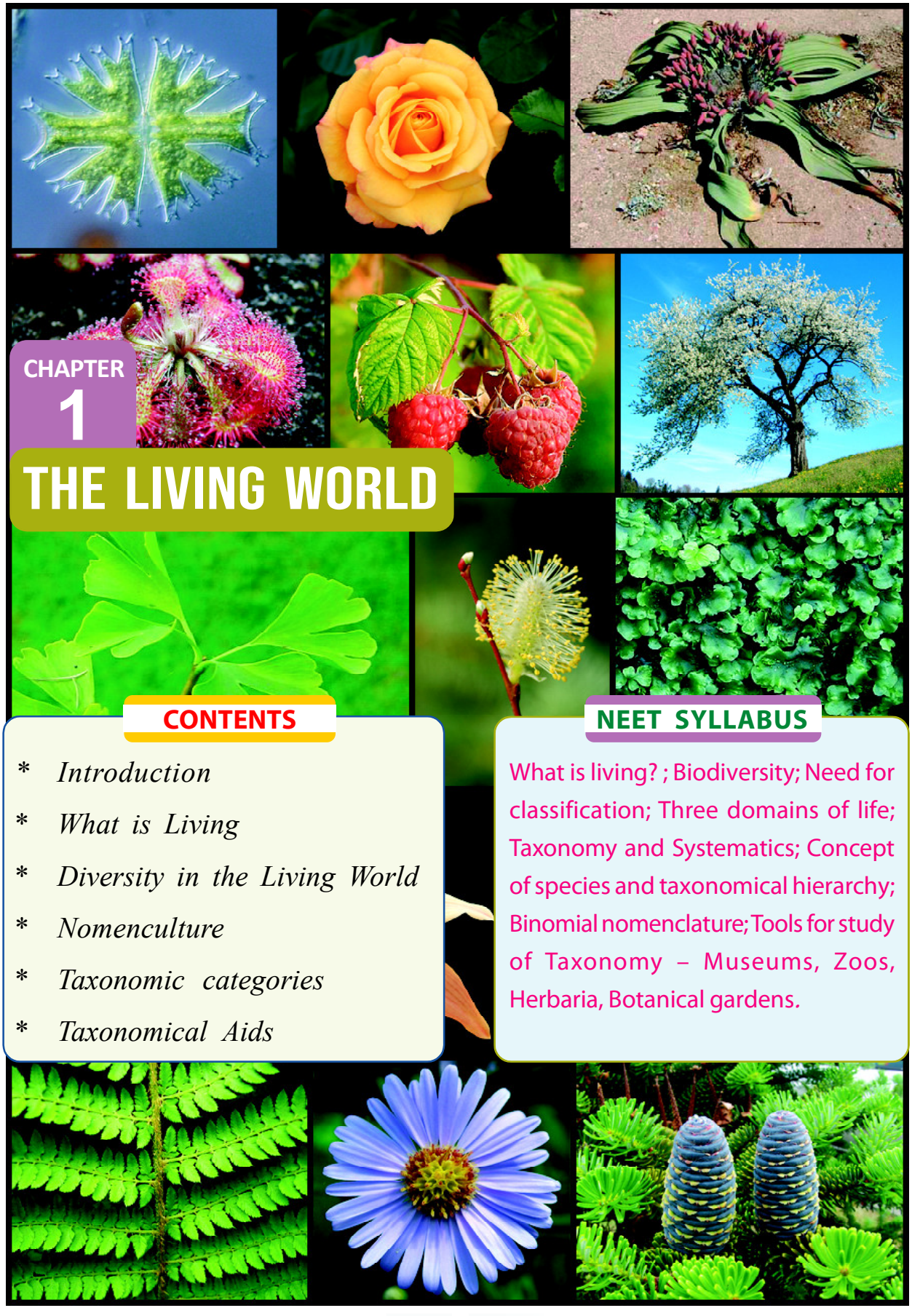


CHAPTER 1

THE LIVING WORLD

CONTENTS

NEET SYLLABUS

What is living? ; Biodiversity; Need for classification; Three domains of life; Taxonomy and Systematics; Concept of species and taxonomical hierarchy; Binomial nomenclature; Tools for study of Taxonomy – Museums, Zoos, Herbaria, Botanical gardens.

INTRODUCTION

* Essence of biology is the study of life forms, functions, vital processes and interrelationships of organisms.
* Jean Baptiste Lamarck first suggested the term **biologie (biology)**.

Things (or) entities (around us)

Inanimate (or)	Animate (or)
Non - living objects (or)	Living organisms (or)
Abiotic component	Biotic component

* Viruses are intermediate between inanimate and animate entities.
* Dead body differs from non-living object because, it had life earlier.
* The living world comprises millions of different kinds of plant and animal life. To study them is to know the kinds and diversity of life forms. Diversity is noticeable in every aspects of living system, namely appearance, habitat, habit, structure and physiological processes
* Biology witnessed less progress when Anthropocentric view was in belief

ANTHROPOCENTRIC VIEW:-

➢ TheHuman beings are considered as more significant entities around which all others revolve.
➢ Much progress in biology has been registered due to **Biocentric approach** which means humans are nothing special but similar to any other entity in the universe
➢ World comprises of the things or entities like non living objects and living organisms
➢ The ecological co-operation and conflict among organisms, populations, communities is quiet interesting
➢ Two implied questions in biology are, one is what is life? The other is what is the purpose of life. For the former we get answer in biology but for the latter no satisfactory answer is available because it is a Philosophical question

WHAT IS LIVING?

* Growth, reproduction, metabolism and ability to sense environment are fundamental features of living organisms.
* One can add a few more features like ability to self-replicate, self-organise, interact and emergence to this list.

BASIC CHARACTERISTICS OF LIVING ORGANISMS :

* Organisms are simple or complex, Unicellular or Multicellular
* They exhibit several biochemical reactions together constitute metabolism
* Maintain a constant internal environment. (Homeostasis)
* Growth and development.
* Produce offspring similar to them.
* Adapt to environmental changes and gradually undergo evolution.

GROWTH:

* All organisms grow, develop and reproduce.
* Increase in mass or overall size of a tissue or organism or its parts is called growth.
* Growth occurs due to synthesis of two different kinds of substances. These are protoplasmic substances, such as cytoplasm and nucleus, and apoplasmic substances, such as fibres of connective tissues, matrix of bone marrow and cartilage. **Apoplasmic substances** are those substances that are produced by the cells and they form a constituent part of the tissues.
* Growth is a complex process involving cell division, cell differentiation and Morphogenesis.
* In animals, growth is seen only up to a certain age. However, cell division occurs in certain tissues to replace lost cells.
* Unicellular organisms like bacteria and amoeba also grow by cell division.
* In majority of higher animals and plants, growth and reproduction are mutually exclusive events.
* Non-living objects also grow if we take increase in body mass as a criterion for growth. Mountains, boulders and sand mounds do grow, **(Extrinsic growth)**
* However, this kind of growth exhibited by non-living objects is by accumulation of material on the surface. In living organisms, growth is from inside **(Intrinsic growth).**

Growth, therefore, cannot be taken as a defining property of living organisms

REPRODUCTION :

* Reproduction involves the production of progeny of the organisms possessing features more or less similar to those of parents.
* Reproduction is necessary for the continuation of life and to compensate for the loss of life due to death. Organisms reproduce by asexual or sexual means.
* Reproduction is a characteristic of living organisms.
* Some asexual reproduction methods are:-
* Unicellular prokaryotes (Bacteria) $\rightarrow$ Binary fission
* Unicellular eukaryotes (*Amoeba*) $\rightarrow$ Binary fission
* Yeasts and Hydra $\rightarrow$ Budding
* Fragmentation $\rightarrow$ Filamentous algae, fungi and bryophytes (Protonema stage of Mosses)
* Regeneration $\rightarrow$ ***Planaria*** (Flat worm)
* In single-celled organisms. We are not very clear about the usage of these two terms – growth and reproduction.
* Further, there are many organisms which do not reproduce (mules, sterile worker bees, infertile human couples, etc).
* ***Hence, reproduction also cannot be an all-inclusive defining characteristic of living organisms.***

