Chapter 3

The Living World

Solutions

SECTION - A

Objective Type Questions

(What is Living?, Diversity in the Living World)

1. Select correct statement for growth as one of the characteristic of living organisms.
   (1) Growth by increase in mass is a defining property of prokaryotic organisms only
   (2) Non-living objects do not show growth by increase in mass of body
   (3) Intrinsic growth is a characteristic of all living organisms
   (4) Growth can be extrinsic or intrinsic for multicellular organisms

Sol. Answer (3)

Intrinsic growth is a characteristic of all living organisms while in non-living thing extrinsic growth is possible/ occurred.

2. Reproduction is synonymous with growth in
   (1) Most of the fungi and *Planaria*
   (2) Desmids, diatoms and protozoans
   (3) Cyanobacteria, fungi and mosses
   (4) Mosses, algae and hydra

Sol. Answer (2)

Reproduction is synonymous with growth in unicellular organisms like- desmids, diatoms and protozoans.

3. Carolus Linnaeus is the father of taxonomy because of one of his contributions
   (1) *Genera Plantarum*
   (2) Binomial nomenclature
   (3) Described nearly ten thousand plants and animal species
   (4) Die Naturlichen Pflanzen Familien

Sol. Answer (2)

Carolus Linnaeus's contribution in taxonomy is – Binomial nomenclature

4. Binomial epithet has
   (1) Two Latin names only
   (2) Two Italics names written in Latin
   (3) Two Latin names and author's name in Italics
   (4) Two Latin names followed by author's name in Roman

Sol. Answer (4)

Binomial epithet has – two Latin names followed by author's name in Roman.

5. Systematics is the study of
   (1) Diversity amongst groups of organisms
   (2) Grouping of organisms
   (3) Identification and grouping of organisms
   (4) Identification, classification and taxonomy

Sol. Answer (1)

Systematics, study of diversity amongst groups of organisms.

6. Which one of the following criteria is/are essential and form the basis of modern taxonomic studies?
   (1) Ecological information of organisms
   (2) Development process
   (3) External and internal structure
   (4) All of these

Sol. Answer (4)

Modern taxonomic studies are

- Ecological information of organisms
- Development process
- External and internal structure

7. Which one of the following is the first publication of Carolus Linnaeus?
   (1) Systema Naturae (2) Classes Plantarum (3) Hortus Cliffortianus (4) Hortus Upplandicus

Sol. Answer (4)

Publications of Carolus Linnaeus

- Hortus Upplandicus (First)
- Philosphica Botanica
- Species Plantrum
- Systema Nature

8. Scientific name *Rattus rattus* is an example of
   (1) Binomial nomenclature (2) Tautonyms
   (3) Synonyms (4) Both (1) & (2)

Sol. Answer (4)

Rattus rattus

- Binomial nomenclature
- Tautonyms

(Taxonomic Categories)

9. Given organisms belongs to how many genera?

Wheat, Brinjal, Potato, Lion, Dog, Tiger

(1) Three (2) Two (3) Four (4) Five

Sol. Answer (3)

Animal		**Genera**	
Wheat	–	*Triticum*	
Brinjal & Potato	–	*Solanum*	⇒ Four genera
Lion & Tiger	–	*Panthera*	
Dog	–	*Canis*	

10. Organisms which can freely interbreed and produce fertile offspring and have similar coded information or blue print for making these organisms are called

(1) Species (2) Tribe (3) Genus (4) Sub-genus

Sol. Answer (1)

Species – Freely interbreed
– Fertile offspring

11. The correct sequence of taxonomic categories is

(1) Division—class—family—tribe—order—genus —species
(2) Division—class—order—family—tribe—genus —species
(3) Phylum—order—class—tribe—family—genus—species
(4) Class—phylum—tribe—order—family—genus—species

Sol. Answer (2)

Hierarchy of taxonomic categories

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

12. Two species can be said to be reproductively isolated if they are

(1) Interfertile (2) Not interfertile
(3) Do not grow together in a common habitat (4) Growing together in a common habitat

Sol. Answer (2)

Reproductively isolated two species – Not interfertile

13. A genus having many species is known as

(1) Polytypic (2) Monotypic (3) Polygamic (4) Both (1) & (3)

Sol. Answer (1)

Polytypic genus – A genus having many species

14. In taxonomic hierarchy, which of the following group of taxa will have more number of similarities as compared to other?

