## SAMPLE CONTENT

Perfect



# BIOLOGY

#### Plank Roots / Buttress Roots

Plank roots often develop at the base of large trees. They are woody lateral extensions around tree trunks which provide extra support to shallowly rooted trees.

STD. XI Sci.

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# PERFECT BIOLOGY Std. XI Sci.

#### Salient Features

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"I never teach my pupils; I only attempt to provide the conditions in which they can learn." – Albert Einstein

"Perfect Biology: Std. XI (Sci.)" forms a part of 'Target Perfect Notes' prepared as per the New Textbook of Maharashtra state board. It focuses on active learning along with making the process of education more interesting and builds up the students' knowledge quotient in the process.

Every chapter in this book begins with 'About the Chapter' that offers a brief introduction of the chapter. The chapter is segregated subtopic-wise and encompasses all textual content in the format of Question-Answers. *Textual Exercise questions, Intext questions, 'Can you tell', 'Can you recall', 'Try this'* and 'Activity' are placed aptly amongst various additional questions in accordance with the flow of subtopic. For the students to gain a better understanding of the concept behind the answer, 'Reading between the lines' (not a part of the answer) has been provided as deemed necessary and access to videos through QR code has been provided for better conceptual understanding. Marks are allotted to give students insight about weightage of a question.

The scope of the book extends beyond the theory examination as it also offers a plethora of Multiple Choice Questions (MCQs) in order to familiarize the students with the pattern of competitive examinations.

While ensuring complete coverage of the syllabus in an effortless and easy to grasp format, emphasis is also given on active learning. To achieve this, we have infused several sections such as, *Gyan Guru, Enrich Your Knowledge, Connections, Cautions, Reading between the lines* and *NCERT Corner*, and additional sections such as, *Apply Your Knowledge, Quick Review, Exercise, Topic Test* and *Competitive Corner*.

Publisher

Edition: Third

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**KEY FEATURES** 



Continued...





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[Reference: Maharashtra State Board of Secondary and Higher Secondary Education, Pune - 04]

**Note:** 1. \* mark represents Textual question.

3. *#* mark represents Intext question.



## **Systematics of Living Organisms**



#### About the chapter...

This chapter introduces students with the various methods of identification, nomenclature and the systems of classification of the biodiversity present on earth. The five kingdoms of Whittaker's system of classification are also explained in details. Viruses that infect plants, animals and bacteria are also introduced in this chapter.

The chapter is allotted weightage of 4 marks with option and 3 marks without option.

- 2.1 Systematics
- 2.2 Classification
- 2.3 Three Domains of Life
- 2.4 Chemotaxonomy
- 2.5 Numerical Taxonomy
- 2.6 Cladogram
- 2.7 Phylogeny

#### 2.1 SYSTEMATICS

- Q.1. Write the definition of systematics given by G. Simpson in 1961. [1 Mark]
- **Ans:** Systematics is the study of kinds and diversity of organisms and their comparative and evolutionary relationship.

#### NCERT Corner

- i. The word systematics is derived from the Latin word 'Systema'. It means the systematic arrangement of organisms.
- ii. Linnaeus used *Systema Naturae* as the title of his publication.
- iii. Systematics considers evolutionary relationships between organisms.

#### Q.2. Explain the term taxonomy. [2 Marks] Ans:

- i. Taxonomy is a branch of biology which deals with the nomenclature, collection, identification, description and classification of plants, animals and micro-organisms.
- ii. It means classification which follows certain rules or principles.
- iii. The word taxonomy comes from two Greek words, taxis meaning arrangement and nomos meaning law or rule.

2.8 DNA Barcoding

CONTENTS AND CONCEPTS

- 2.9 Taxonomic Categories
- 2.10 Taxonomic Hierarchy
- 2.11 Units of Classification
- 2.12 Nomenclature
- 2.13 Salient Features of Five Kingdoms
- 2.14 Acellular Organisms

#### Q.3. Who coined the term taxonomy? [1 Mark]

Ans: The term taxonomy was coined by A.P. de Candolle (Swiss Botanist) [1778-1841].

#### Q.4. Can you tell? (*Textbook page no. 07*) Enlist uses of taxonomy. [3 Marks]

#### Ans: Uses of taxonomy are as follows:

- i. It is used to assign each organism an appropriate place in a systematic framework of classification.
- ii. It is used to group animals and plants by their characteristics and relationships.
- iii. It is used to classify organisms based upon their similarities and differences.
- iv. It is used for nomenclature of an organism.
- v. It is used to serve as an instrument for identification of an organism.
- vi. It becomes easier to understand the evolutionary trends in different groups of organisms.

#### 2.2 CLASSIFICATION

#### Q.5. Define the term classification. What is the basis of classification? [2 Marks] Ans:

- i. Classification is the arrangement of organisms or groups of organisms in distinct categories in accordance with a particular and wellestablished scheme or plan.
- ii. It is based on the similarities and differences among the organisms.

- Q.6. Can you tell? (*Textbook page no. 07*) Which characters of organisms are visible characters? [1 Mark]
- **Ans:** The visible characters of organisms include habit, colour, mode of respiration, growth, reproduction, etc.
- Q.7. What are the three types of classification systems? [3 Marks]
- Ans: The three types of classification systems are:

#### i. Artificial system:

- a. It is based on few visible, easily observable characters, which are non-evolutionary such as habit, colour, form, etc.
- b. It does not consider the affinities (relationships) among different organisms.

E.g. Linnaeus system of classification.

**ii. Natural system:** It is based on objectively significant characters with respect to their affinities with other organisms.

E.g. Bentham and Hooker's system of classification.

**iii. Phylogenetic system:** It is based on the phylogenetic relationship between different organisms with respect to common evolutionary descent (ancestor).

E.g. Engler and Prantl's classification.

#### 2.3 THREE DOMAINS OF LIFE

- Q.8. Can you tell? (*Textbook page no.* 07) What is evolution? [1 Mark]
- **Ans:** Evolution is changes in the heritable characteristics of a species over several generations and relies on the process of natural selection.
- Q.9. What is domain? Name the three domains of life. [2 Marks]

#### Ans:

- i. Domain is a unit of classification of living beings and it is a larger unit than Kingdom.
- ii. Three domains of life are Archaea, Bacteria and Eukarya.

#### Q.10. Who proposed the three-domain system?

#### [1 Mark]

- Ans: Carl Woese proposed the three-domain system.
- Q.11. State one similarity and difference between archaea and bacteria? [2 Marks]
- **Ans:** Both archaea and bacteria are prokaryotic. They differ in their cell wall structures.

Archaea are known for their survival in very extreme conditions like high temperature, salinity, acidic conditions, etc.

### **Q.12. Which domain has eukaryotic cells?** [1 Mark] **Ans:** Domain Eukarya has eukaryotic cells.

#### 2.4 CHEMOTAXONOMY

## Q.13. What is chemotaxonomy? Explain with example. [3 Marks]

#### Ans:

- i. It is a method of biological classification based on the similarities and differences in structure of certain chemical compounds present among the organisms being classified.
- ii. Thus, it is a classification based on chemical constituents of organisms.
- iii. For e.g. Cell wall with peptidoglycan is present in Bacteria while it is absent in Archaea. Among Eukarya, fungi have chitinous cell wall, while plants have cellulosic cell wall.

#### 2.5 NUMERICAL TAXONOMY

#### Q.14. Write a short note on numerical taxonomy.

[3 Marks]

#### Ans: Numerical taxonomy:

- i. It is based on quantification of characters and develops an algorithm for classification.
- ii. The aim of this was to create a taxonomy using numeric algorithms like cluster analysis rather than using subjective evaluation of their properties.
- iii. It was proposed by R. Sokal and P. Sneath in 1963.

#### 2.6 CLADOGRAM

Q.15. What is cladogram? Give a diagrammatic representation of three domains of life with the help of cladogram. [3 Marks]

Ans:

- i. It is a representation of hypothetical relationship denoting a comparison of organisms and their common ancestors.
- ii. It has a typical branching pattern.



#### 2.7 PHYLOGENY

#### Q.16. Write in detail about the Phylogeny. [2 Marks] Ans: Phylogeny:

- i. It is the evolutionary relationship of organism.
- ii. It is an important tool in classification as it considers not merely the morphological status but also the relationship of one group of organisms with other groups of life.



#### **Chapter 2: Systematics of Living Organisms**

- iii. The system helps to understand the evolution and also focuses on the similarities of their metabolic functioning.
- Woese's three domain concept as well as Whittaker's five kingdom system are examples of phylogenetic relationship (classification of living beings according to their evolutionary steps)

#### 2.8 DNA BARCODING

Q.17. Can you tell? (*Textbook page no. 07*) What is DNA barcoding?

#### [1 Mark]

**Ans:** DNA barcoding is a new method for identification of any species based on its DNA sequence, which is obtained from a tiny tissue sample of the organism under study.

#### ENRICH YOUR KNOWLEDGE

#### **DNA Barcoding:**

It is a recent development in genetics, in which a short DNA sequence is read from genetic sample obtained from the organism. This sequence is recorded in a public database such as Genbank. This sample is then compared against all other samples present in the genbank to know how closely related two organisms are.

In a case study, it was used to demonstrate that the common butterfly from Central America was in fact a group of closely related species with very related morphological characters living within the same regions. This discovery exposed a hidden wealth of biodiversity.

#### Q.18. What is the use of DNA barcoding? [1 Mark]

- **Ans:** DNA barcoding helps to study newly identified species as well as understanding ecological and evolutionary relationships between living organisms.
- Q.19. What are the steps involved in the process of DNA barcoding? [1 Mark]
- Ans: The process of DNA barcoding includes two basic steps:
- i. Collecting DNA barcode data of known species.
- ii. Matching the barcode sequence of the unknown sample against the barcode library for identification.
- Q.20. What are the applications of DNA barcoding? [3 Marks]
- **Ans:** The applications of DNA barcoding are as follows:
- i. It helps to protect endangered species.
- ii. It plays an important role in preservation of natural resources.
- iii. It is also used for pest control in agriculture.
- iv. It is used for identification of disease vectors.
- v. It is used for authentication of natural health products.

vi. It is also used for identification of medicinal plants.