METABOLISM :

* All living organisms need a continuous supply of energy and materials. Exchange of matter and energy between an organism and its environment and the transformation of this matter and energy within the organism is called **metabolism.**

* Some metabolic pathways release energy by breaking down complex molecules to simpler forms. These reactions harvest energy by breaking chemical bonds and are regarded as **catabolic pathways** or **catabolism**. Eg. cellular respiration.
* In the reverse situation, reactions (e.g. photosynthesis) consume energy to make complex molecules, like glucose from simple forms, like CO_2 and H_2O. This is called **anabolic pathways** or **anabolism**.
* Biochemical pathways are highly regulated by enzymes.
* No non-living object exhibits metabolism. Metabolic reactions can be demonstrated outside the body in cell-free systems.
* ***An isolated metabolic reaction(s) outside the body of an organism, performed in a test tube is neither living nor non-living.***
* Isolated metabolic reactions *in vitro* are not living things but surely living reactions.
* **Hence, metabolism is a defining feature of all living organisms without exception.**

CONSCIOUSNESS

* It is the ability of organism to sense their surrounding or environment and proper response to these environmental stimuli.
* Stimuli could be physical, chemical or biological. Living organisms respond to these stimuli by their sense organs.
* Affect of photoperiod on reproduction in seasonal breeder is good example of response of organism to an environmental stimuli. Perhaps, the most obvious and technically complicated feature of all living organisms is their ability to sense their surroundings or environment and respond to these environmental stimuli.
* All organisms, from the prokaryotes to the most complex eukaryotes can sense and respond to environmental cues. All organisms are 'aware' of their surroundings. Human being is the only organism who is aware of himself, i.e., self consciousness is the defining feature of Human being.
* Organisms are **open systems** because they interact continuously with their environment.

  It is difficult to define a living state because the patients lying in coma have working heart and lungs supported by machines. They have no self conciousness. They are neither living nor dead.
* **Consciousness is the defining property of living organisms**

INTERACTIONS

* Properties of tissues are not present in the constituent cells but arise as a result of interacations 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 interactiosn among the molecular componenets comparising the organelle.
* These interactions result in emergent properties at a higher level of organisation.
* This phenomenon is true in the hierarchy of organisms are complexity at all levels.
* Therefore, we can say that living organisms are self-responding to external stimuli.

1. Growth	Fundamental property of living organisms	Not defining property of living organisms	Reason : Non-living object also exhibit growth on the surface
2.Reproduction	Fundamental property of living organisms	Not defining property of living organisms	R : Organisms like mule, sterile worker bees, infertile human couple donot reproduce.
3. Metabolism	Fundamental property of living organisms	Defining property of living organisms	R : Cellular organization of the body required for metabolism.
4Consciousness	Fundamental property of living organisms	Defining property of living organisms	R : All organisms are 'aware' of their surroundings.
5. Interaction	Fundamental property of living organisms	Defining property of living organisms	R : Properties of tissues are not present in the constituent cells but arise as a result of interactions among the constituent cells.

TEST YOUR I.Q. 1

1. **Study of life forms and living processes is known as**
   1. Bio-physics 2. Biology
   3. Biochemistry 4. Biotechnology
2. **Which of the following is not a result of cell division**
   1.Metabolism 2.Growth
   3.Repair 4.Reproduction
3. **The Darwin of the 20th century was**
   1. Aristotle 2. Linnaeus
   3. Ernst Mayr 4. Earnst Haeckel
4. **Select a feature related to living**
   1. Growth 2. Reproduction
   3. Metabolism 4. 1, 2 and 3
5. **Select an organism showing growth upto a certain age only**
   1. Neem 2. House fly
   3. Coconut 4. Mango
6. **Select a non-living object showing growth**
   1. Mountain 2. Boulder
   3. Sand mound 4. 1, 2 and 3
7. **Budding is seen in**
   1. Mule 2. Ficus
   3. Hydra 4. Hibiscus
8. **All living organisms are linked to one another by the sharing of the common**
   1. cell wall 2. cell membrane
   3. genetic material 4. nucleolus
9. **Which feature cannot be taken as a defining property of living organisms**
   1. Metabolism 2. Growth
   3. Reproduction 4. 2&3
10. **Identify the organism which do not show the reproduction**
    1. Yeast 2. Sterile worker bee
    3. Amoeba 4. Fertile human couple
11. **The twin characteristics of growth are**
    1) Increase in number of individuals, increase in mass
    2) Increase in height and increase in mass
    3) Increase in molecular weight and increase in mass
    4) Increase in size and decrease in mass
12. **Growth continues upto death in**
    1) Plants 2) Birds
    3) Both a & b 4) Insects
13. **Growth in living organisms is**
    1) Synthesis of new protoplasm
    2) Increase in weight
    3) Increase in size 4) 1, 2 and 3

14. Plants differ from animals in having
1) Definite lifespan
2) Localized growth
3) Indefinite growth
4) Localized growth and indefinite lifespan

15. The statement 'nothing lives forever, yet life continues' illustrates the role of
1) Embryogenesis 2) Morphogenesis
3) Replication 4) Reproduction

16. Synthesis reactions in the body form a kind of metabolism called
1) Anabolism 2) Catabolism
3) Chemical reaction 4) None of these

17. Which of the following is a defining characteristic of living organisms
1) Growth 2) Unable to grow
3) Reproduction
4) Response to external stimuli

18. The response to environmental stimuli is called
1) Metabolism 2) Irritability
3) Chemical reaction
4) Consciousness

19. Effect of day length on flower induction is called
1) Photo tropism
2) Photoperiodism
3) Photo sensitivity
4) Photo oxidation

20. All organisms are aware of their surrounding and this is called
1) Interactions
2) Consciousness
3) Sense 4) Biodiversity

21. The properties of tissues are due to
1) Metabolism 2) consciousness
3) interactions 4) reproduction

22. Diversified habitats in which living organisms are found are
A) Cold mountains
B) Hot springs
C) Deciduous forests
D) Fresh water lakes
E) Deserts
F) Oceans
1) A, B, C, D, E and F 2) A,B only
3) B,E only 4) A,B,E,F only

23. "Growth" means
I) Increase in mass
II) Increase in number
III) Metabolisms
IV) Decompositions
1) I, II only 2) III only
3) I, II, III only 4) IV only

24. Choose the correct statement about reproduction
I) It produces progeny with more or less similar features to parents
II) It occurs by involving one parent (asexual) or two parents
III) It is through budding, fragmentation, spores or gametes
IV) It is not observed in non living organisms
1) 1, II, III & IV 2) All except I
3) All except IV 4) All except III

25. Metabolism is
A) The sum total of all the chemical reactions occurring in the body of organisms
B) Observed even outside the body in a test tube
C) Not observed in nonliving objects
1) A only 2) C only
3) A, C only 4) A, B, C

26. Means of "consciousness"
I) All organisms are aware of their surroundings
II) All organisms are stimulated by their surroundings
III) All organisms are afraid of their surrounding
IV) All organism are increased by their mass
1) I only 2) II only
3) II, III only 4) I, II, III only

ANSWERS

1) 2	2) 1	3) 3	4) 4	5) 2	6) 4
7) 3	8) 3	9) 4	10) 2	11) 1	12) 1
13) 4	14) 3	15) 4	16) 1	17) 4	18) 2
19) 2	20) 2	21) 3	22) 1	23) 1	24) 1
25) 4	26) 4				

DIVERSITY IN THE LIVING WORLD

* The number of species that are known and described ranges between 1.7 - 1.8 million. This refers to biodiversity on earth
* The study of different kinds of organisms, their diversities and also the relationship among them is referred to as Systematics
* The world systematics is derived from Latin word 'Systema'. Which means systematic arrangement of organisms.
* The publication of Linnaeus is 'Systema naturae'
* Systematics also consider evolutionary relationships between organisms.
* **Phylogeny** : It is the evolutionary history of an organism or a group.
* The basic components of taxonomy are characterisation, identification, nomenclature and classification.

