following columns.

	Column I		Column II
A.	Introduced binomial nomenclature	1.	Ernst Mayr
B.	The Darwin of the 20th century	2.	Carolus Linnaeus
C.	Gave the concept of new systematics	3.	John Ray
D.	First described species as a unit of classification	4.	Julian Huxley

Codes

	A	B	C	D		A	B	C	D
(a)	1	2	3	4	(b)	2	1	4	3
(c)	4	3	2	1	(d)	3	4	1	2

117 Match the following columns. ***NEET 2016***

	Column I (Taxonomic hierarchy)		Column II (Examples)
A.	Family	1.	Diptera
B.	Order	2.	Arthropoda
C.	Class	3.	Muscidae
D.	Phylum	4.	Insecta

Codes

	A	B	C	D		A	B	C	D
(a)	3	1	4	2	(b)	3	2	4	1
(c)	4	3	2	1	(d)	4	2	1	3

118 Match the following columns.

	Column I (Designation)		Column II (Scientists)
A.	Father of Taxonomy	1.	Hippocrates
B.	Father of Zoology	2.	Theophrastus
C.	Father of Botany	3.	Aristotle
D.	Father of Medicine	4.	Carolus Linnaeus

Codes

	A	B	C	D		A	B	C	D
(a)	1	2	3	4	(b)	4	3	2	1
(c)	3	4	1	2	(d)	3	1	2	4

119 Match the following columns.

	Column I (Taxonomical aids)		Column II (Features)
A.	Monograph	1.	Information for identification of name of species found in an area.
B.	Botanical garden	2.	Living wild animals in their natural habitat.
C.	Zoological park	3.	Information on any one taxon.
D.	Manual	4.	Place having diversity of living plants.

Codes

	A	B	C	D		A	B	C	D
(a)	3	4	2	1	(b)	1	4	2	3
(c)	4	3	1	2	(d)	4	1	2	3

120 Match the items given in Column I with those in Column II and select the correct option given below.

	Column I (Taxonomical aids)		Column II (Features)
A.	Herbarium	1.	It is a place having a collection of preserved plants and animals.
B.	Key	2.	A list that enumerates methodically all the species found in an area with brief description aiding identification.
C.	Museum	3.	It is a place where dried and pressed plant specimens mounted on sheets are kept.
D.	Catalogue	4.	A booklet containing a list of characters and their alternates which are helpful in identification of various taxa.

NEET 2018

Codes

	A	B	C	D		A	B	C	D
(a)	2	4	3	1	(b)	3	2	1	4
(c)	1	4	3	2	(d)	3	4	1	2

121 Match the following columns.

	Column I (Botanical gardens/Institutes)		**Column II** (Places)
A.	Royal Botanical Garden, Kew	1.	Darjeeling
B.	National Botanical Research Institute	2.	Kolkata
C.	Indian Botanical Garden	3.	Lucknow
D.	Forest Research Institute	4.	Dehradun
E.	Lloyd's Botanical Garden	5.	England

Codes

	A	B	C	D	E
(a)	5	3	2	4	1
(b)	1	3	2	4	5
(c)	2	5	3	4	1
(d)	4	1	3	2	5

122 Match the following columns.

	Column I (A group of specimens)		**Column II** (Description)
A.	Holotype	1.	A specimen cited with original description other than the holotype or isotype
B.	Isotype	2.	A duplicate of the holotype
C.	Paratype	3.	A specimen designated in the original description
D.	Lectotype	4.	A specimen selected from original material to serve as nomenclature type when the holotype was not designated

Codes

	A	B	C	D
(a)	3	2	1	4
(b)	3	1	2	4
(c)	3	2	4	1
(d)	3	4	1	2

NCERT & NCERT Exemplar

MULTIPLE CHOICE QUESTIONS

NCERT

123 Given below is the scientific name of mango, identify the correctly written name.
(a) *Mangifera Indica* (b) *Mangifera indica*
(c) *mangifera Indica* (d) *mangifera indica*