#### Q.21. Can you tell? (*Textbook page no. 07*) Name the recent approaches in taxonomy.

[2 Mark]

- Ans: The recent approaches in taxonomy includes:
- i. Morphological Approach
- ii. Embryological Approach
- iii. Ecological Approach
- iv. Behavioral Approach / Ethological Approach
- v. Genetical Approach / Cytological Approach
- vi. Biochemical Approach
- vii. Numerical Taxonomy

#### READING BETWEEN THE LINES

- *i. Morphological Approach:* It deals with the identification of an organism on the basis of its morphological features which are observed by naked eye or with the help of microscope.
- *ii. Embryological Approach: Embryonic stage of an organism helps greatly in identification. It is used in those cases where morphological approach in less reliable.*
- *iii. Ecological Approach:* It is based on the various habits of an organism.
- *iv.* Behavioral Approach / Ethological Approach: It is extremely useful in identification of closely related species. Organisms are identified on the basis of their ethological characters. These characters are genetically determined. e.g. Sound production, bioluminescence, etc.
- v. Genetical Approach / Cytological Approach: Identification of organisms at a cellular level. It includes structural, genetical and biochemical aspects. In this DNA hybridization and karyological studies are used.
- vi. Biochemical Approach: Organisms are identified on the basis of biochemical composition. In this, Chromatography, Electrophoresis and Immunology techniques are used.
- vii. Numerical Taxonomy: In this method the data is numerically evaluated in the computer and similarities / differences between organisms is obtained with relative ease. After comparison, the organisms are grouped according to overall similarities or dissimilarities.

#### 2.9 TAXONOMIC CATEGORIES

#### Q.22. What is taxonomic category? [2 Marks] Ans:

- i. Category is a rank or level in the hierarchial classification of organisms.
- ii. Kingdom, division, class, order, family, genus, species are the main taxonomic categories.
- iii. Each category is referred to as a unit of classification.

- iv. Category is a part of taxonomic arrangements hence, called taxonomic category.
- v. All categories in their increasing or retrogressive order together constitute the taxonomic hierarchy.
- Q.23. What are the compulsory taxonomic categories? [1 Mark] Ans: Refer Q.22 (ii)
- Q.24. What are the facultative taxonomic categories? [1 Mark]
- **Ans:** Sub-order, sub-family, etc. are the facultative categories which are used when required.

#### 2.10 TAXONOMIC HIERARCHY

#### Q.25. Define taxonomic hierarchy. [1 Mark]

- **Ans:** The manner of scientific grouping of different taxonomic categories in a descending order on the basis of their ranks or positions in classification is called taxonomic hierarchy.
- Q.26. Define the term Taxon. Give some examples of taxa at different hierarchial levels. [2 Marks] Ans:
- i. Taxon is a group of living organisms of any rank in the system of classification.

In plant kingdom, each taxonomic group such as angiospermae, dicotyledonae, polypetalae, malvaceae represents a taxon.

#### Q.27. Can you tell? (*Textbook page no. 09*)

	Make	a	flow	chart	showing	taxonomic
	hierar	chy.				[1 Mark]
Ans:	Kingdor	n⊣	Sub-k	ingdom	→ Divisio	n/Phylum →

Class  $\rightarrow$  Cohort/Order  $\rightarrow$  Family  $\rightarrow$  Genus  $\rightarrow$  Species

#### 2.11 UNITS OF CLASSIFICATION

#### Q.28. Write the classification of:

i. China Rose	ii. C	Cobra
Ans:		
	China Rose	Cobra
Kingdom	Plantae	Animalia
<b>Division / Phylum</b>	Angiospermae	Chordata
Class	Dicotyledonae	Reptilia
Sub-class	Polypetalae	Diapsida
Series	Thalamiflorae	-
Order	Malvales	Squamata
Family	Malvaceae	Elapidae
Genus	Hibiscus	Naja
Species	rosa-sinensis	naja

NCERT Corner								
ORGANISMS WITH THEIR TAXONOMIC CATEGORIES:								
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	Mangifera	Anacardiaceae	Sapindales	Dicotyledonae	Angiospermae		
Wheat	Triticum aestivum	Triticum	Poaceae	Poales	Monocotyledonae	Angiospermae		

#### Q.29. Do Yourself (Textbook page no. 16)

Complete the table (given on textbook page no.16) through collecting information about sunflower, tiger with characteristic features.

i. Sunflower:

Category	Taxon	Characteristics		
Kingdom	Plantae	Autotrophic, photosynthetic, cell wall present.		
Sub-kingdom	Phanerogamae	Seed producing plants, reproductive structures are visible.		
Division	Angiospermae	Seeds are enclosed within the fruit.		
Class	Dicotyledonae	Two cotyledons, tap root system, reticulate venation, pentamerous		
		symmetry of flower, vascular bundle open.		
Order	Asterales	Capitulum inflorescence, showing ray florets and disc florets.		
Family	Asteraceae	Aster family		
Genus	Helianthus	-		
Species	annuus	-		

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#### **Chapter 2: Systematics of Living Organisms**

#### ii. Tiger:

Category	Taxon	Characteristics		
Kingdom	Animalia	Multicellular eukaryotes,		
		cell wall absent,		
		heterotrophic nutrition.		
Phylum	Chordata	Notochord present		
Class	Mammalia	Presence of mammary		
		gland		
Order	Carnivora	Carnivorous in nature		
Family	Felidae	Cat-like mammals		
Genus	Panthera	Large cats		
Species	tigris	-		

#### Q.30. Explain the following terms: [2 Marks Each]

i.	Species	ii.	Genus
iii.	Family	iv.	Order
v.	Class	vi.	<b>Division / Phylum</b>
vii.	Sub kingdom	viii.	Kingdom
Ans:			

- i. Species:
- a. Species is the principal lowest natural taxonomic unit, ranking below a genus.
- b. It is a group of organisms that can interbreed under natural condition to produce fertile offspring.
- c. It was thought to be an indivisible, stable and static unit.
- d. However, in the modern taxonomy, subdivision of species such as sub-species, varieties and populations are seen and given more importance.

#### ii. Genus:

- a. Genus is a higher taxonomic rank or category larger than species used in the biological classification of living and fossil organisms.
- b. Genus is a group of species bearing close resemblance to one another in their morphological characters but they do not interbreed.
- c. For e.g. Tiger, Leopard, Lion all three belong to same genus *Panthera*. They have common characters yet are different from each other because their genus is same but species is different.
- d. Another example is genus *Solanum*. Brinjal and potato both belong to this genus.

#### iii. Family:

- a. It is one of the major hierarchial taxonomic rank.
- b. A family represents a group of closely related genera.

- c. For e.g. genera like *Hibiscus, Gossypium, Sida, Bombax* are included in same family Malvaceae.
- d. Although, there are many similarities between cat and dog, cat belongs to the family of leopards, tigers and lions, i.e. family Felidae and dog belongs to different family i.e. Canidae.

#### iv. Cohort/Order:

- a. It is taxonomic rank used in the classification of organisms and recognised by nomenclature codes.
- b. An order is a group of closely related families showing definite affinities.
- c. Members belonging to same order but different families may show very few dissimilarities.
- d. For e.g. family Papaveraceae, Brassicaceae, Capparidaceae, etc with parietal placentation are grouped in order Parietales.
- e. Families of dogs and cats though are different, they belong to same order Carnivora.

#### v. Class:

- a. The class is the distinct taxonomic rank of biological classification having its own distinctive name.
- b. Class is the assemblage of closely related or allied orders.
- c. For e.g. Orders **Carnivora** and order **Primates** belong to class **Mammalia**. Thus monkeys, gorillas, gibbons (**Primates**) and dogs, cats, tigers (**Carnivora**) belong to same class.

#### vi. Division/ Phylum:

- a. The division is a category composed of closely related classes.
- b. For e.g. division **Angiospermae** includes two classes **Dicotyledonae** and **Monocotyledonae**.
- c. In animal classification, instead of division, the category Phylum is used.

#### vii. Sub-kingdom:

- a. Different divisions having some similarities form sub-kingdom.
- b. The divisions Angiospermae and Gymnospermae forms the sub-kingdom Phanerogams or Spermatophyta (all seed producing plants).

#### viii. Kingdom:

- a. It is the highest taxonomic category composed of different sub-kingdoms.
- b. For e.g. sub-kingdom **Phanerogams** and **Cryptogams** form the Plant kingdom or **Plantae** which includes all the plants, while all animals are included in kingdom **Animalia**.

#### NCERT Corner

Lower the taxa, more common are the characteristics of members. Higher the category, greater is the difficulty of determining the relationship to other taxa at the same level. This makes classification more complex.

#### Q.31. Can you tell? (Textbook page no.09)

Why horse and ass are considered to be twodifferent species or animals?[2 Marks]

- Ans:
- i. Species is a group of organisms that can interbreed under natural conditions to produce fertile offsprings.
- ii. Horse and ass (donkey) are considered to be two different species or animals, because; they cannot interbreed under natural condition to produce fertile offspring.

#### READING BETWEEN THE LINES

Horse and ass belong to the genus Equus of Equidae family. Though they belong to same genus they are genetically different. Chromosomes present in horse and ass are 64 and 62 respectively. Their hybrid offspring have 63 chromosomes. As chromosomes of horse and ass are dissimilar their offspring are unable to produce cells required for reproduction. Thus, because of the odd number of chromosomes the offspring is sterile.

#### 2.12 NOMENCLATURE

Q.32. Define nomenclature.