(1) Anacardiaceae, Convolvulaceae and Poaceae (2) Polymoniales, Poales and Sapindales
(3) *Solanum*, *Petunia* and *Atropa* (4) Leopard, tiger and lion

Sol. Answer (4)

Orders have less similarities than family, genus and species.

15. In which of the following pair of category, greater is the difficulty of determining the relationship to other taxa at the same level, thus, the problem of classification becomes more complex?
    (1) Genus and species
    (2) Variety and genus
    (3) Division and phylum
    (4) Species and family

Sol. Answer (3)

Higher the categories in hierarchy will be lesser similarities and will show difficulty of determining the relationship to other.

16. Rice, cereals, monocots and plants represent
    (1) Different taxa at different level
    (2) Same taxa of different category
    (3) Different category of same taxa
    (4) Same category for different taxa

Sol. Answer (1)

Rice, Cereals, Monocots, Plants
↓ ↓ ↓ ↓
Species Family Class Kingdom

17. The equivalent rank of Carnivora in taxonomic categories of man and housefly is respectively
    (1) *Homo* and *Musca*
    (2) Hominidae and Muscidae
    (3) Mammalia and Insecta
    (4) Primata and Diptera

Sol. Answer (4)

Animal		**Order**
Lion	–	Carnivora
Man	–	Primata
Housefly	–	Diptera

18. All given are suffixes used for category class, except
    (1) -phyta (2) -opsida (3) -phyceae (4) -ae

Sol. Answer (1)

– phyta – Division
– opsida – Class
– phyceae – Class
– ae – Class

19. Biological concept of species was given by _____ and it is based on _____
    (1) Lamarck; physiological isolation
    (2) Linnaeus; morphological isolation
    (3) Ernst Mayr; mechanical isolation
    (4) Ernst Mayr; reproductive isolation

Sol. Answer (4)

Biological concept of species
- Ernst Mayr
- Reproductive isolation

20. Which category comes after phylum in descending order in taxonomic hierarchy?

(1) Genus (2) Family (3) Class (4) Species

Sol. Answer (3)

Phylum $\rightarrow$ Class

21. Order primata and carnivora are placed in the same class, *i.e.*

(1) Hominidae (2) Mammalia (3) Insecta (4) Chordata

Sol. Answer (2)

Order $\longrightarrow$ Class

Primata, Carnivora $\}$ Mammalia

22. Fishes, amphibians, reptiles and birds are kept in the same

(1) Order (2) Class (3) Genus (4) Phylum

Sol. Answer (4)

Animals	Class	Phylum
Fishes	Pisces	Chordata
Amphibians	Amphibians	Chordata
Reptiles	Reptilia	Chordata
Birds	Aves	Chordata

23. Choose odd one out w.r.t. *Panthera leo*

(1) Common name of tiger

(2) *Panthera* represents generic name

(3) *leo* represents specific epithet

(4) *Panthera* represents higher level of taxon than *leo*

Sol. Answer (1)

Panthera leo is common name of lion.

24. Potato and brinjal belong to the genus *Solanum*, which reflects that

(1) They belong to single species

(2) They are a group of related species

(3) They both are morphologically and structurally similar to each other in all respects

(4) They can always produce fertile hybrid

Sol. Answer (2)

Potato and Brinjal are a group of related species.