124 Can you identify the correct sequence of taxonomical categories?
(a) Species → Order → Phylum → Kingdom
(b) Genus → Species → Order → Kingdom
(c) Species → Genus → Order → Phylum
(d) Genus → Order → Family → Kingdom

NCERT Exemplar

125 Which of the following is a defining characteristic of living organisms?
(a) Growth
(b) Ability to make sound
(c) Reproduction
(d) Response to external stimuli

126 All living organisms are linked to one another because
(a) they have common genetic material of the same type
(b) they share common genetic material, but to varying degrees
(c) All have common cellular organisation
(d) All of the above

127 As we go from species to kingdom in a taxonomic hierarchy, the number of common characteristics
(a) will decrease
(b) will increase
(c) remain same
(d) may increase or decrease

128 The term 'Systematics' refers to
(a) identification and study of organ systems
(b) identification and preservation of plants and animals
(c) diversity of kinds of organisms and their relationship
(d) study of habitats of organisms and their classification

129 Genus represents
(a) an individual plant or animal
(b) a collection of plants or animals
(c) group of closely related species of plants or animals
(d) None of the above

130 Which of the following 'suffixes' used for units of classification in plants indicates a taxonomic category of 'family'?
(a) – ales (b) – onae
(c) – aceae (d) – ae

131 The taxonomic unit 'Phylum' in the classification of animals is equivalent to which hierarchical level in classification of plants?
(a) Class (b) Order
(c) Division (d) Family

132 Botanical gardens and Zoological parks have
(a) collection of endemic living species only
(b) collection of exotic living species only
(c) collection of endemic and exotic living species
(d) collection of only local plants and animals

133 Taxonomic key is one of the taxonomic tools in the identification and classification of plants and animals. It is used in the preparation of
(a) monograph
(b) flora
(c) Both (a) and (b)
(d) None of the above

134 Match the following columns.

	Column I		Column II
A.	Family	1.	*tuberosum*
B.	Kingdom	2.	Polymoniales
C.	Order	3.	*Solanum*
D.	Species	4.	Plantae
E.	Genus	5.	Solanaceae

Codes

	A	B	C	D	E
(a)	5	4	2	1	3
(b)	5	4	1	3	2
(c)	1	2	3	5	4
(d)	2	1	3	4	5

Answers

> Mastering NCERT with MCQs

1 (c)	2 (c)	3 (d)	4 (a)	5 (a)	6 (a)	7 (b)	8 (b)	9 (a)	10 (b)
11 (b)	12 (c)	13 (d)	14 (d)	15 (b)	16 (b)	17 (a)	18 (a)	19 (c)	20 (b)
21 (b)	22 (a)	23 (d)	24 (c)	25 (b)	26 (a)	27 (b)	28 (d)	29 (d)	30 (c)
31 (a)	32 (b)	33 (b)	34 (d)	35 (a)	36 (c)	37 (d)	38 (b)	39 (d)	40 (d)
41 (c)	42 (c)	43 (b)	44 (b)	45 (c)	46 (d)	47 (b)	48 (d)	49 (a)	50 (d)
51 (a)	52 (c)	53 (c)	54 (c)	55 (c)	56 (a)	57 (a)	58 (b)	59 (a)	60 (d)
61 (d)	62 (a)	63 (c)	64 (b)	65 (c)	66 (b)	67 (d)	68 (a)	69 (c)	70 (c)
71 (a)	72 (b)	73 (d)	74 (b)	75 (c)	76 (b)	77 (d)	78 (a)	79 (c)	80 (d)
81 (d)	82 (d)	83 (b)	84 (b)	85 (a)	86 (a)	87 (b)	88 (d)	89 (c)	

> NEET Special Types Questions

90 (a)	91 (b)	92 (b)	93 (b)	94 (b)	95 (c)	96 (b)	97 (a)	98 (b)	99 (a)
100 (d)	101 (b)	102 (d)	103 (d)	104 (c)	105 (a)	106 (c)	107 (b)	108 (d)	109 (a)
110 (c)	111 (d)	112 (c)	113 (c)	114 (c)	115 (b)	116 (b)	117 (a)	118 (b)	119 (a)
120 (d)	121 (a)	122 (a)							

> NCERT & NCERT Exemplar Questions

123 (b)	124 (c)	125 (d)	126 (b)	127 (a)	128 (c)	129 (c)	130 (c)	131 (c)	132 (c)
133 (c)	134 (a)								

Answers & Explanations

3 (*d*) Growth occurs in unicellular organisms by cell division. It can be observed in *in vitro* culture by counting the number of cells under microscope.