#### [1 Mark]

- **Ans:** The art of giving name to the organism is called nomenclature.
- Q.33. What is meant by vernacular name? [1 Mark]
- **Ans:** Vernacular names are the names which are given to organisms in a particular region and language by local people.
- Q.34. What are the disadvantages of vernacular names of organisms? [2 Marks]
- Ans: Disadvantages of vernacular names/ local names/ common names:
- i. Vernacular names do not indicate the necessary information about the organism.
- ii. It does not indicate proper relationship of the organisms.

- iii. Vernacular names are not universal. e.g. Pansy (Viola tricolor L.) grown in most European and American gardens has about 50 common english names. In Ayurveda, mango (Mangifera indica L.) is known by over 50 different names which are in Sanskrit language.
- iv. Vernacular names have limited usage.
- v. Local names are different and confusing.
- Q.35. Who proposed binomial system of nomenclature? [1 Mark]
- Ans: Swedish naturalist Carl Linnaeus proposed binomial system of nomenclature.
- Q.36. What is binomial nomenclature? Give the rules for binomial nomenclature. [4 Marks]

#### Ans:

- i. A system of nomenclature of plants and animals in which the scientific name consists of two words (genus and species) or parts or epithets is called **binomial nomenclature**.
- ii. This system of nomenclature was developed by Carl Linnaeus. He gave certain principles for this nomenclature in his book 'Species Plantarum'.
  - **Rules of binomial nomenclature:**
- i. The name of the organism is composed of two Latin or Greek words.
- ii. Generic name is a simple noun which should come first and always begin with a capital letter.
- iii. Specific epithet is the descriptive adjective which should come later and begin with a small letter.
- iv. The generic and specific epithet must be underlined separately if hand written or in italics when printed.
- v. The generic as well as specific name should not have less than three letters and more than thirteen letters.
- vi. Usually the name of the author who names a plant or animal is also written in full or abbreviated form after scientific name. e.g. *Mangifera indica* L. Where L stands for **Linnaeus**.

#### Q.37. Why is binomial nomenclature important?

[3 Marks]

- Ans: Binomial nomenclature is important because;i. The binomials are simple, meaningful and precise.
- ii. They are standard since they do not change from place to place.
- iii. These names avoid confusion and uncertainty created by local or vernacular names.
- iv. The organisms are known by the same name throughout the world.

- v. The binomials are easy to understand and remember.
- vi. It indicates phylogeny (evolutionary history) of organisms.
- vii. It helps to understand inter-relationship between organisms.

#### ENRICH YOUR KNOWLEDGE

## ICNAFP (International Code of Nomenclature for Algae, Fungi and Plants):

Before 2011, scientific names were confirmed by ICBN (International Code of Botanical Nomenclature). In July 2017, XIX International Botanical Congress (IBC) was held in Shenzhen, China. This code is called Shenzhen code, so the old code ICBN has been changed to ICNAFP (International Code of Nomenclature for Algae, Fungi and Plants). This code was published on 26th June 2018.

#### \*Q.38. The scientific name of sunflower is given below. Identify the correctly written name. [1 Mark]

- A. Helianthus annus
- B. Helianthus Annus
- C. *Helianthus annuus* L.
- D. *Helianthus annuus l.*
- Ans: The correctly written scientific name of sunflower is *Helianthus annuus* L.
- Q.39. In *Mangifera indica* L., what does letter 'L' indicate? [1 Mark]
- Ans: In *Mangifera indica* L., letter L indicates author's name i.e. Linnaeus.

Q.40. Internet my friend: (Textbook page no. 9)

- i. Collect the information about most recent system of classification of living organisms and Kingdom System of Classification. e.g. Search for APG system of classification for Plants.
- Ans: [Note: Students are expected to collect more information about most recent system of classification of living organisms and Kingdom System of Classification from internet on their own.]

[APG system of classification for plants: http://francescofiume.altervista.org/taxa/APG.p df]

- ii. Collect the information about classification systems for all types of organisms.
- Ans: [Note: Students are expected to collect more information about classification systems for all types of organisms from internet on their own.]

#### 2.13 SALIENT FEATURE OF FIVE KINGDOMS

- Q.41. Which kingdoms were included in two kingdom system of classification? Who introduced it? [1 Mark]
- Ans: The two-kingdom system of classification included Kingdom plantae and Kingdom animalia. This system was introduced by Carl Linnaeus.
- Q.42. What was the drawback of two kingdom system of classification? [1 Mark]
- **Ans:** Two kingdom system was found inadequate for classification of some organisms like bacteria, fungi, *Euglena*, etc.

#### NCERT Corner

Two kingdom system of classification was developed by Linnaeus, in which all plants and animals were classified into kingdom plantae and kingdom animalia respectively. Two kingdom system of classification did not distinguish between unicellular and multicellular organisms, eukaryotes and prokaryotes, photosynthetic and non-photosynthetic organisms.

#### ------

## Q.43. Who suggested five kingdom system of classification? [1 Mark]

**Ans:** R.H. Whittaker suggested five kingdom system of classification.

#### Q.44. Can you recall? (*Textbook page no. 06*)

#### What is Five Kingdom system of classification?

**Ans:** Five kingdom system of classification was proposed by R.H. Whittaker in 1969. This system shows the phylogenetic relationship between the organisms.

#### The five kingdoms are:

- i. Kingdom Monera ii. Kingdom Protista
- iii. Kingdom Plantae iv. Kingdom Fungi
- v. Kingdom Animalia

#### READING BETWEEN THE LINES

The criteria used by Whittaker for his system were:

- *i. Cell organization: The organism is either prokaryotic or eukaryotic.*
- *ii. Body organization:* The organism is either unicellular or multicellular.
- *iii. Mode of nutrition:* The organism is either autotrophic or heterotrophic.
- *iv. Life style:* The organism may be a producer, consumer or decomposer.



#### \*Q.45. Write short note on five kingdom system.

[2 Marks]

Ans: Refer Q.44.

#### Q.46. Can you tell? (*Textbook page no. 11*) What are salient features of Monera? [4 Marks]

#### Ans: Salient features of Kingdom Monera:

- i. Size: The organisms included in this kingdom are microscopic, unicellular and prokaryotic.
- **ii. Occurrence:** These are **omnipresent**, means, they are found in all types of environment i.e. habitats which are not generally inhabited by other living beings.
- iii. Nucleus: These organisms do not have well defined nucleus. DNA exists as a simple double stranded circular, single ring, without nuclear membrane called as nucleoid. Apart from the nucleoid they often show presence of extrachromosomal DNA which is small circular called plasmids.
- **iv.** Cell wall: Cell wall is made up of peptidoglycan (also called murein) which is a polymer of sugars and amino acids.
- v. Membrane bound cell organelles: Membrane bound cell organelles like mitochondria, chloroplast, and endoplasmic reticulum are absent. Ribosomes are present, which are smaller in size (70S) than in eukaryotic cells.
- vi. Nutrition: Majority are heterotrophic, parasitic or saprophytic in nutrition. Few are autotrophic that can be either photoautotrophs or chemoautotrophs.

- vii. **Reproduction:** The mode of reproduction is asexual or with the help of binary fission or budding. Very rarely, sexual reproduction occurs by conjugation method.
- viii. Examples: Archaebacteria: e.g. *Methanobacillus*, *Thiobacillus*, etc.

Eubacteria: e.g. *Chlorobium*, *Chromatium*, and Cyanobacteria e.g. *Nostoc*, *Azotobacter*, etc.

#### READING BETWEEN THE LINES

Locomotion in members of kingdom Monera: The organisms may be either motile or non-motile. If motile, the locomotion is due to flagella or due to gliding movements.

#### \*Q.47. What are the salient features of Monera? [4 Marks]

#### Ans: Refer Q.46.

#### Q.48. Match the following.

	Column I		Column II
i.	Vibrio	a.	Rod-shaped
ii.	Bacillus	b.	Spherical
iii.	Spirillum	c.	Spiral shaped
		d.	Comma or kidney shaped

Ans: (i-d), (ii-a), (iii-c)

#### Q.49. Can you tell? (Textbook page no. 11)

What will be the shape of a bacillus and<br/>coccus type of bacteria?[1 Mark]

**Ans:** The shape of bacillus type of bacteria is rodshaped and coccus is spherical.



#### **Chapter 2: Systematics of Living Organisms**

- \*Q.50. What will be the shape of bacillus and coccus type of bacteria? [1 Mark] Ans: Refer Q.49.
- Q.51. Identify the different shapes of bacterial cells shown in the given figures:



Ans: Figure a: Coccus;Figure b: Coccobacillus;Figure c: VibrioFigure d: Bacillus;Figure e: Spirillum;Figure f: Spirochete

#### Q.52. What are Archaebacteria? [3 Marks] Ans:

- i. These are the most primitive type of bacteria.
- ii. They are differentiated from other bacteria on the basis of their different cellular features.
- iii. Their cell wall is without peptidoglycan.
- iv. They reproduce by binary fission.
- v. These bacteria are mostly found in the extreme environmental conditions, hence called **extremophiles**.
- vi. Bacteria that can withstand high salinities are called **halophiles**, while those that withstand extreme temperature are known as **thermophiles**. **Methanogenic** bacteria found in gut of ruminants (cows and buffaloes) help in production of methane in biogas plants.

## Q.53. Why are archaebacteria called extremophiles? [2 Marks]

#### Ans:

- i. These bacteria are mostly found in the extreme environments, hence called extremophiles.
- ii. They have capacity to survive in very severe conditions.
- iii. They are found in a variety of places from volcanic craters to salty lakes and hot springs.

#### Q.54. Write in detail about Eubacteria. [3 Marks] Ans: Eubacteria:

- i. These are commonly referred as true bacteria.
- ii. They have cell wall made up of peptidoglycan.
- iii. Eubacteria are mostly heterotrophic, few are autotrophic.
- iv. The autotrophs can be photosynthetic like *Chlorobium* (Green sulphur bacteria) and *Chromatium* or chemosynthetic like sulphur bacteria.