25. Class mammalia consists of

(1) Order carnivora only (2) Families like felidae and canidae only

(3) Related orders like carnivora, primata, etc. (4) All animals belonging to various phyla

Sol. Answer (3)

Order	Class
Carnivora	Mammalia
Primata	

26. Dicots like mango, brinjal and monocot like wheat are placed under a common taxonomic category known as

(1) Phylum – Arthropoda (2) Phylum – Angiospermae

(3) Division – Angiospermae (4) Class – Angiospermae

Sol. Answer (3)

Class	**Division**
Dicot	Angiospermae
Monocot	Angiospermae

27. Rice and brinjal belong to the category ending with suffix

(1) "aceae" (2) "ales" (3) "phyta" (4) "ae"

Sol. Answer (3)

Species	**Family**	**Class**	**Division**
Rice	Poaceae	Monocot	Angiosperm
Brinjal	Solanaceae	Dicot	Angiosperm

28. Various taxonomic categories are

(1) Mere morphological aggregates

(2) Distinct biological entities

(3) International codes used for nomenclature

(4) Collection of organisms on structural similarities only

Sol. Answer (2)

Various taxonomic categories are distinct biological entities

29. Plants belonging to different classes, with a few similar characters are assigned to a category called

(1) Phylum (2) Order (3) Division (4) Genus

Sol. Answer (3)

Class $\rightarrow$ Division $\rightarrow$ Kingdom

(Taxonomical Aids)

30. Amongst the given taxonomic aids, how many are associated with preservation of specimens?

Monograph, Flora, Key, Museums, Botanical gardens, Catalogoue, Herbarium, Manual

(1) One (2) Three (3) Two (4) Four

Sol. Answer (3)

Preservation of specimens is done in taxonomic aids

- Museum
- Herbarium

31. Which of the following chemicals is used for poisoning the specimens in herbarium technique?

(1) Hg_2Cl_2 (2) $AgNO_3$ (3) HCl (4) $HgCl_2$

Sol. Answer (4)

Poisoning chemical for the specimens – $HgCl_2$

32. The international size of herbarium sheet is

(1) 41 × 29 cm (2) 40 × 30 inches (3) 42 × 20 cm (4) 39 × 28 cm

Sol. Answer (1)

International size of herbarium sheet is 41 × 29 cm

33. Find the correct sequence of various steps of herbarium technique

a. Drying b. Poisoning

c. Collection d. Labelling

e. Mounting f. Deposition

g. Stitching

(1) c, a, b, e, g, d, f

(2) c, b, d, e, f, g, a

(3) c, a, b, e, g, f, d

(4) c, a, b, g, e, f, d

Sol. Answer (1)

Correct sequence

Collection → Drying → Poisoning → Mounting → Stitching → Labelling → Deposition

34. Select the correct match

Column I	**Column II**
a. *Ex-situ* conservation	(i) Central national Herbarium
b. Quick referral system	(ii) Museum
c. Preserved plants and animals	(iii) Flora
d. Actual account of habitat and distribution of plants of a given area	(iv) Royal Botanical Gardens, Kew

(1) a(ii), b(iii), c(iv), d(i) (2) a(i), b(iv), c(ii), d(iii)

(3) a(iv), b(i), c(iii), d(ii) (4) a(iv), b(i), c(ii), d(iii)

Sol. Answer (4)

Ex-situ conservation – Botanical garden

Quick referral – Herbarium

Preserved plants and animals – Museum

Habitat & distribution of plants of a given area – Flora

35. Live specimens are used for reference in taxonomic studies in

(1) Museum (2) Zoological parks

(3) Botanical gardens (4) More than one option is correct

Sol. Answer (4)

Live specimens

– Zoological parks

– Botanical gardens

36. Which one of the following scientific name represents trinomial nomenclature of an animal?

(1) *Acacia nilotica indica*

(2) *Brassica oleracea botrytis*

(3) *Corvus splendens splendens*

(4) More than one option is correct

Sol. Answer (3)

SECTION - B

Previous Years Questions

1. Match the items given in Column I with those in Column II and select the correct option given below: **[NEET - 2018]**

	Column I		Column II
a.	Herbarium	(i)	It is a place having a collection of preserved plants and animals
b.	Key	(ii)	A list that enumerates methodically all the species found in an area with brief description aiding identification
c.	Museum	(iii)	Is a place where dried and pressed plant specimens mounted on sheets are kept
d.	Catalogue	(iv)	A booklet containing a list of characters and their alternates which are helpful in identification of various taxa.

	a	b	c	d
(1)	(i)	(iv)	(iii)	(ii)
(2)	(iii)	(ii)	(i)	(iv)
(3)	(iii)	(iv)	(i)	(ii)
(4)	(ii)	(iv)	(iii)	(i)