Identification:

* Determining whether a collected organism is entirely new or already known is called Identification.
* In plants identification can be done by directly comparing the characters with the authentic herbarium specimen or indirectly with the help of keys in floras.

Nomenclature:

* Providing a scientific name to an identified organism is called nomenclature.
* Gaspard Bauhin introduced Binomial nomenclature
* Carolus Von Linnaeus popularised the Binomial nomenclature
* Scientific names are given to plants based on agreed principles and criteria provided in International Code for Botanical Nomenclature (ICBN).
* Binomial nomenclature is followed while naming an organism
* For example, scientific name of mango is *Mangifera indica*

  Mangifera represents Genus and *indica* is species or specific epithet

Rules of ICBN:

* Biological names are generally in Latin and written in italics. They are latinised or derived from Latin irrespective of their origin.
* The first word in a biological name represents the genus while the second component denotes the specific epithet.
* Both the words in a biological name, when hand written, are separately underlined, or printed in italics to indicate their Latin origin.
* Genus starts with capital letter while specific epithet starts with small letter.
* Name of the author is written in abbreviated form after the specific epithet e.g., *Mangifera indica* Linn. Denoting that this species was first described by Linnaeus.

Classification:

* The process of grouping of organisms into categories based on some observable characters.

1.	**Identification**	-Determine whether a collected organisms is entirely new/already known	**Direct Identification**-Comparing Herbarium specimen **Indirect identification-** keys in flora.
2.	**Nomenclature**	-Providing a scientific name to an identified organism.	Binomial nomenclature – The system of providing name with two Latin words is called Binomial nomenclature.
3.	**Classification**	-The process by which anything is grouped into convenient categories based on easily observed characters.	Earliest classifications were based on the uses of various organisms.

Systematics :
* The word systematic is derived from the Latin word-systema.
* Systema – means :- Systematic arrangement of organisms.
* Systema naturae published by : Linnaeus.
* Systematics deals with :
  Study of different kinds of organisms of diversities and relationship among them.
  Identification, Nomenclature, Classification of organisms
  Evolutionary relationships between organisms.

TEST YOUR I.Q. 2

27. Determining whether a collected organism is entirely new or already known is called
1) Nomenclature 2) Identification
3) Classification 4) Characterisation

28. The number of species that are known and described ranges between
1) 1. 5 -1. 7 millions
2) 1. 7 - 1. 8 millions
3) 1. 7 - 1. 8 lakhs 4) 1. 5 - 1.7 lakhs

29. The science of giving names to living beings called
1) Nomenclature 2) Identification
3) Classification 4) Characterisation

30. 'ICBN' expands as
1) International committee in Botanical Nomenclature
2) Indian Code of Botanical Nomenclature
3) International Code for Botanical Nomenclature
4) International Committee on Board Nomenclature

31. The study of different kinds of organisms, the diversities and also the relationship among them referred to as
1) Category 2) Systematics
3) Classifications 4) Publication

32. InMangifera indica Linn. indica refers to
1) Genus 2) Author
3) Family 4) Specific epithet

33. Biological names generally in
1) Greek 2) Latin
3) Russian 4) Parsion

34. The word systematics is derived from
1) Greek word systema
2) Italic word systema
3) Latin word systema
4) English word systema

35. Identification can be done with the help of
1) Taxon 2) Herbarium Specimens
3) Keys in floras 4) 2 & 3

36. Earliest classifications were based on
1) Morphological characters
2) Sexual characters
3) Anatomical characters
4) Uses of organisms

37. Binomial nomenclature was popularised by
1) Linnaeus 2) Pliny
3) Harvey 4) Bentham and Hooker

38. Specific epithet is
1) First word in the scientific name of an organism
2) Second word in the scientific name of an organism
3) Both A and B
4) Two words of a scientific name

39. Taxonomy comprises
1) Identification 2) Nomenclature
3) Classification 4) All of these

40. Systema naturae is published by
1) Linnaeus 2) Darwin
3) Theophrastus 4) Aristotle

41. The first step in taxonomy
1) Nomenclature 2) Identification
3) Description 4) Classification

42. The main objectives of plant taxonomy is
1) To study the world's flora
2) to provide a method for identification and nomenclature
3) To provide scientific name for every group of plants in the world
4) 1, 2 and 3

43. Phylogeny refers to
1) Developemental history of an organism
2) Evolutionary history of an organism
3) Influence of light on flowering
4) Change in dry weight

44. Select the correct rules of ICBN :
I) Biological names are generally in Latin.
II) The first word in a biological name represents the genus.
III) Genus name and species name are separately underlined when printed in Italics
IV) The first word of genus starts with a capital letter.
1) I, II only correct
2) II, III only correct
3) III, IV only correct
4) I, II, and IV only

45. The basic components of taxonomy are
a) characterisation b) identification
c) classification d) nomenclature
1) b, c and d only 2) a, c and d only
3) a, b and c only 4) a, b, c and d

ANSWERS

27) 2	**28) 2**	**29) 1**	**30) 3**	**31)2**	**32) 4**
33) 2	**34) 3**	**35) 4**	**36) 4**	**37) 1**	**38) 2**
39) 4	**40) 1**	**41) 2**	**42) 4**	**43) 2**	**44) 4**
45) 4					

TAXONOMIC CATEGORIES

* Classification involves hierarchy of steps in which each step represents a rank or category.
* All categories together constitute taxonomical hierarchy arranged in ascending order starting with species.
* Each category represents a rank in taxonomic hierarchy and is called as taxon.
* The common categories (7 obligatory taxons) of taxonomical studies are kingdom, division (for plants) or Phylum (for animals), class, order, family, genus, and species.
* Both plant and animal kingdoms have species as the lowest category.

Species

* Species is a group of organisms with fundamental similarities
* It is considered as a basic unit of classification.
* The scientific names of
Mango- *Mangifera indica*
Potato – *Solanum tuberosum*
Tobacco – *Nicotiana tabacum*
* In this, *indica, tuberosum* and *tabacum* are specific epithets.
* Each genus may have one (or) more than one specific epithets representing different organisms.
Ex: Solanum includes species like tuberosum, niger, melongena.

* panthera has another specific epithet called *tigris*
* Human belongs to the species *Sapiens* which is grouped under genus Homo.
* The scientific name thus for human being is written as *Homosapiens*

Genus

Genus comprises a group of related species. Which has more characters in common incomparison to species of other genera. We can say that genera are aggregates of closely related species. e.g., potato and brinjal belong to the same genus *Solanum*

* The lion (*panthera leo*), leopard (P. pardus) and tiger (P. tigris) with several common features, are all species of the genus *panthera.*
* This genus differs from another genus *Felis* which includes cats.