- v. These are mostly multicellular filamentous forms living in fresh water.
- vi. Filaments show heterocyst which helps in nitrogen fixation.
- vii. The body is covered by mucilaginous sheath.
- viii. The eubacterial cell is typical prokaryotic.
- ix. The photosynthetic pigments include Chl-a, Chl-b, carotenes and xanthophylls.
- x. Most of them are decomposers that help in breaking down large molecules in simple molecules or minerals.

#### NCERT Corner

#### Chemosynthetic autotrophic bacteria:

- i. They oxidise various inorganic substances such as nitrates, nitrites and ammonia and used the released energy for their ATP production.
- ii. They play great role in recycling nutrients like N<sub>2</sub>, P, Fe, S.

#### Q.55. Can you tell? (Textbook page no. 11)

Write a note on useful and harmful bacteria. Ans:

i. Useful bacteria: Most of the bacteria act as a decomposer. They breakdown large molecules into simple molecules or minerals.

Examples of some useful bacteria:

*Lactobacillus*: It helps in curdling of milk. *Azotobacter*: It helps to fix nitrogen for plants.

*Streptomyces*: It is used in antibiotic production such as streptomycin.

Methanogens: These are used for production of methane (biogas) gas from dung.

*Pseudomonas* spp. and *Alcanovorax borkumensis*: These bacteria have the ability to destroy the pyridines and other chemicals. Hence, used to clear the oil spills.

**ii. Harmful bacteria:** This includes disease causing bacteria. They cause various diseases like typhoid, cholera, tuberculosis, tetanus, etc.

**Examples of some harmful bacteria:** *Salmonella typhi:* It is a causative organism of typhoid.

Vibrio cholerae: It causes cholera.

*Mycobacterium tuberculosis*: It causes tuberculosis. *Clostridium tetani*: It causes tetanus.

Clostridium spp.: It causes food poisoning.

Many forms of mycoplasma are pathogenic.

*Agrobacterium*, *Erwinia*, etc are the pathogenic bacteria causing plant diseases.

Animals and pets also suffer from bacterial infections caused by *Brucella*, *Pastrurella*, etc.

- \*Q.56. Write a short note on useful and harmful bacteria. [4 Marks] Ans: Refer Q.55.
- Q.57. Identify label X and Y in the given figure of Cyanobacteria (*Nostoc*). [1 Mark]



Ans: X: Heterocyst; Y: Mucilaginous sheath

#### Q.58. What is Mycoplasma? [2 Marks] Ans:

- i. These are the smallest living cells known.
- ii. They lack cell wall.
- iii. Many forms are pathogenic.
- iv. They are resistant to common antibiotics because they lack cell wall.

#### **READING BETWEEN THE LINES**

Mycoplasma can survive without oxygen.

#### \*Q.59. Identify the following diagram, label it and write detail information in your words.

[3 Marks]



Ans: The given figure represents Paramoecium.



Characteristiscs:

- i. It belongs to kingdom Protista. It is further classified as animal like protist.
- ii. It lacks cell wall.

- iii. It shows heterotrophic and holozoic nutrition.
- iv. It is a ciliated protozoan where locomotion is due to cilia.
- v. It has gullet (a cavity) which opens on the cell surface.
- \*Q.60. Draw neat and labelled diagram of Paramoecium. [2 Marks]
- Ans: Refer Q.59.
- Q.61. Which kingdom shows link with all eukaryotic members? [1 Mark]
- **Ans:** Kingdom Protista shows link with all eukaryotic kingdoms such as kingdom plantae, fungi and animalia.
- Q.62. Unicellular eukaryotic organisms are included in which kingdom? [1 Mark]
- Ans: Unicellular eukaryotic organisms are included in kingdom Protista.
- Q.63. Give different types of Protists with examples. [4 Marks]
- Ans: Protists are of different types:
- i. Plant like protists (Photosynthetic protists):
- a. They are termed as phytoplanktons, also known as **Chrysophytes**.
- b. They are autotrophic (photosynthetic) in nature and form major producers of ocean ecosystem.
- c. Most of them are referred as **Diatoms** because they have body wall made up of two soap-box like fitting silica covers. E.g. Diatoms.

#### 1. Dinoflagellates:

- i. They are aquatic (mostly marine) and autotrophic (photosynthetic).
- ii. They have wide range of photosynthetic pigments which can be yellow, green, brown, blue and red.
- iii. The cell wall is made up of cellulosic stiff plates.
- iv. A pair of flagella is present, hence they are motile.
- v. They are responsible for famous **'red tide'**. E.g. *Gonyaulax*. It makes sea appear red.
- 2. Euglenoids:
- i. They lack cell wall but have a tough covering of proteinaceous pellicle.
- ii. Pellicle covering provides flexibility and contractibility to *Euglena*.
- iii. They possess two flagella, one short and other long.
- iv. They behave as heterotrophs in absence of light but possess pigments, similar to that of higher plants, for photosynthesis.

Chapter 2: Systematics of Living Organisms

- ii. Animal like protists (Consumer protists):
- a. They are the primitive animal forms.
- b. They are also termed as **protozoans**.
- c. These are heterotrophic and lack cell wall.
- d. **Amoeboid protozoans** have pseudopodia as locomotory organs. E.g. *Amoeba*, *Entamoeba*. *Amoeba* is free living form, but *Entamoeba* is endoparasite and causes amoebic dysentery.
- e. **Flagellated protozoans** have flagella as locomotory organ. E.g. *Trypanosoma*.
- f. **Cilliated protozoans** have cilia for locomotion. E.g. *Paramoecium*.
- g. *Plasmodium* is a **Sporozoan protozoa**. It causes malaria. It forms spores in one of its life stages.

ENRICH YOUR KNOWLEDGE

#### Nuclear Dimorphism in Ciliate protozoan:

- i. Ciliate protozoan like *Paramoecium* shows Nuclear Dimorphism i.e presence of micronucleus and macronucleus.
- ii. Micronucleus performs reproductive functions whereas macronucleus is vegetative in function.
- iii. Fungi like protists (Consumer decomposer protists):
- a. They form a group called Myxomycetes.
- b. They are saprophytic in nature, found on decaying leaves.
- c. Their cells aggregate to form a large cell mass called **plasmodium**.
- d. The spores of plasmodium are very tough and survive extreme conditions. e.g. Slime molds.
- Q.64. Why diatoms are used in filtration and polishing? [2 Marks]
- Ans: Diatoms forms a substance called **Diatomaceous earth**. These are the shells of diatoms containing silica that left behind for many years. Diatomaceous earth is granular; hence it is used in polishing and filtration.
- Q.65. Label the given figures representing ventral and dorsal view of *Gonyaulax*.





\*Q.66. Identify the following diagram, label it and write detail information in your words.



Ans: The given figure represents Euglena.



#### **Characteristics:**

- i. It belongs to kingdom Protista. It is further classified into **euglenoids**.
- ii. Refer Q.63. (i-2)

#### ENRICH YOUR KNOWLEDGE

#### Euglena

It possesses two flagella inserted in a flask shaped gullet. Out of two flagella, one is very short and does not protrude from the cell. Only one long flagellum emerges out from the gullet

#### \*Q.67. Draw neat and labelled diagram of *Euglena*.

[3 Marks]

[3 Marks]

**Ans:** *Refer Q.66.* 

#### Q.68. Write the characteristics of Kingdom plantae.

#### Ans: Characteristics of Kingdom plantae:

i. Kingdom plantae is dominated by autotrophs.

- ii. Some members are insectivorous plants. E.g. Venus fly trap, pitcher plant, bladderwort, while some are heterotrophic parasitic members like *Cuscuta*.
- iii. Members of this kingdom are eukaryotic, multicellular, having eukaryotic cells containing chlorophyll.
- iv. Their cell wall is mostly made up of cellulose.
- v. They exhibit alternation of generation i.e. life cycle has two distinct phases.
- vi. It is divided into two major groups Cryptogams and Phanerogams.

#### र्दुत Connections

In chapter 3, you will study classification of Kingdom Plantae in detail.

- Q.69. Give the general characters of Kingdom Fungi with examples. [4 Marks]
- Ans: General characters of Kingdom Fungi:
- i. Type of organisms: It is a unique kingdom of eukaryotic heterotrophic organisms, showing extracellular digestion. They may be unicellular or multicellular and filamentous. These are commonly found in warm and humid places.
- **ii. Nucleus:** The cells may be multinucleate or uninucleate.
- iii. Body: Multicellular organisms consist of a body called mycelium in which a number of thread or fibre-like structures called hyphae are present. The hyphae may be with septa (septate) or without septa (aseptate). The non-septate multinucleated hyphae are called coenocytic hyphae.
- iv. Cell wall: The cell wall in fungi is composed of chitin or fungal cellulose.
- v. Cell organelles: The fungi contain well organized membrane bound cell organelles except the chloroplasts.
- vi. Nutrition: The fungi exhibit heterotrophic mode of nutrition and most of the members are saprophytes and absorb food which is decomposed (digested) outside. Some are parasitic or predators.
- vii. **Reproduction:** They reproduce both sexually as well as asexually. Asexual reproduction takes place by fragmentation, fission and budding.
- **viii.** Some fungi are symbiotic. These fungi either live with algae as lichens or as mycorrhiza in association with roots of higher plants.

#### Q.70. Can you tell? (Textbook page no. 14)

#### Classify fungi into their types.

**Ans:** Fungi are classified into four types on the basis of their structure, mode of spore formation and fruiting bodies as follows:

#### i. Phycomycetes:

Members of this class are commonly called as algal fungi.

These are consisting of aseptate coenocytic hyphae.

They grow well in moist and damp places on decaying organic matter as well as in aquatic habitats or as parasites on plants.

e.g. *Mucor*, *Rhizopus* (bread mold), *Albugo* (parasitic fungus on mustard).

#### ii. Ascomycetes:

These are commonly called as **sac fungi**.

These are multicellular. Rarely they are unicellular (e.g. Yeast).