Sol. Answer (3)

- Herbarium – Dried and pressed plant specimen
- Key – Identification of various taxa
- Museum – Plant and animal specimen are preserved
- Catalogue – Alphabetical listing of species

2. The label of a herbarium sheet **does not** carry information on **[NEET (Phase-2)-2016]**

(1) Date of collection

(2) Name of collector

(3) Local names

(4) Height of the plant

Sol. Answer (4)

The herbarium sheets carry a label providing information about date and place of collection, english, local and botanical names, family, collector's name.

3. Study the four statements (A–D) given below and select the two **correct** ones out of them:

   A. Definition of biological species was given by Ernst Mayr.

   B. Photoperiod does not affect reproduction in plants.

   C. Binomial nomenclature system was given by R.H. Whittaker.

   D. In unicellular organisms, reproduction is synonymous with growth.

   The two **correct** statements are **[NEET (Phase-2)-2016]**

   (1) B and C (2) C and D (3) A and D (4) A and B

Sol. Answer (3)

Photoperiod affect reproduction in plants.

Bionomial nomenclature system was given by *Carolus Linnaeus*

4. Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature? **[NEET-2016]**

   (1) When written by hand, the names are to be underlined

   (2) Biological names can be written in any language

   (3) The first word in a biological name represents the genus name and the second is a specific epithet

   (4) The names are written in Latin and are italicised

Sol. Answer (2)

Biological names originate from latin language and printed in italics

5. Which one of the following is not a correct statement? **[NEET-2013]**

   (1) Botanical gardens have collection of living plants for reference

   (2) A museum has collection of photographs of plants and animals

   (3) Key is a taxonomic aid for identification of specimens

   (4) Herbarium houses dried, pressed and preserved plant specimens

Sol. Answer (2)

A museum has collection of speciman of plants and animals.

6. Maximum nutritional diversity is found in the group **[AIPMT (Prelims)-2012]**

   (1) Plantae

   (2) Fungi

   (3) Animalia

   (4) Monera

Sol. Answer (4)

7. Which one of the following aspects is an exclusive characteristic of living things? **[AIPMT (Mains)-2011]**

   (1) Perception of events happening in the environment and their memory

   (2) Increase in mass by accumulation of material both on surface as well as internally

   (3) Isolated metabolic reactions occur *in-vitro*

   (4) Increase in mass from inside only

Sol. Answer (4)

Increase in mass from inside only is an exclusive characteristic of living things.

8. The living organisms can be unexceptionally distinguished from the non living things on the basis of their ability for **[AIPMT (Prelims)-2007]**

(1) Growth and movement
(2) Responsiveness to touch
(3) Interaction with the environment and progressive evolution
(4) Reproduction

Sol. Answer (2)

Defining features are
- Metabolism
- Consciousness
- Cellular structure

9. ICBN stands for **[AIPMT (Prelims)-2007]**

(1) Indian Code of Botanical Nomenclature
(2) Indian Congress of Biological Names
(3) International Code of Botanical Nomenclature
(4) International Congress of Biological Names

Sol. Answer (3)

ICBN $\Rightarrow$ International Code of Botanical Nomenclature.

10. Two plants can be conclusively said to belong to the same species if they: **[AIPMT (Prelims)-2007]**

(1) Have same number of chromosomes
(2) Can reproduce freely with each other and form seeds
(3) Have more than 90 per cent similar genes
(4) Look similar and possess identical secondary metabolites

Sol. Answer (2)

Two same species can reproduce freely with each other and form seeds.

11. Biosystematics aims at

(1) The classification of organisms based on broad morphological characters
(2) Delimiting various taxa of organisms and establishing their relationships
(3) The classification of organisms based on their evolutionary history and establishing their phylogeny on the totality of various parameters from all fields of studies
(4) Identification and arrangement of organisms on the basis of their cytological characteristics

Sol. Answer (3)

Biosystematics – Classification based on their ontogeny and phylogeny.

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

(1) Genus (2) Family (3) Order (4) Division

Sol. Answer (2)

Tomato and Potato will be maximum at the family level.