Family

* A group of related genera.
* Families are characterized on the basis of both vegetative and reproductive characters. e.g., *Solanum*, *Nicotiana* and *Datura* belong to the same family Solanaceae
* The suffix for the family is -aceae(in plants)
* Among animals for example genus *Panthera* comprising lion, tiger, leopard is put along with genus *Felis* (cats) in the familyFelidae.
* Cat and dog seperated into two different families Felidae and Canidae, respectively.

Order

* It is an assemblage of families which exhibit a few similar characters.
* The similar characters are less in number as compared to different genera included in a family.

e.g., Convolvulaceae, Solanaceae are included in the order Polemoniales.

* The suffix for the order is -ales.
* The animal order Carnivora, includes families like Felidae and Canidae.

Class

* A group of related orders e.g., Malvales, Rosales and Polemoniales are included in the class dicotyledonae
* Order primita compirsing monkey, gorilla and Gibbon is placed in class Mammalia along with order carnivora that includes animals like tiger, cat and dog.

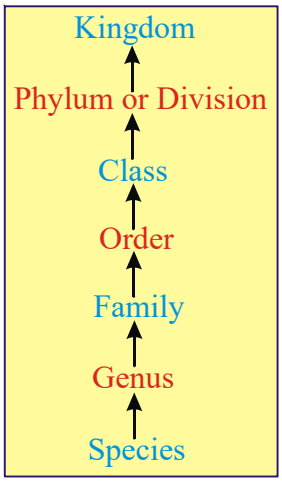
Division/Phylum

* In plants, a group of related classes are included under Division.
* In animals, a group of related classes are included under phylum.
* The classes dicotyledonae and monocotyledonae are included in the division Spermatophyta (Sub-division Angiospermae).
* Classes comprising animals like fishes, amphibians, reptiles, birds along with mammals constitute the next higher category called phylum.

Kingdom

* Various divisions are placed under a highest category called Kingdom.
* As we go higher from species to kingdom, the number of common characteristics will decrease.
* Lower the taxa, more are the characteristics that members of the taxon share
* All animals belonging to various phyla are assigned to the highest category called kingdom Animalia in the classification system of animals.

Taxonomic categories showing hierarchial arrangement in ascending order : -



Oganisms with their Taxonomic Cartegories

Common Name	Biological Name	Genus	Family	Order	Class	Phylum/ Division
Man	*Homo sapiens*	*Homo*	Hominidae	Primata	Mammalia	Chordata
Housefly	*Musca domestica*	*Musca*	Muscidae	Diptera	Insecta	Arthropoda
Mango	*Mangifera indica*	*Mangi-fera*	Anacardi-aceae	Sapindales	Dicotyledonae	Spermatophyta
Wheat	*Triticum vulgare*	*Triticum*	Poaceae	Poales	Monocoty-ledonae	Spermatophyta

Term given by Category : Suffix

SCIENTIST	TAXON	SUFFIX
Eichler	Division	-phyta
Linnaeus	Class	-phyceae or Opsida or ae
Linnaeus	Order	-ales
John Ray	Family	-aceae

1.3. Taxonomic categories showing hierarchial arrangement in ascending order

S.No	Taxon	Definition	Other feature
1.	**Kingdom**	• Various divisions are placed under a highest category called Kingdom.	• As we go higher from species to kingdom, the number of common characteristics will decrease.
2.	**Division or Phylum**	• In plants, a group of related classes are included under Division. In animals, a group of related classes are included under phylum.	• The classes dicotyledonae and monocotyledonae are included in the division Spermatophyta (Sub-division Angiospermae)
3.	**Class**	• A group of related orders	• e.g. Malvales, Rosales and Polemoniales are included in the class dicotyledonae
4.	**Order**	• It is an assemblage of families which exhibit a few similar characters.	• The similar characters are less in number as compared to different genera included in a family. e.g.,Convolvulaceae, Solanaceae are included in the order Polemoniales. The suffix for the order is -ales.
5.	**Family**	• A group of related genera.	• Families are characterized on the basis of both vegetative and reproductive characters. e.g., *Solanum*, *Nicotiana* and *Datura* belong to the same family Solanaceae The suffix for the family is –aceae
6.	**Genus**	• Genus comprises a group of related species. Which has more characters in common in comparison to species of other genera.	• We can say that genera are aggregates of closely related species. e.g., potato and brinjal belong to the same genus *Solanum*
7.	**Species**	• Species is a group of organisms with fundamental similarities It is considered as a basic unit of classification.	• **The scientific names of** Mango- *Mangifera indica* Potato – *Solanum tuberosum* Tobacco – *Nicotiana tabacum* In this, *indica, tuberosum* and *tabacum* are specific epithets. Each genus may have one (or) morethan one specific epithets representing different organisms. Ex: Solanum includes species like tuberosum, niger, melongena.

TEST YOUR I.Q. 3

46. Each category found in taxonomic hierarchy is known as
1. Genus 2. Family
3. Species 4. Taxon

47. Lowest category of animal kingdom is
1. Genus 2. Family
3. Species 4. Taxon

48. Select a species not related to genus Solanum
1. tobacum 2. tuberosum
3. nigrum 4. melongena

49. Select a genus not related to family Solanaceae
1) Solanum 2. Nicotiana
3. Mangifera 4. Datura

50. Which order includes Convolvulaceae and Solanaceae
1. Poales 2. Sapindales
3. Rosales 4. Polymoniales

51. The highest taxon in taxonomic hierarchy is
1. Species 2.Genus
3.Order 4. Kingdom

52. As we go lower from kingdom to species the number of common characteristics goes on
1. Increasing 2. remain unchanged
3. decreasing 4. some times decreasing

53. House fly belongs to
1. Order - Insecta
2. Family - Musca
3. Genus - Diptera
4. Phylum - Arthropoda

54. Select the correct related to man
1. Genus - Homonidae
2. Order - Primata
3. Family - Mammalia
4. Division - Chordata

55. Wheat belongs to which family
1. Solanaceae 2. Anacardiaceae
3. Convolvulaceae 4. Poaceae

56. The fundamental taxonomic category or basic unit of classification is
1) Genus 2)Species
3) Sub-species 4)Variety

57. The word ending with - *aceae* indicates
1) Genera 2)Family 3) Order 4)Class

58. Genus represents
1) An individual plant or animal
2) A collection of plants or animals
3) Group of related species of plants or animals
4) A group of plants in a given area

59. The taxonomic unit 'phylum' is the classification of animals is equivalent to which hierarchial level of classification of plants
1) Class 2) Order
3) Division 4) Family

60. *Solanum*, *Nicotiana* and *Datura* belong to the same
a) Species b) Genus
c) Family d) Order
1) a and b only 2) c and d only
3) b and c only 4) b and d only

61. Which is the odd one?
1) Species 2) Malvaceae
3) Genus 4) Family

62. When organisms are in the same class but not in same family, the taxonomic term is called as
1) Order 2) Genus
3) Family 4) Species.