Hyphae are branched and septate.

They can be decomposers, parasites or coprophilous (grow on dung).

Some varieties of this class are consumed as delicacies such as morels and truffles.

*Neurospora* is useful in genetic and biochemical assays.

e.g. *Aspergillus*, *Penicillium*, *Neurospora*, *Claviceps*, *Saccharomyces* (unicellular ascomycetes).

#### iii. Basidiomycetes:

These are commonly called as **club fungi**.

They have branched septate hyphae.

e.g. *Agaricus* (mushrooms), *Ganoderma* (bracket fungi), *Ustilago* (smuts), *Puccinia* (rusts), etc.

#### iv. Deuteromycetes:

It is a group of fungi which are known to reproduce only asexually.

They are commonly called **imperfect fungi**.

They are mainly decomposers, while few are parasitic.

e.g. Alternaria.

#### ENRICH YOUR KNOWLEDGE

**Deuteromycetes:** Deuteromycetes reproduce only by asexual spores known as conidia. When sexual stage gets discovered in species, they would be reclassified according to sexual stage.

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NCERT COTTEE								
Reproduction in fungi:								
Reproduction	Phycomycetes	Ascomycetes	Basidiomycetes	Deuteromycetes				
Asexual	Motile zoospores, non-	Conidia produced	Generally, not	Conidia				
reproduction	motile aplanospores	exogenously on	found.					
	produced endogenously	conidiophores.						
	in sporangium.	Conidia on						
		germination produce						
		mycelium.						
Sexual	Zygospore formation	Ascospores are	Plasmogamy occurs	Either absent or				
reproduction	occurs due to isogamy	produced in sac like	$\rightarrow$ fusion of two	not known				
	(similar gametes fuse) or	asci (sing. ascus)	vegetative cells					
	anisogamy (dissimilar	endogenously. Asci	$\rightarrow$ give rise to					
	gametes fuse) or oogamy	are arranged in	basidium					
	(small flagellated male	fruiting bodies called	$\rightarrow$ karyogamy and					
	gamete and non-	ascocarps.	meiosis occurs in					
	flagellated large female		basidium to produce					
	gamete fuse).		four basidiospores.					

#### \*Q.71. Identify the following diagram, label it and write detail information in your words.



## Ans: The given figure represents *Mucor*. Characteristics:

- i. It belongs to class phycomycetes of kingdom fungi.
- ii. Mycelium is made up of aseptate coenocytic hyphae.
- iii. It commonly grows on decaying fruits, vegetables, in soil, on various food- stufflike bread, jellies, jams, etc.
- iv. In favourable conditions mucor reproduces asexually by formation of spores within sporangia. It can also reproduce by sexual means.



\*Q.72. Identify the following diagram, label it and write detail information in your words.





- Ans: The given figure represents *Aspergillus*. Characteristics:
- i. It belongs to class ascomycetes of kingdom Fungi.
- ii. It is multicellular.
- iii. The hyphae are branched and septate.
- iv. *Aspergillus* grows well in soil, decaying vegetation, hay, dung, on plants, etc.
- v. Asexual reproduction takes place by spores called conidia which are produced at the tip of hyphae called conidiophores.





\*Q.73. Identify the following diagram, label it and write detail information in your words.



- Ans: The given figure represents *Agaricus* (Mushroom). Characteristics:
- i. It belongs to class basidiomycetes of kingdom Fungi.
- ii. It has branched septate hyphae.
- iii. It grows in soil, on rotten wood, etc.
- iv. It is edible and rich in proteins.
- v. Vegetative reproduction takes place by fragmentation.



Q.74. Can you tell? (Textbook page no. 14)

Write a note on economic importance of<br/>fungi.[2 Marks]

Ans: Economic importances of fungi are as follows:

#### i. Role of fungi in medicine:

- a. Antibiotic penicillin is obtained from *Penicillium*.
- b. Drugs like cyclosporine, immunosuppressant drugs, precursors of steroid hormones, etc are isolated from fungi.

#### ii. Role of fungi in industries:

- a. Yeast is used in bread making. It causes dough to rise and make the bread light and spongy. It is also used in breweries or wine making industries. Sugars present in grapes are fermented by using yeast. This results in production of alcohol which is used for making wine.
- b. Lichen is a symbiotic association of algae and fungi are used in preparation of litmus paper which is used as acid-base indicator.

#### iii. Role of fungi in food:

a. Fungi like mushrooms are consumed as a food. These are rich source of protein.

- b. Fungi genus *Penicillium* helps in ripening of cheese.
- iv. Role of fungi as biocontrol agents:
- a. Fungi help to control growth of weeds.
- b. Pathogenic fungi like *Fusarium* sp., *Phytophthora palmivora, Alternaria crassa*, etc act as mycoherbicides.

\*Q.75. Write short note on useful fungi. [3 Marks] Ans: *Refer Q.74.* 

- Q.76. Can you tell? (*Textbook page no. 14*) Why are fungi considered as heterotrophic organisms? [2 Marks]
- **Ans:** In fungi, chloroplast is absent, thus they cannot synthesize their own food by photosynthesis. Fungi decompose the organic matter by breaking down with the help of enzymes from which they absorb nutrients. Thus, exhibiting heterotrophic mode of nutrition.

#### Q.77. Can you tell? (*Textbook page no. 14*) What are coenocytic hyphae? [2 Marks]

Ans:

- i. In filamentous fungi, body consists of mycelium which is formed by a network of hyphae.
- ii. When these hyphae are non-septate, multinucleated, they are known as coenocytic hyphae.

Q.78. Explain how fungi exhibit heteromorphic mode of nutrition? [2 Marks]

#### Ans:

- i. Most of the members of kingdom fungi are saprophytes.
- ii. They absorb food which is decomposed (digested) outside.
- iii. Some are parasites or predators and some are symbiotic.
- iv. In fungi, chloroplast is absent, thus they cannot synthesize their own food by photosynthesis. Due to this, fungi exhibit heteromorphic mode of nutrition.

## Q.79. Identify the given picture and explain in detail. [3 Marks]



Ans: The given picture represents Lichens.

- i. Lichen is an association of an alga and fungus.
- ii. It is the best example of symbiosis or mutualism.
- iii. They are found in extreme environments like snow clad poles.

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#### **Chapter 2: Systematics of Living Organisms**

- iv. The algal component of lichen is phycobiont, mostly belongs to cyanobacteria (blue-green algae) or green algae and fungal component is mycobiont.
- v. Algae prepare the food and supply it to the fungal component, while fungal component provides shelter to algae and also absorbs water and minerals for algae.
- vi. The association is intense and it is difficult to identify them as separate living beings.
- vii. They are very sensitive to pollutions, hence not found in polluted areas.
- viii. They are used as pollution indicators.
- ix. They play an important role in soil formation by using specific acid productions.

[Note: Lichens cannot be categorized as acellular organisms.]

GG - Gyan Guru

#### Lichens as natural sunscreen

Lichens have evolved to survive the intense sunlight. Xanthoria parietina is a foliose lichen. It contains a yellow pigment 'parietin'. This pigment has the property of absorbing UV radiation. It acts as a sunscreen to protect the algal cells. These protective chemicals can be incorporated in human sunscreens too.

Q.80. Can you tell? (*Textbook page no. 14*)

#### i. How are fungi different from plants?

#### [2 Marks]

#### Ans: Fungi are different from plants because:

- a. They lack chloroplast hence, do not perform photosynthesis and are heterotrophic in nutrition. Whereas plants are autotrophic and prepare their own food by photosynthesis.
- b. They are separated from Plantae based on their saprophytic mode of nutrition.
- c. Fungi are decomposers of ecosystem whereas plants are producers of ecosystem.
- d. In fungi, cell wall is made up of fungal cellulose or chitin. Whereas in plants, cell wall is made up of cellulose and pectic compounds.

## ii. Have you seen any diseased plant in your farm? [2 Marks]

- Ans: Yes, I have seen some diseased plants in our farm. There are different pathogens like fungi, bacteria, viruses that cause diseases in plants. The common plant diseases are:
- **a.** Leaf rust disease: It is caused by fungus *Puccinia triticina*. It is the most common rust disease of wheat.

- **b. Blight disease in rice:** It is caused by harmful bacteria *Xanthomonas oryzae*. It causes wilting of seedlings and yellowing and drying of leaves.
- c. Early blight of potato: It is caused by fungi *Alternaria solani*. It causes 'bulls eye' patterned leaf spots and tuber blight on potato.
- **d.** Crown gall disease: It is caused by *Agrobacterium tumefaciens*. This pathogen infects the plant and forms rough surfaced galls on stem and roots.

[Students are expected to write their observations about diseased plants found in farms]

- Q.81. Write the general characters of Kingdom Animalia with examples. [3 Marks]
- Ans: General characters of Kingdom Animalia:
- i. **Types of organisms:** The organisms are multicellular and eukaryotic.
- **ii. Habitat:** The organisms may be aquatic, terrestrial, amphibious or aerial in habitat.
- iii. Cell organelles: The organisms do not possess cell wall, plastids and central vacuole.
- iv. Locomotion: Majority of the animals are motile. However, few like sponges are sedentary.
- v. Sense organs: They possess sense organs, nervous system and respond to stimuli by exhibiting certain behaviour.
- vi. **Reproduction:** They mostly reproduce sexually by producing gametes, while some can reproduce asexually.
- vii. Nutrition: They are heterotrophic, mostly holozoic, sometimes parasitic.
- viii. Growth: It is determinate. (follow definite pattern)

र्दु Connections

Anc.

In chapter 4, you will study the classification of Kingdom Animalia in detail.

#### Q.82. Can you tell? (*Textbook page no. 14*)

#### Differentiate between Plantae and Animalia. [3 Marks]

No.	Plantae	Animalia		
i.	Autotrophic mode of	Heterotrophic mode		
	nutrition.	of nutrition.		
ii.	They do not show	They show		
	locomotion.	locomotion.		
iii.	Cell wall is present.	Cell wall is absent.		
iv.	Chloroplast present.	Chloroplast absent.		
V.	They do not possess	They possess well		
	nervous system.	developed nervous		
		system.		
vi.	Reproduction can be	Mainly shows		
	both sexual and asexual.	sexual reproduction.		