4 (*a*) In majority of the higher organisms (plants and animals), reproduction and growth are mutually exclusive events as increase in the body size of living beings do not alter the rate of reproduction or *vice-versa*.

5 (*a*) Increase in the body mass is a common feature of non-living and living objects to represent growth.

6 (*a*) Non-living objects like mountains, boulders and sand mounds grow by accumulation of material on their surface. However, in living organisms, growth is from inside (i.e. cell division in the body).

7 (*b*) *Planaria* shows true regeneration in which *Planaria* regenerates the lost part of its body and becomes, a new organism.

8 (*b*) Reproduction by fragmentation can be best observed in protonema of mosses, filamentous algae and in fungi.

9 (*a*) In unicellular organisms like bacteria, algae (unicellular) and *Amoeba*, reproduction involves increase in number of cells and thus, it is synonymous with growth.

10 (*b*) Reproduction cannot be considered as an inclusive defining characteristic of life as many living organisms are sterile, i.e. they do not reproduce, e.g. mules, worker bee, etc.

11 (*b*) Both growth and reproduction are not the defining characteristics of living organisms. Growth is exhibited by non-living matter in terms of increase in mass due to the accumulation of material. Similarly, reproduction is not exhibited by all living organisms and is not essential for the survival of an individual.

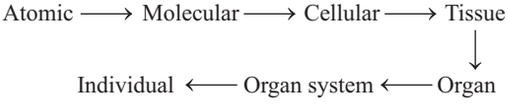
12 (*c*) Metabolism is the sum total of all the metabolic activities (chemical reactions) occurring in the body, i.e. anabolism and catabolism. Anabolism is a constructive process, while catabolism is a destructive process.

13 (*d*) Metabolic reactions occur in living organisms and can also be performed outside the body in a cell free system, e.g. isolated metabolic reactions can be carried out in *in vitro* conditions also.

14 (*d*) Consciousness is the defining property of living organisms because all living organisms show response to external or internal stimuli. For example, photoperiod affects breeding in plants and animals. Plants respond to external factors like light, water, temperature, pollutants, etc. Human being is aware of himself, i.e. show self-consciousness.

15 (*b*) A higher level of organisation emerges due to the interactions among various organelles and their constituents. A molecular constituent, a tissue or an organelle itself does not play a significant role in hierarchical organisation unless there is no interaction among them.

16 (*b*) Organisational levels starts from submicroscopic level and leads to population level. Hence, the correct, biological organisation in living organism can be represented as



19 (*c*) Nomenclature is the process of standardising the name of living organisms such that a particular organism is known by same name all over the world.

20 (*b*) In taxonomy, nomenclature of organisms is possible only when their correct place and correct names are known, i.e. when organism is described correctly. This is known as identification. Thus, identificaiton of an organism is the first step in taxonomy.

29 (*d*) Binomial nomenclature consists of two words, i.e. a generic name and a specific name. The first word denoting the genus starts with capital letter, while specific epithets start with small letter. In the scientific name *Columba LIVIA*, *Columba* is written correctly, while *LIVIA* is incorrect because species names are written in small letters. Thus, the correct form would *Columba livia*.

30 (*c*) According to binomial nomenclature, name of the author appears after the specific epithet (species name), i.e. at the end of the biological name and is written in an abbreviated form.

31 (*a*) The correct form of writing the scientific name of mango as described by Carolus Linnaeus is *Mangifera indica* Linn.

32 (*b*) Classification is the process by which anything is grouped into convenient categories based on some easily observable characters. It is important for establishing relationships amongst organisms.