63. Taxon refers to
1) Species 2) Genus
3) family 4) Group of any rank

64. The taxon which includes related families is
1) class 2) phylum
3) order 4) Genus

65. Whcih of the following is a class
1) sapindales 2) Mammalia
3) Prinate 4) Poales

66. Which one of the following has least similiar characters?
1) Family 2) Class
3) Genus 4) Species

67. What is the correct sequence of classification?

1) Kingdom, class, division, order, family, genus, species
2) Kingdom, division, class, order, family, genus, species
3) Kingdom, division, class, family, order, genus, species
4) Kingdom, family, division, class, order, genus, species

68. More number of common characters are observed in members of a

1) Family 2) Species
3) Genus 4) Kingdom

69. Which of the following taxonomic categories contains organisms least similar to one another?

1) Genera 2) Family 3) Class 4) Species

70. Ascending order of ranks of Taxa

1) Species → Genus → family → order
2) Genus → Species → order → family
3) family → Species → Genus → order
4) Order → Genus → Family → Species

71. Arrangement of Taxa is

1) Natural classification 2) Systematics
3) Hierarchy 4) Key of taxa

72. Humans belong to the family

1) Hominidae 2) Primata
3) Mammalia 4) Chordata

73. Which of the following plants is a monocotyledon?

1) Tobacco 2)Potato
3) Wheat 4) Mango

74. Mango family

1) Hominidae 2) Muscidae
3) Anacardiaceae 4) Poaceae

75. Which one is the correct form of the scientific name for man.

1) *homo sapiens* 2) *Homo sapiens*
3) *homo Sapiens* 4) *Homo Sapiens*

76. The group of related genera

I) order II) class
III) family IV) species
1) I only 2) II only
3) III only 4) I and III only

77. Which of the following is a group of related species with more similar characters

I) Genus II) Family III) Order IV) Class
1) I only 2) II and III only
3) I and IV only 4) I, II, III and IV

78. The correct order of Taxonomic categories.

I. Kingdom → Division → Class → Order → Family → Genus → Species (Descending order)
II. Kingdom → Division → Order → Class → Family → species (Ascending order)
III. Kingdom → Species → Order → Class → Family (Descending order)
IV. Species → Genus → Family → Order → Class → Division → Kingdom (Ascending order)

1) I & IV correct 2) I only
3) III only 4) IV only

79. Find the correct statements regarding Taxonomic hierarchy.

a. from species to kingdom, the number of similarities decreases
b. from species to kingdom, the number of dissimilarities increases
c. Lower the taxa, higher are the similarities
d. Higher the taxa, higher are the dissimilarities

1. a and c only 2. b and d only
3. a, b and c only 4. a, b, c and d

80. Organisms with their taxonomic categories in order with common name; Biological Name; Genus; Family & class.

I. Man → *Homo sapiens* → *Homo* → Hominidae → Mammalia
II. Housefly → *Musca domestica* → *musca* → muscidae → Diptera
III. Mango → *Mangifera indica* → *Mangifera* → Anacardiaceae → Dicotyledonae
IV. Wheat → *Triticum vulgare* → *Triticum* → Poaceae → Monocotyledonae

1) I and II correct
2) II only correct
3) I and III correct
4) I, III and IV correct

ANSWERS

46) 4	47) 3	48) 1	49) 3	50) 4	51) 4
52) 1	53) 4	54) 2	55) 4	56) 2	57) 2
58) 3	59) 3	60) 2	61) 2	62) 1	63) 4
64) 3	65) 2	66) 2	67) 2	68) 2	69) 3
70) 1	71) 3	72) 1	73) 3	74) 3	75) 2
76) 3	77) 1	78) 1	79) 4	80) 4	

TAXONOMICAL AIDS

* Taxonomic studies require correct classification and identification of organisms
* The collection of actual specimens of plant and animal species is essential and is the prime source of taxonomic studies.
* There are certain procedures and techniques to store and preserve the information as well as the specimens. They are:

Herbarium:

* Herbarium is a store house of collected plant specimens that are dried pressed and preserved on sheets.
* **Standard size of herbarium sheet : 41 x 29 Cm.**
* Later the sheets are arranged based on an universally accepted system of classification.
* Herbarium sheets with specimens and their descriptions become a store house or repository for future use.
* Herbarium sheets carry information about date and place of collection, English, local and botanical names, family, collector's name, etc.
* Thus they serve as quick referral systems.
* Royal Botanical garden RBG at Kew, England has largest herbarium and is an international centre for plant identification
➢ A digital herbarium contains digital images of the herbarium specimens and the related information is preserved and published on internet for wider use.It provides an analogous online facility.

Botanical Gardens:

* Botanical Gardens have collections of living plants for reference.
* Plants are grown for identification purposes and each plant is labelled indicating its scientific name and its family. **Famous botanical gardens**:

1. Royal Botanical Garden, Kew (England)
2. Indian Botanical Garden, Howrah (India)
3. National Botanical Research Institute, Lucknow (India)

Museums:

* Museums have collections of preserved plant and animal specimens for study and reference.
* Specimens are preserved in containers having preservative solutions. (Formalin solution)
* Plant and animal specimens may also be preserved as dry specimens.
* Biological museums are generally set up in educational institutes such as schools and colleges.

Zoological Parks

* These are all the places where wild animals are kept in protected environments under human care and which enable us to learn about their food habits and behaviour.
* All animals in a zoo are provided, as for as possible, the conditions similar to their natural habits
* Childen love visiting these parks commonly called zoos.

Key

* Identification of plants and animals is done through keys based on similarities and dissimilarities.
* The keys are based on a pair of contrasting characters called a **couplet**.
* It represents the choice made between two opposite options.
* This results in acceptance of only one and rejection of the other.

* Each statement in the key is called as a lead.
* Keys are analytical in nature.
* Flora, manuals, monographs and catalogues are some other means of recording descriptions.
* **Flora:** Flora contains the actual account of habitat and distribution of plants of a given area.
* **Manuals:** Manuals provide information for identification of names of species found in an area.

  Manuals are small books for ready referrence.
* **Monographs:** Monographs contain information on any one taxon.
* **Catalogue:** It is list of systematically arranged plants or animals found in an area with brief description that help in their identification.

S.N	Taxonomical Aids	Definitions	Other features
1.	**Herbarium :-**	Store house of collected plant specimens that are dried, pressed, preserved on sheet.	Store house/Repositary for future use. Largest herbarium found in RBG at kew. Digital herbarium is preserved and published on Internet for wider use.
2.	**Botanical gardens :-**	Specialised gardens have collection of living plants for reference.	Each plant is labeled indicating its Botanical name and its family. **Famous Botanical gardens :** * Royal Botanical Garden at kew England * Indian Botanical Garden at kewHowrah(India) * National Botanical Research Institution – Lucknow (India)
3.	**Museum :-**	Collection of preserved plant and animal specimens in preservative solutions for study and reference.	Biological museums are generally setup in Educational institutes (school, colleges). Plants and animals also preserved as Dry specimens.
4.	**Keys :-**	Used for identification of plants and animals based on the similarities and dissimilarities	*A pair of contrasting characters is called **couplet.** *Each statement in the key is called **Lead.** *Separate taxonomic keys are required for each taxonomic category. * Keys are generally analytical in nature.
5.	**Flora :-**	Actual account of habitat, distribution, systematic listing of plants in a given area	Flora provide the **Index to the plant species** found in a particular area.
6.	**Manuals :-**	Small book specially designed for ready reference.	Useful in providing information for Identification of names of species found in an area.
7.	**Monograph :-**	Contain information of any one taxon.	
8.	**Catalogues :-**	A list of systematically arranged all the plants (or) animals found in an area with brief description that helps in their identification.	