[Note: Scan the given Q. R. Code in Quill - The Padhai App for detail classification of given tree diagram.]



#### Q.86. Observe and discuss:

Animal like Protista

Complete the following table on the basis of previous knowledge.

- Entamoeba

Characters	Monera	Protista	Fungi	Plantae	Animalia
Cell type	Prokaryotic	Eukaryotic	Eukaryotic	Eukaryotic	Eukaryotic
Cell wall		Present in some		Present	
		organisms		(cellulose)	
Nuclear	Absent	Present	Present		Present
membrane					
Body	Unicellular		Multicellular/	Tissue /organ	Tissue /organ
organization			loose tissue		system
Mode of		Autotrophic		Autotrophic	
nutrition		Photosynthetic,		(Photosynthetic)	
		Heterotrophic			
Ecological	Decomposers		Decomposers		Consumers
role					
Ans:					

#### Ans:

ii.

Characters	Monera	Protista	Fungi	Plantae	Animalia
Cell type	Prokaryotic	Eukaryotic	Eukaryotic	Eukaryotic	Eukaryotic
Cell wall	Present (Peptidoglycan)	Present in some organisms	Present (chitin)	Present (cellulose)	Absent
Nuclear membrane	Absent	Present	Present	Present	Present
Body organization	Unicellular	Unicellular	Multicellular/ loose tissue	Tissue /organ	Tissue /organ system



**Chapter 2: Systematics of Living Organisms** 

Characters	Monera	Protista	Fungi	Plantae	Animalia
Mode of	Heterotrophic	Autotrophic	Heterotrophic	Autotrophic	Heterotrophic
nutrition	(saprophytic/	Photosynthetic,	(saprophytic/	(Photosynthetic)	(holozoic)
	parasitic)	Heterotrophic	parasitic)		
	Autotrophic				
	(Photoautotrophic/				
	Chemoautotrophic)				
Ecological	Decomposers	Producers and	Decomposers	Producers	Consumers
role	_	consumers			

#### 2.14 ACELLULAR ORGANISMS

- Q.87. Who referred virus as 'contagium vivum fluidum'? [1 Mark]
- **Ans:** M. W. Beijerinck referred virus as 'contagium vivum fluidum (infectious living fluid).'
- Q.88. Who demonstrated that viruses are inert when outside the host cell and can be crystallised? [1 Mark]
- **Ans:** Stanley demonstrated that viruses are inert and can be crystallised.
- Q.89. Can you tell? (Textbook page no. 15)

Why are viruses called infectiousnucleoproteins?[2 Marks]

#### Ans:

- i. Viruses are acellular, highly infectious and ultramicroscopic.
- ii. Viruses are made up of only genetic material and protein. Genetic material is either DNA or RNA, but never both. The genetic material in viruses is covered by a protein coat (capsid), hence called nucleoprotein.
- iii. They do not show any activity outside the body of host; but once they enter their specific host cell, they start multiplying within the living host cells.
- iv. Viruses lack their own metabolic machinery, they make use of the cellular machinery of the host i.e. ribosome for the synthesis of protein during their reproduction; and therefore, they cause severe infection.

Thus, they are called infectious nucleoproteins.

#### Q.90. What is the structure of virus? [2 Marks] Ans:

- i. Viruses are acellular and ultramicroscopic.
- ii. Genetic material in viruses is usually either single stranded RNA (very rarely double stranded RNA) or double stranded DNA (rarely single stranded DNA).
- iii. Their genetic material is protected by a protein coat called **capsid**.
- iv. Capsid is made up of smaller units called **capsomeres**.

v. Capsomeres are arranged in polyhedral or helical forms thus, imparting that particular shape to the virus.

#### \*Q.91. Complete chart and explain in your word.



Depending upon the host, viruses are classified into three types as:

- i. Plant virus
- ii. Animal virus
- iii. Bacterial virus (Bacteriophage)

#### i. Plant virus:

- a. Generally, they are rod shaped or cylindrical with helical symmetry.
- b. Majority of plant viruses have RNA as their genetic material. (Exception: Cauliflower Mosaic Virus has double stranded DNA as genetic material)
- c. Plant viruses cause disease in plants. e.g. Tobacco Mosaic Virus (TMV).

#### ii. Animal virus:

- a. Generally, they are polyhedral in shape with radial symmetry.
- b. They have either DNA or RNA as genetic material.
- c. It causes disease to majority of animals including human beings. e.g. Influenza virus.

#### iii. Bacteriophage:

- a. They have tadpole-like shape.
- b. They infect bacteria and hence are called as bacteriophage.
- c. Bacteriophages were discovered by Twort.
- d. Bacteriophages have double stranded DNA as the genetic material.
- e. Its body consists of head, collar and tail.

#### Q.92. Can you tell? (*Textbook page no. 15*) Describe genetic material in plant and animal

viruses as well as in bacteriophages. [3 Marks]

- **Ans:** The genetic material in different viruses is as given below:
- i. Plant virus: Refer Q.91. (i-b)
- ii. Animal virus: Refer Q.91. (ii-b)
- iii. Bacteriophage: Refer Q.91. (iii-d)

#### \*Q.93. Identify the following diagram, label it and write detail information in your words.

[3 Marks]



Ans: The given figure represents Bacteriophage.





#### \*Q.94. Draw a neat labelled diagram of TMV.





animals and bacteria.

iv.

v.

e.g.

The genetic material

can be ss-RNA, ds-

Protein coat is present.

Leaf mosaic disease is

a plant disease caused

RNA or DNA.

by viruses.

plants.

RNA.

The genetic material is

single stranded circular

Protein coat is absent.

Tomato chloric dwarf

is a plant disease

caused by viroids.

#### Q.98. Internet my friend. (Textbook page no. 15)

In modern medicine, certain infectious neurological diseases were found to be transmitted by abnormally folded proteins. These proteins are called prions. The word prion comes from 'proteinaceous infectious particle'. e.g. mad cow disease in cattle, Jacob's disease in human. Find more information about prions.

#### Ans: Prions:

- i. A prion is a misfolded form of a protein generally present in brain cells.
- ii. When the prion gets into a cell containing the normal form of the protein, the prion somehow converts normal protein molecules to the misfolded prion versions.
- iii. Several prions then aggregate into a complex that can convert other normal proteins to prions.
- iv. Prions can be transmitted through blood, surgical instruments and contaminated food.
- v. Diseases caused by prions are Bovine Spongiform Encephalopathy in cattles, Kuru and Creutzfeldt Jakob disease in humans.

[Note: Students are expected to search for more information about Prions on internet]

#### **PRACTICAL / PROJECT**

\*Q.99. Make a group of students. Observe living organisms in your school/college campus and try to write their characters with respect to habit, habitat, mode of nutrition, growth- determinate or indeterminate, type of reproduction - vegetative reproduction, asexual reproduction, sexual reproduction. With the help of similarity and dissimilarity, try to classify organisms into different categories. Similar work should implement for animal group.

Sr. No.	Living organisms	Habitat	Mode of nutrition	Growth	Types of reproduction
i.	Plants: (Habit: Herb,	Terrestrial or	Autotrophic	Indeterminate	Vegetative, asexual and
	shrub, tree, etc.)	aquatic			sexual reproduction.
ii.	Animal: e.g. Dog,	Terrestrial	Heterotrophs	Determinate	Only sexual reproduction
	cats, cow, etc.				
iii.	Birds: e.g. Crow,	Aviary (diverse	Heterotrophs	Determinate	Only sexual reproduction
	sparrow, etc.	habitat)			

Ans: The common living organisms observed near school/college are:

[Note: Students are expected to collect more information about characteristics of living organisms and classify them into different categories]

## **Q.100.** Find out types of lichens and its economic importance.

#### Ans: Types of lichens are:

- i. Based on fungal components:
- a. Ascolichens: In this category, the fungal partner belongs to Ascomycetes group of fungi.
- **b. Basidiolichens:** Here, the fungal partner belongs to Basidiomycetes group of fungi.
- **c. Deuterolichens:** In this category, the fungal partner belongs to Deuteromycetes group of fungi.

#### ii. Based on their forms:

**a. Crustose lichen:** These lichens show crust-like growth. These lichens grow on rocks and bark of the trees.

e.g. Graphis, Lecanora, Haematomma, etc.

**b.** Foliose lichen: These lichens grow on trees in the hilly regions. The thallus is like a dry forked leaf.
e.g. *Parmelia*, *Collema*, *Peltigera*

c. Fruticose lichen: These lichens are seen on the branches of trees hanging down. They are cylindrical, well branched and pendulous, with hair-like outgrowths. e.g. Usnea, Cladonia, Alectoria, etc.

#### iii. Economic importance of lichens:

a. Lichen as food and fodder: Many species of lichens are used as food by animals including man. Lichens contain a substance lichenin which is similar to carbohydrate making them edible.

*Parmelia* is used in curry powder in India. Lichens like *Cladonia, Citraria, Evernia, Parmelia* are used as fodder as they form a favourite food for reindeers and cattles.

b. Lichens in medicine: Lichens contain usnic acid due to which they are used in medicines. *Usnea* and *Cladonia* species are used as an antibiotic against Gram positive bacteria.



Some lichens are also used in medicine due to their anticarcinogenic property.

#### Industrial use of lichens: c.

- 1. Lichens are used in various dyes for colouring fabrics.
- 2. Species like *Rocella* and *Lasallia* are used in preparation of litmus paper which is acidbase indicator.
- 3. In Sweden and Russia, lichens are used for production of alcohol.
- 4. Orcein is a biological stain obtained from Orchrolechia androgyna and O. tortaria.
- 5. Some lichens are also used in tanning process in leather industry.
- 6. Evernia and Ramalina are the sources of essential oils which are used in preparation of soaps and other cosmetics.