34 (*d*) External and internal structure of an organism along with the structure of its cells, developmental process and ecological information of an organism form the basis of modern taxonomic studies.

35 (*a*) Earliest classifications were based on 'uses' or basic amenities of organisms. This is because earlier animals and plants were superficially classified due to lack of advanced technologies.

37 (*d*) Systematics is the branch of biology that deals with the kind of diversity of organisms and existing relationship among them.

Systematics is derived from Latin word *Systema* which means systematic arrangement.

38 (*b*) Carolus Linnaeus used the term systematics for the first time in his book *Systema Naturae,* which was published in 1758.

40 (*d*) Taxon is used to represent any rank in taxonomic hierarchy, i.e. any level of grouping of organisms based on observable features.

42 (*c*) Species is the smallest taxon of taxonomy/classification. According to Ernst Mayr, species is group of interbreeding natural populations. It contains organisms which resemble each other in morphological, physiological and biochemical behavioural characteristics.

45 (*c*) *Panthera leo* is the scientific name of lion. In which *Panthera* is the genus name and *leo* is the specific epithet or species name.

Cannis is a genus of cat. *Pisum* is the generic name of sweet pea, while Carnivora is order containing cat, dog, lion, etc.

46 (*d*) In a scientific name, first name indicates the generic name of an organism, while the second name represents the specific epithet or species name.

47 (*b*) *Solanum* and *Panthera* are genera (genus name) of family–Solanaceae and Felidae, respectively.

48 (*d*) Potato, tomato and brinjal belong to the genus *Solanum.* Bottle gourd belongs to the genus–*Lagenaria.*

49 (*a*) A family is a group of related genera with less number of similarities as compared to genus and species.

51 (*a*) Asteraceae/Fabaceae are not taxonomic categories as these are the names of plant families.

Species, phylum and class are all taxonomic categories.

55 (*c*) Mammalia is a class which comprises of orders like Primata, Carnivora, etc.

56 (*a*) Class is the highest taxonomic category among the given options as it includes order, family and genus.

58 (*b*) Out of the four options, Division occupies the highest or top most position in taxonomic hierarchy. It can be represented by the following sequence

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

59 (*a*) In classification of plants, classes with a few similar characters are assigned to a higher category called division, e.g. angiospermae. In animals, phylum is used in place of division.

60 (*d*) In taxonomical hierarchy, similarity increases from highest/largest category to lowest category. Therefore, among the given options, division comprises organisms with least similar features, as it is the highest taxonomic category.

61 (*d*) Option (d) is incorrect and can be corrected as Division is a group of related classes (not phyla).

62 (*a*) The taxonomic categories in ascending order of similar characteristics are seen as follows

Class < Family < Genus < Species

63 (*c*) The order of mango is Sapindales, similarly the order of man is Primata.

66 (*b*) Both mango and wheat belong to the division-Angiospermae. Other taxonomic categories of mango and wheat are as follows

Category	Mango	Wheat
Class	Dicotyledonae	Monocotyledonae
Order	Sapindales	Poales
Family	Anacardiaceae	Poaceae

67 (*d*) Among the given options, Poaceae is the odd term as it represents a family of angiosperms. *Triticum*, *Homo* and *Musca* are the genus of wheat, human and housefly, respectively.

68 (*a*) Hierarchical taxonomic system is used in classification by majority of biologist because each higher taxonomic category contains lower groups below it. Thus, it reduces the volume of description in a catalogue of animals and plants.

69 (*c*) Nature of protoplasmic composition is shared by all living organisms in all taxonomic categories.

Mode of nutrition and cellular organisation are the peculiar features of the five kingdom system of classification.

70 (*c*) Poales and Sapindales represent the order of dicot and monocot classes, respectively. Both these classes belong to the the division–Angiospermae.

71 (*a*) The prime source of taxonomic studies is the collection of actual specimens of plant and animal species.

72 (*b*) Herbarium is the storehouse of collected plant specimens that are dried, pressed and preserved on sheets. These specimens along with their description on herbarium sheets become a storehouse or repository for future use.