TEST YOUR I.Q. 4

81. The recorded description contain information on any one taxon is called
1) Flora 2) Manuals
3) Monographs 4) catalogues

82. The recorded description useful in providing information for identification of names of species found in an area is called
1) Flora 2) Manuals
3) Monographs 4) Catalogues

83. An international Centre for plant indentification is
1) Royal Botanical Garden
2) National Botanical Garden
3) Indian Botanical Garden
4) Royal society of England

84. Which one serves as quick referral system in taxonomical studeis
1) Botanical Gardens
2) Museums
3) Manual
4) Herbarium

85. The famous Botanical Gardens are
1) Royal Botanical Garden, Kew
2) Indian botanical Garden, Howrah
3) National Botanical Research Institute, Lucknow
4) All the above

86. In museums specimens are preserved in the containers having
1) Staining solutions
2) Antibiotics
3) Chilled ethanol
4) Preservative solutions

87. The Largest herbarium of the world is at
1) Kew, England 2) Kew, France
3) Kew. America 4) Kew, India

88. The collection of preserved plants and animals for study and reference is called
1) Museum 2) Keys
3) Herbarium 4) Flora

89. A taxonomical aid used for identification of plants and animals based on the similarities and dissimilarities is called
1) Herbarium 2) Museum
3) key 4) garden

90. Each statement in the key is called
1) Set 2) Lead
3) Couplet 4) Statement

91. Collection of plants that usually have been dried, pressed and preserved on sheets is called
1) Herbarium 2) Botanical gardens
3) Museums 4) Zoological parks

92. The largest herbarium of the world is
1) Royal Botanical Gardens.
2) Museum of Natural history.
3) Indian Botanical Garden.
4) National Botanical Gardens.

93. If a taxonomist requires information about a taxon i.e., Poaceae, the taxonomical aid that he can refer to immediately is
1) Herbarium 2) Flora
3) Manual 4) Monograph

94. National Botanical Research Institute is located in
1) Dehradun 2) Lucknow
3) Delhi 4) Pune

95. Indian Botanical Garden is situated at
1) Dehradun 2) Lucknow
3) Simla 4) Howrah

96. Botanical gardens have
1) pressed and pinned specimen of plants for identification
2) living plants for reference and identification purpose
3) Preserved specimens in containers for classification
4) All the above

97. Algae are preserved in
1. Flora 2. Museum
3. Zoo 4. Monograph

98. Taxonomic keys are based on the
1) Morphological characters
2) Reproductive characters
3) Anatomical characters
4) Contrasting characters

99. A paper was published in a journal of Flora of Dist. Nellore. In which branch of botany should this paper be placed
1) Morphology 2) Taxonomy
3) Evolution 4) Embryology

100. Ernst Mayr's work is related to this branch of biology
1) Physiology 2) Ecology
3) Evolutionary biology 4) Embryology

101. Which of the following requires intensive laboratory and field studies
1) collection of specimens
2) Identification
3) gardening of plants
4) nomenclature

102. Select the definitions of Herbarium and Key respectively
I) A taxonomical aid used for identification of plants and animals based on the similarities and dissimilarities.
II) Collection of preserved plant and animal specimens.
III) Store house of collected dried, pressed and preserved plant specimens on sheets
IV) A taxonomical aid contain information on any one taxon.
1) I and III correct
2) I and IV correct
3) III and I correct
4) I only correct

103. Study the following statements and select the correct ones
I) Herbarium is a store house of collected plant specimens that are dried, pressed and preserved on sheets.
II) Flora provides the index to the plant species found in a particular area
III) Monographs contain information on only one taxon
1) I & II 2) II & III
3) I & III 4) I, II & III

104. Choose the correct statements about living organisms
I) They have the sense of feelings to sur roundings
II) Their study was done of necessity
III) They share similarities to one another vertically and horizontally
IV) All living organisms are related to one another and also to all organisms that ever lived on earth
1) All except IV 2) All except II
3) All except III 4) I, II, III, IV

ANSWERS

81) 3 82) 2 83) 1 84) 4 85) 4 86) 4
87) 1 88) 1 89) 3 90) 2 91) 1 92) 1
93) 4 94) 2 95) 4 96) 2 97) 2 98) 4
99) 2 100) 3 101) 2 102) 3 103) 4
104) 4

EXERCISE-I

('Assertion' and Reason type Questions)
The following questions consist of two statements each :
Assertion (A) and Reason (R), To answer these questions mark the correct alternative as directed below.
1) If both A and R are true and R is the correct explanation of A.
2) If both A and R are true but R is not the correct explanation of A
3) If A is true but R is false
4) If A is false but R is true

1. **A:** Growth in non-living object is external as material is accumulated on the surface
R : Growth in living organisms is internal as biomass is synthesized in the cell
2. **A:** Growth continues upto the end of life in plants
R: In plants, growth is carried by all cell of the plant body through out their life.
3. **A:** Growth cannot be taken as a defining property of a living organisms..
R: Mountains show the growth

4. **A :** One of the characteristic features of growth is increase in dry weight
R : Growth results in the formation of new cells and tissues
5. **A :** Growth is found in multicellular organisms due to cell division.
R : Unicellular organisms also grow by division with increasing size of population
6. **A:** Reproduction cannot be considered as defining property of living organisms
R: There are many living organisms which do not reproduce eg: mules, steriles worker bees, infertile human couples etc
7. **A:** Growth is the final end product of successful metabolism
R: Only some of the reactions that take place in living organisms are called metabolism.
8. **A:** All organisms are aware of their surroundings and this is called consciousness.
R : Human being is the only one who is aware of himself i.e., has self consciousness.
9. **A** : All living organisms present, past and future are linked to each other.
R : All living organisms share common genetic material to varying degrees
10. **A:** All living phenomena are due to interactions
R : Interactions among lower levels of organization in an organism result in emerging properties at higher level of organization.
11. **A:** Scientific names of organisms are given in Latin.
R: All local names of organisms are given in Latin.
12. **A:** The science of classifying organisms is called taxonomy.
R: Systematics and taxonomy have same meaning.
13. **A:** Systematics is the branch of biology that deals with classification of living organisms
R: The earliest classifications are based on the uses of organisms.
14. **A :** Systematics is systematic arrangement of organisms
R : Systematics takes into account evolutionary relationships between the organisms.
15. **A:** The same specific name can be given to organisms belonging to different genera
R : Two organisms of different families may have same generic name
16. **A:** Kingdom is the highest taxonomic category.
R: All division are included into kingdom.
17. **A:** Royal Botanical Garden at Kew acts as an International Centre for Plant identification.
R: Royal Botanical Garden at kew has the largest herbarium in the world.
18. **A:** Keys are generally analytical in nature.
R : Keys are based on a pair of contrasting characters called a couplet.

SIMPLE MATCHING TYPE

19. Match column-I with Column-II and select the correct option from the given below

Column-I	Column-II
A) Protonema of Funaria	I) Binary fission
B) Fungi	II) Spores
C) Yeast	III) Budding
D) Bacteria	IV) Cyst
	V) Fragmentation

1) A-I,B-II,C-III,D-IV
2) A-V,B-II,C-III,D-I
3) A-II,B-V,C-I,D-IV
4) A-IV,B-II,I,C-III,D-V

20.

List - I Common name	List - II Biological name
1) Tobacco	A - *Mangifera indica*
2) Potato	B - *Triticum vulgare*
3) Brinjal	C - *Nicotiana tabacum*
4) Wheat	D-*Solanum tuberosum*
	E - *Solanum melongena*

	1	2	3	4
1)	D	C	A	B
2)	C	D	E	B
3)	A	B	C	D
4)	B	A	D	C

21. **List - I** **List - II**

A. Family I) *nigrum*
B. Kingdom II) Polemoniales
C. Order III) *Solanum*
D. Species IV) Plantae
V) Solanaceae

	A	B	C	D
1)	V	IV	II	I
2)	IV	V	III	II
3)	I	II	III	IV
4)	III	II	IV	V

22. **Col-I** **Col-II**

A) Couplet I) Information of any one taxon
B) Lead II) Preserved specimen
C) Monograph III) Specially designed for ready reference
D) Manuals IV) each statement in the key
V) A pair of contrasting characters