#### d. Other uses of lichens:

- 1. Lichens are used in cosmetics.
- 2. Some lichens like Evernia prunastri also known as oakmoss is used in making perfumes.
- 3. Lichen is also used as a preservative for beer.

#### APPLY YOUR KNOWLEDGE

- **O.101.** In your laboratory you accidentally discover an old permanent slide without a label. You are curious to identify it, and you place the slide under the microscope. You observe the following features:
- i. Well-organized nucleus ii. Unicellular
- iii. Biflagellate - one placed longitudinally and the other transversely.
- Ans: All unicellular eukaryotes form a connecting link between prokaryotic Kingdom Monera and complex eukaryotic Kingdoms Plantae, Fungi and Animalia.

Since the specimen shows the presence of two flagella, one placed longitudinally and the other transversely, the given organism can be dinoflagellate and has to be placed under Kingdom Protista.

#### Q.102. Name the following:

- The kingdom which includes the smallest i. living forms.
- The protists which behave as heterotroph in ii. absence of light but performs photosynthesis in presence of light
- These are infectious single stranded RNA, iii. smaller than virus

#### Ans:

- Kingdom Monera Euglena i. ii. Viroids
- iii.

#### **QUICK REVIEW**

#### **Taxonomic Hierarchy**

Kingdom  $\rightarrow$  Sub-kingdom  $\rightarrow$  Division/phylum  $\rightarrow$  Class  $\rightarrow$  Cohort /order  $\rightarrow$  Family  $\rightarrow$  Genus  $\rightarrow$  Species



|--|

	EXERCISE	
2.1	Systematics	
1. Ans:	Define Systematics. <i>Refer Q.1.</i>	1 Mark]
2.2	Classification	
2. Ans:	What is classification? <i>Refer Q.5. (i)</i>	[1 Mark]
3.	Explain different methods of classificat	ion. <mark>3 Marks]</mark>
Ans:	Refer Q.7.	
2.3	Three Domains of Life	
4. Ans:	Name the domain system proposed Woese.	by Carl 1 Mark]
5. Ans:	Name three domains of life. [ <i>Refer Q.9. (ii)</i>	1 Mark]
2.4	Chemotaxonomy	
6. Ans:	Write a short note on chemotaxonomy. [. <i>Refer Q.13.</i>	3 Marks]
2.5	Numerical Taxonomy	
7.	What is numerical taxonomy? Who pro	posed it? 2 Marks]
Ans:	Refer Q.14.	
2.6	Cladogram	
8. Ans:	Write a note on cladogram? [2 <i>Refer Q.15</i> .	2 Marks]
2.7	Phylogeny	
9. Ans:	Write a short note on phylogeny. [2 <i>Refer Q.16.</i> ]	2 Marks]
2.8	DNA Barcoding	
10. <b>Ans:</b>	Explain DNA barcoding. [3 <i>Refer Q.17. 18, 19, and 20.</i>	Marks]
2.9	Taxonomic Categories	
11. Ans:	Explain the term taxonomic category. [ <i>A Refer Q.22</i> .	2 Marks]
12. Ans:	Give the classification of cobra. [2 <i>Refer Q.28. (ii)</i>	2 Marks]
13. Ans:	Give the classification of china-rose. [2 <i>Refer Q.28. (i)</i>	2 Marks]
2.10	Taxonomic Hierarchy	
14.	What is taxon? Give any one example of	of it. 2 Marks]
Ans:	Refer Q.26.	

2.11	Units of Classification
15. Ans:	Which are the units of classification? [1 Mark] <i>Refer Q.30.</i>
16. Ans:	Explain the following terms by giving oneexample of each:[1 Mark Each]i.Sub-kingdomii.Genusiii.OrderRefer Q.30. (vii), (ii), (iv)
17. Ans:	'A family represents a group of closely related genera'. Give one example to justify the statement. [1 Mark] <i>Refer Q.30. (iii-c)</i>
2.12	Nomenclature
18.	What does letter 'L' indicates in Mangifera indica L.,?       [1 Mark]         Baferr Q 20       [1 Mark]
Ans:	Refer Q.39.
19.	<ol> <li>Define binomial nomenclature system.</li> <li>Who proposed it?</li> <li>Why a unique name for a particular individual is essential in a multilingual country like India?</li> </ol>
Ans:	i. <i>Refer Q.36. (i)</i> ii. <i>Refer Q.36. (ii)</i> iii. <i>Refer Q.34.</i>
20.	Why is binomial nomenclature useful for classification of organisms?[3 Marks]Pater Q 37
Alls.	Salient Features of Five Kingdoms
21. 21.	Which are the two kingdoms of organisms given by Carl Linnaeus? What was the drawback of this system?[2 Marks]Refer O 41 and O 42
22.	Name the five kingdoms given by Whittaker [1 Mark]
Ans:	Refer Q.44.
23. Ans:	Unicellular prokaryotic organisms are included in which kingdom? [1 Mark] <i>Refer O 46. (i)</i>
24.	Explain kingdom Monera with the help of given points: [3 Marks] i. Nucleus ii. Reproduction iii. Nutrition

- **Ans:** *Refer Q.46. (iii), (vii), (vi)*
- 25. Give examples of archaebacteria and eubacteria. [2 Marks]
- Ans: Refer Q.46. (viii)26. What is mycoplasma?Ans: Refer Q.58.

27. Ans:	Enlist different types of protozoa. <i>Refer Q.63. (ii)</i>	[1 Mark]
28.	Which are the different types of protist	s? [ <b>1 Mark]</b>
Ans:	Refer Q.63.	[]
29. Ans:	What are dinoflagellates? <i>Refer Q.63. (i-1)</i>	[1 Mark]
30. Ans:	Explain animal like protists. <i>Refer Q.63. (ii)</i>	[2 Mark]
31. Ans:	Give examples of insectivorous plants. <i>Refer Q.68. (ii)</i>	[1 Mark]
32. Ans:	What are the two major group is kingdom plantae is divided? <i>Refer O.68. (vi)</i>	in which [1 Mark]
33. Ans:	Explain fungi like protist. [2 <i>Refer Q.63. (iii)</i>	2 Marks]
34.	What are the characteristics of eugleno	ids? 2 Marksl
Ans:	Refer Q.63. (i-2)	
35.	Explain in detail general characters of Fungi.	Kingdom 4 Marks]
Ans:	Refer Q.69.	
36. Ans:	Why do fungi exhibit heterotrophic nutrition? [2 <i>Refer O.69. (vi)</i>	mode of 2 Marks]
37.	Name the four classes of kingdom fungi.	[1 Mark]
Ans:	<i>Refer Q.70.</i>	
38. Ans:	Explain in detail the class of kingd which includes yeast. [2 <i>Refer Q.70. (ii)</i>	om fungi 2 Marks]
39.	Why deuteromycetes are called imperfe	ect fungi? 2 Marksl
Ans:	Refer Q.70. (iv)	
40. Ans:	What are lichens? <i>Refer Q.79.</i>	[1 Mark]
41.	What is the fungal partner in lichen cal	led? [1 Mark]
Ans:	Refer Q.79. (iv)	
42.	What is the algal partner in lichen calle	d? [1 Mark]
Ans:	Refer Q.79. (iv)	
43.	Why lichens are considered as indicators?	pollution [1 Mark]
		1.1. 1.1.1
44. Ans:	Holozoic mode of nutrition is observed kingdom? <i>Refer Q.81. (vii)</i>	i in which [1 Mark]

45.	Who coined the name contagium vivum fluidum? [1 Mark]		
Ans:	Refer Q.87.		
46.	What is the genetic material in viruses?		
Ans:	[1 Mark] Refer Q.89. (ii)		
47. Ans:	What are bacteriophages?[1 Mark]Refer Q.91. (iii)		
48.	Give example of viral disease caused in humans. [1 Mark]		
Ans:	Refer Q.95. (ii)		
49. Ans:	Who discovered viroids?[1 Mark]Refer Q.96. (ii)		
50. Ans:	What is the genetic material in viroids? [1 Mark] Refer Q.96. (iv)		
51. Ans:	How viroids differ from viruses? [2 Marks] <i>Refer Q.97.</i>		
	MULTIPLE CHOICE QUESTIONS		
	[1 Mark Each]		
1.	<ul> <li>The term 'Taxonomy' was coined by</li> <li>(A) Carl Linnaeus</li> <li>(B) A.P. de Candolle</li> <li>(C) Carl Woese</li> <li>(D) R.H Whittaker</li> </ul>		
2.	Arrangementoforganismsintodistinctcategories is called(A)Taxonomy(B)Taxon(C)Nomenclature(D)Classification		
3.	The domain known for its survival in very extreme condition like high temperature, salinity, etc. is(A) Eukarya(B) Archaea(C) Bacteria(D) Cyanobacteria		
4.	Kingdom Protista, Fungi, Plantae and Animaliaare included under domain(A) Eukarya(B) Archaea(C) Bacteria(D) Cyanobacteria		
5.	Which system of classificationwas based uponeasily observable characters?(A) Natural(B)(C) Artificial(D)(D) DNA barcoding		
6.	System based upon chemical constituents of organisms isconstituents of Phylogeny(A)Cladogram(B)Phylogeny(C)DNA barcoding(D)chemotaxonomy		

2.14 Acellular Organisms



7.

8.

9.

10.

11.

12.

13.

14.

15.

16.

17.

18.