73 (*d*) The label of a herbarium sheet provide information about date and place of collection, English, local and botanical names, family, collector's name, etc. It does not provide information about the height of a plant.

75 (*c*) Botanical gardens are specialised gardens having collections of living plants for reference. Plant species in these gardens are grown for identification purposes.

76 (*b*) In botanical garden, each plant is labelled indicating its botanical/scientific name and its family.

79 (*c*) The largest botanical garden in the world is the herbarium of Royal Botanical Garden, Kew (London), which contains more than 6,000,000 plant specimens.

86 (*a*) Flora is the book containing information about the habitat, climate, description and index of plants. It helps in correct identification of plants, founds in a specific area.

89 (*c*) Catalogue is the list that enumerates methodically all the species found in an area with brief description aiding identification.

90 (*a*) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.

Death is considered as the regulatory process on earth. It occurs when there is an increase in entropy and degeneration of body parts of an organism. Reproduction is an important characteristic of living organism in order to continue living on earth. But reproduction can cause overcrowding. Thus, to balance reproduction, death checks the population size.

91 (*b*) Both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.

All living organisms have the ability to sense their surroundings or environment and respond to these environmental stimuli which could be physical, chemical or biological. All organisms, therefore are aware of their surroundings. Human beings also show self-consciousness. Consciousness therefore becomes the defining property of living organisms.

92 (*b*) Both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.

All living organisms are made up of chemicals. These chemicals, small and big belonging to various classes, sizes, functions, etc., are constantly being created (i.e. anabolism) or either broken down into other/smaller biomolecules (i.e. catabolism). These reactions are collectively called as metabolic reactions or metabolism.

93 (*b*) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

Living organisms are self-replicating, evolving and self-regulating interactive systems capable of responding to external stimuli. Properties of tissues are not present in the constituent cells but arise as a result of interactions among the constituent cells.

Similarly properties of cellular organelles are not present in the molecular constituents of the organelle but arise as a result of interactions among the molecular components comprising the organelle.

These interactions result in emergent properties at higher levels of organisation. This phenomenon is true in the hierarchy of organisational complexity at all levels.

94 (*b*) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

Alpha (α) taxonomy involves the collection and identification of organisms on the basis of gross morphology, compilcation of flora and monographs. It is classical taxonomy, whereas omega (ω) taxonomy is modern biosystematics or new systematics which brings out taxonomic affinities on the basis of evolutionary and genetic traits.

95 (*c*) Assertion is true, but Reason is false and can be corrected as

The binomial system of animal classification given by Linnaeus is an artificial system, as it is based on locomotion type and the absence of chlorophyll. Linnaeus system does not show genetic relationship or phylogeny.

96 (*b*) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

The obligate categories used in the classification are species, genus, family, order, class, division/phylum, kingdom. Inspite of these seven major categories, sometimes subcategories like, subspecies or varieties are added for clear distinction. These are called intermediate categories. Generally, intermediate categories are added in classification of plants.

97 (*a*) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

Hierarchical system of classification helps to reduce description of volume in catalogue of plants and animals. This is because characters for higher categories are not repeated for lower categories. It can be illustrated by an example like *Cannis familiaris* is common dog, belong to family–Canidae.
Genus–*Cannis* are applied to wolf, jackal of same family.

98 (*b*) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

Taxonomic studies of various species of plants, animals and other organisms are useful in various industries like agricultural and forest industry and in general in knowing our bioresources and their diversity. These studies would require correct classification and identification of organisms.

These are fundamental and essential for training in systematics. The information gathered is stored along with the specimens for future studies.

99 (*a*) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

Museums are a source of ancient and present information of plants, animals, art, history, science, etc. These are helpful in keeping preserved plants and animals as well as artistic and educational materials so as to be displaced for creating public awareness.

101 (*b*) Both statements I and II are false. These can be corrected as

- Reproduction and growth are not the defining characteristics of living organisms because non-living organisms also grow due to the accumulation of material and many living organisms are unable to reproduce.
- Reproduction is not an all inclusive characteristics of living organisms because many living organisms cannot reproduce.