1) A-V, B-IV, C-I, D-III
2) A-IV, B-II, C-III, D-I
3) A-I, B-III, C-II D-IV
4) A-III, B-I, C-IV, D-II

23. Match column-I with Column-II and select the correct option from the codes gives below

Column-I **Column-II**

A) Binomial nomenclature (introduced by) I) Linnaeus
B) The Darwin of the 20th century II) Earnst Mayr
C) Father of Botany III) Gaspard Bauhin
D) Father of taxonomy IV) Theophrastus

1) A-III, B-II, C-IV, D-I
2) A-III, B-II, C-I, D-IV
3) A-I, B-II, C-III, D-IV
4) A-II, B-III, C-IV, D-I

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

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

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

25. Which of the following suffix is used for category "Order"?

1) -phyta 2) -phyceae
3) -ales 4) -aceae

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

a) Drying b) Poisoning
c) Collection d) Labelling
e) Mounting f) Deposition
g) Stritching

1) c, a, 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

(TRUE OR FALSE)

27. In plants growth occurs continuously throughout their life span by Meiosis cell division.
28. Non-living objects also grow by accumulation of material on the surface.
29. Fungi multiply & spread easily due to the millions of sexual spores.
30. We are not very clear about the usage of the terms growth & reproduction in bacteria, Amoeba.
31. Reproduction can be taken as a defining property of all living organisms.
32. All living organisms are made up of chemicals. These belongs to various classes, sizes, functions.
33. Thousands of metabolic reactions occurring simultaneously outside all living organisms.
34. Metabolism can be taken as defining property of all living organisms.
35. We sense our environment through our sex organs.
36. All human beings exhibit self-consciousness
37. Properties of tissues are not present in the constitutent cells but arise as a result of interactions among the constituent cells.
38. The number & types of organisms present on earth is known as Biodiversity.
39. Local names of plants and animals would vary from place to place.

40. In plants, identification can be done by indirectly with herbarium specimen (or) directly with the help of keys in flowers.
41. The scientific name of each organism has only one name with two Latin words.
42. Botanical name of each plant written in Latin.
43. Characterisation, Identification, Nomenclature, classification are basic components to Taxonomy.
44. Systematics take into account evolutionary relationship between organisms.
45. In plant and animal kingdoms have species as the lowest taxon.
46. In taxonomic hierarchical sequence 5 taxons present between species kingdom.
47. The species like tuberosum, nigrum, melongena belongs to same genera - Solanum.
48. Family has a group of related genera with still more number of similarities as compared to genus and species.
49. Convolulaceae, Solanaceae families are included in the order polymoniales only based on the floral characters.
50. Dicots and Monocots classes are assigned to a higher category division angiospermae.
51. The taxonomic categories from kingdom to species have been shown in ascending order starting with kingdom.
52. Lower from kingdom to species, the number of common character goes on increases.
53. Problems of classification becomes more complex.
54. The taxon 'Diptera' exhibit more common characters than 'Insecta' and less common characters than muscidae.
55. Only two taxonomic categories are similar in mango and wheat classifications.
56. Identification of organisms required intensive laboratory and field studies.
57. Royal Botanic Garden act as international centre for plant identification.
58. Largest botanical garden in India is Howrah.
59. Famous botanical gardens in India are Indian botanical garden and National Botanical research Institute.
60. In museums, plants and animal specimens preserved either in solutions (or)as dry specimens.
61. Flora provide the index to the plant species found in a particular area.
62. Manuals are useful in providing information for identification of plants found in an area.
63. The influence of the only relative day duration on the flowers response of plants is called photo periodism.
64. In higher plants spores are called Meiospores.
65. In thallophytes, spores are called Mitospores.
66. Metabolism is refers to the sum of anabolism and catabolism.

ANSWERS

1) 2 2) 3 3) 1 4) 1 5) 2
6) 1 7) 3 8) 2 9) 1 10) 1
11) 3 12) 2 13) 2 14) 2 15) 3
16) 1 17) 1 18) 2

(SIMPLE MATCHING TYPE)

19) 2 20) 2 21) 1 22) 1 23) 1
24) 3 25) 3 26) 1

(TRUE OR FALSE)

27) F 28) T 29) F 30) T 31) F
32) T 33) F 34) T 35) F 36) F
37) T 38) T 39) T 40) F 41) T
42) F 43) T 44) T 45) T 46) T
47) T 48) F 49) F 50) F 51) F
52) T 53) T 54) T 55) T 56) T
57) T 58) F 59) T 60) T 61) T
62) T 63) T 64) T 65) T 66) T

EXERCISE-II

(PREVIOUS MEDICAL ENTRANCE EXAMINATION)

1. Founder of binomial nomenclature was (AIPMT 2005)
1) Linnaeus 2) Mendel
3) Darwin 4) Lamarck

2. In binomial nomenclature, every organism has (CBSE 2001)
1) Two names, one Latin other common
2) Two names, one scientific other common
3) Two names by two scientists
4) One scientific name with two words, generic and specific

3. ICBN stands for (DPMT 2011)
1) International classification of biological nomenclature
2) International class of biological nomenclature
3) International code for botanical nomenclature
4) International classification of biological naming

4. First botanist to give binomial nomenclature was (MGIMS, Wardha 2000)
1) Bauhin 2) Aristotle
3) Mendel 4) Hutchinson

5. Binomial nomenclature includes [BHU MPP MT - 2006]
1) genus, species 2) genus, family
3) genus, sub family
4) species, sub-species

6. Binomial nomenclature was introduced by [MPPMT - 2001]
1) Darwin 2) Linnaeus
3) Johnray 4) A. P decondolle

7. Which is the first step of taxonomy? (MGIMS,Wardha 02)
1) Naming 2) Classification
3)Identification 4) Hierarchial arrangement

8. Basic unit of classification is (BHU 2002)
1) Genus 2) Species 3) Order 4) Class

9. Taxon is (MAHE 2007)
1) Any type of taxonomic grouping like species, family, phylum based on similarity of traits
2) A rank in hierarchical classification
3) A group of closely related families
4) A group of closely related organisms

10. Species is considered (CBSE 2003)
1) As basic unit of classification
2) The largest unit of classification
3) Artificial concept of human mind which cannot be defined in absolute terms
4) Real unit of classification devised by taxonomists

11. A group of plants or animals with similar traits of any rank [ODISHA JEE 2009]
1) taxon 2) genus
3) order 4) species

12. Taxon is [CHANDIGARH CET 2000]
1) species 2) unit of classifications
3) highest rank in classification
4) group of closely related organism

13. Each unit of a category of classification is termed as (KERALA CET-2005)
1) taxon 2) order
3) cohort 4) trophic level

14. The lowest taxonomic category in universal usage is [PCS - 2002]
1) genus 2) order 3) species 4) class

15. Cohort is a group of correlated [MHCET- 2004]
1) order 2) species
3) genera 4) families

16. Which is more general in similar characters as compared to genus (CBSE 2001)
1) Family 2) Class
3) Division 4) Species

17. Which one is the correct hierarchial order in taxonomy [JKC MEE - 2009]
1) genus - species - class - order
2) genus - class - order - family
3) species - order - class - phylum
4) genus - class - division - order

18. Which of the following combinations is correct for wheat ? (DPMT 2010)
1) Genus : *Triticum*, Family : Anacardiaceae, Order : Poales, Class : Monocotyledonae

2) Genus : *Triticum*, Family : Poaceae,
Order : Poales, Class : Dicotyledonae
3) Genus : *Triticum*, Family : Poaceae,
Order : Sapindales,
Class : Monocotyledonae
4) Genus : *Triticum*, Family : Poaceae,
Order : Poales,
Class : Monocotyledonae

19. Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature [NEET 2016 PHASE-1]

1) The names are written in Latin and are italicised
2) When written by hand the names are to be underlined.
3) Biological names can be written in any language
4) The first word in a biological name represents the genus name and the second is a specific epithet.