In Helianthus annuus, 'annuus' indicates

(B)

(D)

species

class

genus

family

(A)

(C)

30. Agaricus belongs to class

(A)

Deuteromycetes (B) Phycomycetes

Fungi

Animalia

Thermophiles

Psychrophiles

rod shaped

Mushroom

Moss

Ustilago

Euglena

Euglenoid

Mycomycetes

sporangium

fruiting body

Yeast

Lichen

spiral

(C) Basidiomycetes (D) Ascomycetes

- 31. Which of the following is harmful fungus that causes diseases in plants?
  - (A) *Puccinia* (B) Mushroom
  - (C) Yeast (D) Streptomyces
- 32. Which of the following is NOT true about kingdom animalia?
  - (A) Members are heterotrophs.
  - (B) They lack chlorophyll as well as cell wall.
  - (C) Growth is indeterminate.
  - (D) Most of the members have capacity of locomotion.
- 33. Which of the following are virus free varieties of banana produced by tissue culture technique?
  - (A) Shrimanti (B) Basarai
  - (C) G-9 (D) All of these
- \*34. Which of the following shows single stranded RNA and lacks protein coat?
  - (A) Bacteriophage (B) Plant virus
  - (C) Viroid (D) Animal virus
- 35. The fungal component of lichen is called
  - (A) phycobiont(B) photobiont(C) mycobiont(D) symbiont
  - **ANSWERS TO MULTIPLE CHOICE QUESTIONS**

1.	(B)	2.	(D)	3.	(B)	4.	(A)
5.	(C)	6.	(D)	7.	(B)	8.	(D)
9.	(B)	10.	(A)	11.	(B)	12.	(C)
13.	(A)	14.	(D)	15.	(A)	16.	(A)
17.	(B)	18.	(B)	19.	(C)	20.	(C)
21.	(B)	22.	(B)	23.	(C) o	r (D)	
24.	(A)	25.	(A)	26.	(A)	27.	(D)
28.	(A)	29.	(A)	30.	(C)	31.	(A)
32.	(C)	33.	(D)	34.	(C)	35.	(C)

[Note: Q. 23. Methanogens and Cyanobacteria are autotrophs as they both have the capacity to synthesize their own food. They derive energy by converting inorganic compound to organic compound]

**COMPETITIVE CORNER** 

- Which of the following are found in extreme saline conditions? [NEET (UG) 2017]
   (A) Archaebacteria (B) Eubacteria
  - (A) Archaebacteria(B) Eubacteria(C) Cyanobacteria(D) Mycobacteria
- Hint: Bacteria found in extremely saline conditions are called halophiles. Archaebacteria includes bacteria that survive in most harsh habitats such as extreme salty area, hot springs and marshy area.

- Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen? [NEET (UG) 2017]
  - (A) Bacillus (B) Pseudomonas
  - (C) Mycoplasma (D) Nostoc
- 3. Viroids differ from viruses in having
  - [NEET (UG) 2017]
  - (A) DNA molecules with protein coat
  - (B) DNA molecules without protein coat
  - (C) RNA molecules with protein coat
  - (D) RNA molecules without protein coat
- **Hint:** Viroids are smaller than viruses. They are regarded as sub-viral agents or free RNA, without protein coat (usually found in viruses). They are infectious RNA. e.g. Potato spindle tuber disease.
- 4. In the system of classification, which one of the following is NOT a category? [MHT CET 2018]
  (A) Kingdom (B) Series
  - (C) Angiospermae (D) Genus

Hint: Angiospermae is a taxon.

- 5. Which one of the following characteristics is NOT shown by a virus? [MHT CET 2018]
  - (A) They are acellular.
  - (B) They can be crystallised.
  - (C) Active outside the host's body.
  - (D) Have genetic material.

Hint: Viruses are inert outside the host cell.

- Select the correctly written scientific name of Mango which was first described by Carolus Linnaeus: [NEET Odisha 2019]
  - (A) Mangifera indica
  - (B) Mangifera Indica
  - (C) Mangifera indica Car. Linn.
  - (D) Mangifera indica Linn
- **Hint:** The author's name appears after the specific epithet i.e. at the end of the biological name in this manner *Mangifera indica* Linn.
- Match the organisms in Column I with habitats in Column II. [NEET Odisha 2019]

	Column-I		Column-II
i.	Halophiles	a.	Hot springs
ii.	Thermoacidophiles	b.	Aquatic environment
iii.	Methanogens	c.	Guts of ruminants
iv.	Cyanobacteria	d.	Salty areas

Select the correct answer from the options given below:

- (A) i-b, ii-d, iii-c, iv-a
- (B) i-d, ii-a, iii-c, iv-b
- (C) i-a, ii-b, iii-c, iv-d
- (D) i-c, ii-d, iii-b, iv-a

- 8. the following statements is Which of CORRECT? [NEET Odisha 2019]
  - Lichens are not good pollution indicators. (A)
  - Lichens do not grow in polluted areas. **(B)**
  - Algal component of lichens is called (C) mycobiont.
  - (D) Fungal component of lichens is called phycobiont.
- Hint: Lichens are good pollution indicators as they do not grow in polluted areas.
- 9. Match Column - I with Column - II.

[NEET (UG) 2019]

	Column - I		Column - II
i.	Saprophyte	p.	Symbiotic association of
			fungi with plants roots
ii.	Parasite	q.	Decomposition of dead
iii.	Lichens	r.	Living on living plants or
			animals
iv.	Mycorrhiza	S.	Symbiotic association of
			algae and fungi

Choose the correct answer from the options given below:

- (A) i-q, ii-p, iii-r, iv-s
- (B) i-q, ii-r, iii-s, iv-p
- (C) i-p, ii-q, iii-r, iv-s
- (D) i-r, ii-q, iii-p, iv-s
- 10. Lowest category in the hierarchial system of classification is [MHT-CET 2019] (B) order **(A)** species (C) kingdom (D) genus
- Which group of fungi is called imperfect fungi? 11. [MHT-CET 2019]
  - Phycomycetes (B) Ascomycetes
  - (A) **Deuteromycetes** (D) Basidiomycetes **(C)**
- Which one of the following is an INCORRECT 12. [MHT-CET 2019] pair?
  - Three kingdom system of classification (A)  $\rightarrow$  Haeckel
  - Three domain system of classification **(B)**  $\rightarrow$  Adolf Mayr
  - (C) Five Kingdom system of classification  $\rightarrow$  R.H.Whittaker
  - (D) Two kingdom system of classification  $\rightarrow$  Carolus Linnaeus

- **Hint:** Three domain system of classification  $\rightarrow$  Carl Woese
- Which of the following is CORRECT about 13. viroids? [NEET (UG) P-I 2020] **(A)** They have free RNA without protein
  - (B) They have DNA with protein coat.

coat.

- They have free DNA without protein coat. (C)
- They have RNA with protein coat. (D)
- Which of the following is INCORRECT about 14. Cvanobacteria? [NEET (UG) P-II 2020] **(A)** They lack heterocysts.
  - They often form blooms in polluted water (B) bodies.
  - (C) They have chlorophyll 'a' similar to green plants.
  - (D) They are photoautotrophs.
- 15. In the taxonomic categories which hierarchical arrangement in ascending order is correct in case of animals? [NEET (UG) 2022]
  - Kingdom, Order, Class, Phylum, Family, (A) Genus, Species
  - (B) Kingdom, Order, Phylum, Class, Family, Genus, Species
  - Kingdom. Phylum, Class, Order, **(C)** Family, Genus, Species
  - (D) Kingdom, Class, Phylum, Family, Order, Genus, Species
- 16. Which of the following is a correct statement?

[NEET (UG) 2022]

- Slime moulds are saprophytic (A) organisms classified under Kingdom Monera.
- Mycoplasma have DNA, Ribosome and (B) cell wall.
- Cyanobacteria are a group of **(C)** autotrophic organisms classified under **Kingdom Monera.**
- Bacteria are exclusively heterotrophic (D) organisms.
- Hint: Slime moulds are saprophytic organisms classified under Kingdom Protista. Mycoplasma lack cell wall.

Bacteria may be photosynthetic, chemosynthetic or heterotrophic.

Time: 1 Hour 30 Min **Total Marks: 25** TOPIC TEST **SECTION A O.1.** Select and write the correct answer: [04] i. Which of the following shows single stranded RNA and lacks protein coat? (A) Bacteriophage (B) Plant virus Viroid (C) (D) Animal virus Which of the following is harmful fungus that causes diseases in plants? ii. (A) Puccinia Mushroom Yeast (B) (C) (D) Streptomyces

- iii. Which among the following is an order? (A) Malvales (B) Polypetalae (C) Angiospermae (D)
- iv. Kingdom Protista, Fungi, Plantae and Animalia are included under domain (A) Eukarya (B) Archaea (C) Bacteria (D)

#### Q.2. Answer the following:

- i. What is binomial nomenclature?
- ii. What is the use of DNA Barcoding?
- iii. Which kingdom shows link with all the eukaryotic members?

#### **SECTION B**

#### **Attempt any Four:**

- Q.3. What are Archaebacteria?
- Q.4. Match the column.

	Kingdom		Examples
i.	Monera	a.	Riccia
ii.	Protista	b.	Cyanobacteria
iii.	Plantae	c.	Rhizopus
iv.	Fungi	d.	Diatoms

- Q.5. Justify. Fungi are different from plants.
- Q.6. Distinguish between kingdom Plantae and Animalia.
- Q.7. Draw a neat labelled diagram of bacteriophage.
- Q.8. Enlist the characteristics of Mucor.

#### SECTION C

#### Attempt any Two:

- Q.9. i. Who referred virus as 'contagium vivum fluidum'?ii. Explain the structure of virus.
- Q.10. Explain the three types of viruses depending upon the host.
- Q.11. Explain the following terms:
  - i. Species ii. Genus iii. Class

#### SECTION D

#### Attempt any One:

- Q.12. Write the general characters of kingdom Animalia.
- Q.13. Give the general characters of kingdom Fungi with examples.

Scan the given Q. R. Code in *Quill - The Padhai App* to view the solutions of the Topic Test.



Hibiscus

Cyanobacteria

[03]

[08]

[06]

[04]



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(A)- 40°

(B)+ 40°

(C)- 80

(0)-20

Cet the next one right too

hich of the following

(8)

DF

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