103 (*d*) The statement in option (d) is correct. Rest statements are incorrect and can be corrected as

- Cellular organisation of the body is the defining feature of living forms.
- All living organisms have the ability to sense their surroundings and respond to various stimuli and are thus aware of their surroundings, i.e. show consciousness.
- A patient with dead brain has no consciousness (as brain is the main controlling organ of the body) and hence is considered to be dead.

104 (*c*) The statement in option (c) is correct. Rest statements are incorrect and can be corrected as

- Mule is a result of outbreeding interspecific hybridisation.
- Worker bees lack primary sex organs. So, they are unable to perform reproduction.

105 (*a*) Statement I is true, but II is false and can be corrected as

In binomial nomenclature, the first name represents the generic name and the second name represents the species name or the specific epithet of that organism.

106 (*c*) The statement in option (c) is correct. Rest statements are incorrect and can be corrected as

Mangifera indica L is the scientific name of mango with 'L' as the name of the author Linnaeus. *Mangifera* represents the genus and *indica* represents the species name.

107 (*b*) The statement in option (b) is correct.

Rest statements are incorrect and can be corrected as

- *Panthera tigris* is the Indian tiger, well-protected in the Bandhavgarh National Park.
- *Musca domestica*, the housefly, belongs to the class–Insecta (Phylum–Arthropoda).
- *E. coli*, full name *Escherichia coli*, is a commonly occurring bacterium in the human intestine.

108 (*d*) Statements III and V are correct as X represents family (group of related genera) and Y represents class group of related orders.

109 (*a*) The statement in option (a) is correct.

In taxonomic categories, family occupies the position between class and species (lowest). It means two different families can have same class. But a family can accommodate different genera which in turn possess different species. Different species like dog, wolf, jackal belong to same genera *Cannis* and class–Carnivora. Thus, two different genera classified into the same family belong to the same class, but contain different species.

110 (*c*) The statement in option (c) is incorrect and can be corrected as

Museums have collection of preserved plant and animals specimens which are kept in jars containing preservative solutions.

Rest statements are correct.

112 (*c*) Statement I is false, but statement II is true. Statement I can be corrected as

In a taxonomic key, couplet represents the pair of contrasting characters. While identifying an organism, one character is selected and the other is discarded.

113 (*c*) Statements I, IV and V are correct. Statements II, III and VI are incorrect and can be corrected as

- *Genera Plantarum* was written by Bentham and Hooker.
- The highest taxonomic category is kingdom.
- The term 'Systematics' was first coined by Linnaeus.

114 (*c*) Statements III and V are true. Statements I, II and IV are false and can be corrected as

- Taxon is used to represent any rank in taxonomic hierarchy.
- Royal Botanical Garden is located at Kew (London).
- There are about 492 (approximately 504) Wildlife Sanctuaries and 89 National Parks in India.

125 (*d*) Consciousness or response to external stimuli is the defining property of living organisms. All organisms from the prokaryotes to the most complex eukaryotes can sense and respond to various environmental cues.

126 (*b*) All living organisms share common genetic material, i.e. DNA and RNA but to varying degrees. Due to this, living organisms are linked to one another.

127 (*a*) Common characteristics among organisms decreases as we move towards higher taxonomic hierarchy. Thus, on moving from species to kingdom in a taxonomic hierarchy, the number of common characteristics will decrease.

130 (*c*) The name of a family in plants always ends with the suffix –aceae, e.g. Solanaceae, Cannaceae and Poaceae. The suffix–ales is used for taxon 'order' while suffix–ae is used for taxon 'class' and suffix–onae is not used in any of the taxon.

131 (*c*) In case of plants, the taxonomic category 'Division' includes classes of plants with members having a few similar characters.

It is equivalent to the category 'Phylum' which is used in case of animals.

132 (*c*) Botanical garden and zoological parks are specialised places where plants and animals, respectively are grown bred and kept for analytical purposes. Both endemic (local) as well as exotic (foreign) species are kept in these places.

133 (*c*) Taxonomic keys help in the identification of organisms on the basis of paired contrasting characters called couplets. These keys are used to prepare both monograph and flora.