13. Taxonomic hierarchy refers to

(1) Step-wise arrangement of all categories for classification of plants and animals
(2) A group of senior taxonomists who decide the nomenclature of plants and animals
(3) A list of botanists or zoologists who have worked on taxonomy of a species or group
(4) Classification of a species based on fossil record

Sol. Answer (1)

Taxonomic hierarchy, step-wise arrangement of all categories for classification of plants and animals.

14. 'Taxon' is the unit of

(1) Order (2) Taxonomy (3) Species (4) Genus

Sol. Answer (2)

Taxon is the unit of taxonomy.

15. The closely related morphologically similar sympatric populations, but reproductively isolated, are designated as

(1) Clones (2) Sibling species (3) Clines (4) Demes

Sol. Answer (2)

Sibling species :

- Morphologically similar sympatric populations
- Reproductively isolated

16. Which of the following is least general in characters as compared to genera?

(1) Species (2) Division (3) Class (4) Family

Sol. Answer (1)

Species is least general in characters as compared to genera.

17. Species is considered as

(1) Real basic unit of classification
(2) The lowest unit of biosystematics
(3) Artificial concept of human mind which cannot be defined in absolute terms
(4) Real units of classification devised by taxonomists

Sol. Answer (1)

Species is real basic unit of classification.

18. Which of the following is **not** true for a species?

(1) Members of a species can interbreed
(2) Gene flow does not occur between the populations of a species
(3) Each species is reproductively isolated from every other species
(4) Variations occur among members of a species

Sol. Answer (2)

Gene flow occurs between the populations of a species.

19. One of the most important function of botanical gardens is that

(1) They provide a beautiful area for recreation (2) One can observe tropical plants there
(3) They allow *ex-situ* conservation of germplasm (4) They provide the natural habitat for wildlife

Sol. Answer (3)

Botanical gardens – *Ex-situ* conservation of germplasm.

SECTION - C

Assertion - Reason Type Questions

1. A : Members of a species are reproductively isolated from the members of other species.

R : Species is the basic taxonomic category.

Sol. Answer (2)

Assertion & Reason both are corect but not explanation of assertion.

2. A : *Panthera* is a polytypic genera.
   R : *Panthera* has specific epithets like *leo*, *tigris*, *pardus*.

Sol. Answer (1)

Panthera is a polytypic genera because it has more than two specific epithets like – *leo*, *tigris*, *pardus*.

3. A : A group of closely related families form an order.
   R : The families of an order show close resemblance in certain fundamental features and also in evolutionary trends.

Sol. Answer (1)

Assertion and reason both are correct and also correct explanation.

4. A : Biological concept of species is based on reproductive isolation.
   R : Most accepted species concept was given by Linnaeus.

Sol. Answer (3)

Biological concept of species, given by Ernst Mayr.

5. A : Synonyms are concerned with one of the most important rules of ICBN.
   R : Out of the two or more scientific names given to the organism, the oldest name is recognized as valid name and other names are recognised as synonyms.

Sol. Answer (1)

Assertion and Reason both are correct and correct explanation.

6. A : Botanical gardens are *ex-situ* conservation strategy of plants.
   R : National Botanical Garden is situated at Howrah.

Sol. Answer (3)

National Botanical Garden is situated at Lucknow.

7. A : Two plants A and B are treated as two taxonomic species.
   R : Both A and B are different in correlated characters.

Sol. Answer (1)

Assertion and Reason both are correct and also gives correct explanation.

8. A : Species is a genetically closed system.
   R : Because the reproductive isolation constitutes the most important boundary between different species.

Sol. Answer (1)

Species is a genetically closed system because the reproductive isolation constitutes the most important boundary between different species.

9. A : Scientific names for plants have been standardized through ICBN.
   R : Naming system which uses three word format was given by Linnaeus.

Sol. Answer (3)

Trinomial nomenclature was given by Lamark.

10. A : Dried specimens are poisoned by $HgCl_2$.
    R : It protects the specimen from the moisture.

Sol. Answer (3)

$HgCl_2$ protects the specimen from the microbes.

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