20. The label of a herbarium sheet does not carry information on [NEET 2016 PHASE-2]

1) date of collection 2) name of collector
3) local names 4) height of the plant

21. Match column I with column II for housefly classification and select the correct option using the codes given below [NEET 2016 PHASE-2]

Column - I	Column - II
A. Family	i) Diptera
B. Order	ii) Arthropoda
C. Class	iii) Muscidae
D. Phylum	iv) Insecta

1) A-iii, B-i, C-iv, D-ii
2) A-iii, B-ii, C-iv, D-i
3) A-iv, B-iii, C-ii, D-i
4) A-iv, B-ii, C-i, D-iii

22. Study the four statements (A-D) given below and select the two correct ones out of them [NEET 2016 PHASE-2]

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

23. 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 a taxa.

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

24. Select correctly written scientific name of Mango which was first described by Carolus Linnaeus : NEET-2019

1) Mangifera india Car. Linn.
2) Mangifera india Linn.
3) Mangifera india 4) Mangifera India.

ANSWERS

1) 1	2) 4	3) 3	4) 1	5) 1	6) 2
7) 3	8) 2	9) 1	10) 1	11) 1	12) 2
13) 1	14) 3	15) 4	16) 4	17) 3	18) 4
19) 3	20) 4	21) 1	22) 3	23) 4	24) 2

19. Besides paddy fields, cyanobacteria are also found inside vegetative part of [NEET 2013]

(1) *Cycas* (2) *Equisetum*
(3) *Psilotum* (4) *Pinus*

20. Isogamous condition with non flagellated gametes is found in [NEET 2013]

(1) *Spirogyra* (2) *Volvox*
(3) *Fucus* (4) *Chlamydomonas*

21. Monoecious plant of *Chara* shows occurence of [NEET 2013]

(1) stamen and carpel on the same plant
(2) upper antheridium and lower oogonium on the same plant
(3) upper oogonium and lower antheridium on the same plant
(4) antheridophore and archegoniophore on the same plant

22. Read the following statements (A-E) and answer the question which follows them [NEET 2013]

(A) In liverworts, mosses and ferns gametophytes are free living
(B) Gymnosperms and some ferns are heterosporous
(C) Sexual reproduction in *Fucus*, *Volvox* and *Albugo* is oogamous
(D) The sporophyte in liverworts is more elaborate than that in mosses
(E) Both, *Pinus* and *Marchantia* are dioecious

How many of the above statements are correct?

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

23. Male gametophyte with least number of cells is present in [AIPMT 2014]

(1) *Pinus* (2) *Pteris*
(3) *Funaria* (4) *Lilium*

24. Which one of the following shows isogamy with non-flagellated gametes? [AIPMT 2014]

(1) *Spirogyra* (2) *Sargassum*
(3) *Ectocarpus* (4) *Ulothrix*

25. Which one of the following is wrong about *Chara*? [AIPMT 2014]

(1) Globule is male reproductive structure
(2) Upper oogonium and lower round antheridium
(3) Globule and nucule present on the same plant
(4) Upper antheridium and lower oogonium

26. An alga which can be employed as food for human being is [AIPMT 2014]

(1) *Polysiphonia* (2) *Ulothrix*
(3) *Chlorella* (4) *Spirogyra*

27. Which of the following is responsible for peat formation? [AIPMT 2014]

(1) *Sphagnum* (2) *Marchantia*
(3) *Riccia* (4) *Funaria*

28. Which one of the following statements is wrong? [AIPMT 2015]

(1) *Chlorella* and *Spirulina* are used as space food
(2) Mannitol is stored food in Rhodophyceae
(3) Algin and carrageen are products of algae
(4) Agar-agar is obtained from *Gelidium* and *Gracilaria*

29. In which of the following gametophyte is not independent free living? [AIPMT'15]

(1) *Pteris* (2) *Pinus*
(3) *Funaria* (4) *Marchantia*

30. Read the following five statements (A to E) and select the option with all correct statements: [AIPMT 2015]

(A) Mosses and Lichens are the first organisms to colonise a bare rock.
(B) *Selaginella* is a homosporous pteridophyte.
(C) Coralloid roots in *Cycas* have VAM.
(D) Main plant body in bryophytes is gametophytic, whereas in pteridophytes it is sporophytic.
(E) In gymnosperms, male and female gametophytes are present within sporangia located on sporophyte.

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

31. Male gametes are flagellated in: [AIPMT 2015]

(1) *Ectocarpus* (2) *Spirogyra*
(3) *Polysiphonia* (4) *Anabaena*

32. Which one is a wrong statement ? [AIPMT 2015]

(1) Brown algae have chlorophyll a and c, and fucoxanthin
(2) Archegonia are found in bryophyta, pteridophyta and gymnosperms
(3) *Mucor* has biflagellate zoospores
(4) Haploid endosperm is typical feature of gymnosperms

33. Male gametes are flagellated in: [AIPMT 2015]

(1) *Polysiphonia* (2) *Anabena*
(3) *Ectocarpus* (4) *Spirogyra*

34. Select the correct statement: [NEET -UG I 2016]

(1) Gymnosperms are both homosporous and heterosporous
(2) *Salvinia, Ginkgo* and *Pinus* all are gymnosperms
(3) *Sequoia* is one of the tallest trees
(4) The leaves of gymnosperms are not well adapted to extremes of climate

35. In bryophytes and pteridophytes, transport of male gametes requires :- [NEET -UG I 2016]

(1) Wind (2) Insects
(3) Birds (4) Water

36. Conifers are adapated to tolerate extreme environmental conditions because of : [NEET -UG II 2016]

(1) thick cuticle (2) presence of vessels
(3) broad hardy leaves
(4) superficial stomata

37. Which one of the following statements is wrong ? [NEET -UG I 2016]

(1) Agar-agar is obtained from Gelidium andGracilaria
(2) Laminaria and Sargassum are used as food
(3) Algae increase the level of dissolved oxygen in the immediate environment
(4) Algin is obtained from red algae, and carrageenan from brown algae.

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38. Which of the following statement is correct?

(1) Ovules are not enclosed by ovary wall in gymnosperms
(2) Selaginella is heterosporous. while Salvinia is homosporous
(3) Horsetails are gymnosperms
(4) Stems are usually unbranched in both Cycas and Cedrus

39. Which one is wrongly matched ?

(1) Uniflagellate gametes - Polysiphonia
(2) Biflagellate zoospores - Brown algae
(3) Gemma cups - Marchantia
(4) Unicellular organism - Chlorella

40. Winged pollen grains are present in

(1) Mustard (2) Cycas
(3) Mango (4) Pinus

NEET-2019

41. From evolutionary of view, retention of the female gametophyte with developing young embryo on the parent sporophyte for some time, is first observed in :

1) Liverworts 2) Mosses
3) Pteridophytes 4) Gymnosperms

42. Pholem in gymnosperms lacks :

1) Albuminous cells and sieve cells
2) Sieve tubes only
3) Companion cells only
4) Both sieve tubes and companion cells

ANSWERS

1. (4)	2. (3)	3. (2)	4. (1)	5. (1)
6. (2)	7. (3)	8. (1)	9. (2)	10.(3)
11.(3)	12.(4)	13.(3)	14.(2)	15.(2)
16.(3)	17.(1)	18.(4)	19.(1)	20.(1)
21.(3)	22.(2)	23.(4)	24.(1)	25.(4)
26.(3)	27.(1)	28.(2)	29.(2)	30.(1)
31.(1)	32.(3)	33.(3)	34.(3)	35.(4)
36.(1)	37.(4)	38. (1)	39. (1)	40.(4)
41. (3)	42. (4)			