XI BIO-ZOO L1 THE LIVING WORLD

I. CHOOSE THE BEST ANSWER:

1. A living organism is differentiated from non-living structure based on
(a) Reproduction   (b) Growth
(c) Metabolism   **(d) All the above**

2. A group of organisms having similar traits of a rank is
(a) Species   **(b) Taxon**
(c) Genus   (d) Family

3. Every unit of classification regardless of its rank is
(a) Taxon   (b) Variety
(c) Species   (d) Strain

4. Which of the following is not present on same rank?
(a) Primata   (b) Orthoptera
(c) Diptera   (d) Insecta

5. What taxonomicaid gives comprehensive information about a taxon?
(a) Taxonomic Key   (b) Herbarium
(c) Flora   (d) Monograph

6. Who coined the term Bio-diversity?
(a) Walter Rosen   (b) AG Tansley
(c) Aristotle   (d) AP de Candole

7. Cladogram considers the following characters
(a) Physiological and Biochemical
(b) Evolutionary and Phylogenetic
(c) Taxonimic and systematic
(d) None of the above

8. Molecular taxonomic tool consists of
(a) DNA and RNA
(b) Mitochondria and Endoplasmic reticulum
(c) Cell wall and Membrane proteins
(d) All the above

9. Who coined the word Taxonomy?
(a) Linnaeus   **(b) Candolle**
(c) Aristotle   (d) John Ray

10. Who is the father of Taxonomy?
(a) Aristotle   (b) Linnaeus
(c) Bauhin   (d) John Ray

11. Who is known as father of botany?
(a) Aristotle   (b) Linnaeus

(c) Theophrastus   (d) John Ray

12. Who proposed three domain classification?
(a) Carl woese   (b) Ernst Haeckel
(c) Whittaker   (d) Theophrastus

13. Who introduced the concept of a Cladogram?
(a) Haeckel   (b) Woese
(c) Whittaker   (d) John Ray

14. Who introduced the seven kingdom system of classification?
(a) John Ray   **(b) Smith**
(c) Bauhin   (d) Linnaeus

15. The seven kingdom system of classification was proposed by _____.
(a) Coral Woese   **(b) R.H. Whittakar**
(c) John ray   (d) Cavalier Smith

16. The mind map Cladogram was introduced by
(a) Aristot1e   (b) R.H. Whittaker
(c) Earnest Hackel   (d) Carlous L nnaeus

17. The beneficial bacterias are known as
(a) pathogens   **(b) probiotic**
(c) cyanobacteria   (d) plasmid

18. _____ is the father of modern taxonomy and found of systematics.
(a) Linnaeus   (b) Aristotle
(c) John Ray   (d) Bauhin

19. Book written by Darwin _____.
(a) Historia Generalis   **(b) Origin of species**
(c) Systema Naturae   (d) Phylogeny of plants

20. _____ was developed by Natural History Museum, London.
(a) SPIDA (b) ABIS(c) DAISY (d) **INOTAXA**

21. _____ is called the bird man of India.
(a) Dr. Subramaniam   **(b) Dr. Salim Ali**
(c) Whittaker   (d) Varad Giri

22. Species plantarum was written by _____
(a) Linnaeus   **(b) Woese**
(c) Theophrastus   (d) Darwin

23. _____ established species as the ultimate unit of

taxonomy. (He coined the term species).
(a) Aristotle   (b) Linnaeus

(c) **John Ray**   (d) Bauhin

24. Cladistics is based on _____.
(a) Natural characters   (b) Reproductive organs
(c) **Molecular studies**   (d) Phylogeny

25. _____ was the first to classify animals.
(a) **Aristotle**   (b) Linnaeus
(c) Theophrastus   (d) Haeckel

26. Five kingdom system of classification was given by _____.
(a) Woese   (b) **Whittaker**
(c) Linnaeus   (d) Cronquist

27. Genus *Felis* refers to _____.
(a) Dogs   (b) Sparrow
(c) **Cat**   (d) Monkeys

28. *"Historia Generalis Plantarum"* was written by
(a) Linnaeus   (b) Aristotle
(c) **John Ray**   (d) Bauhin

II. IDENTIFY THE CORRECT STATEMENTS:

1. Identify the correct statements from the below
(I) Binomial Nomenclature popularised by Carolus Linnaeus.
(II) Kingdom Animalia is the top most of taxonomic hierarchy.
(III) Genus is the basic unit of classification.
(IV) Curd is one of the best sources of probiotics.
(a) **I, II and IV only**   (b) I and IV only
(c) II and IV only   (d) I and III only

2. Identify the correct statements from the below
(I) Species is the basic unit of classification.
(II) Only one species in the genus is called monotypic genus.
(III) More than one species in the genus is called polytypic genus.
(IV) Male tiger and female lion results in Liger.
(a) I, II and IV only   (b) I and II only
(c) I and III only   (d) **I, II and III only**

3. Identify the correct statements from the below "Domain Archaea"
(I) This domain includes single celled organism, prokaryotes.
(II) Prokaryotes have the ability to grow in extreme conditions, like volcano vents etc.,
(III) They are capable of synthesizing their food without sunlight.

(IV) Their wall contains peptidoglycans.
(a) I and III only   (b) **I, II and III only**
(c) I and IV only   (d) I and II only

4. Identify the correct statements from the below.
(a) Group of classes with similar distinctive characteristics.
(b) These classes share some common features like notochord.
(c) **It is the top most of the taxonomic hierarchy.**
(d) Also share common features like dorsal tubular nerve cord.

5. Identify the correct statements from the below
(I) Monera is the kingdom of Prokaryotes
(II) Protista is the kingdom of unicellular eukaryotes.
(III) Fungi is the kingdom of multicellular Eukaryotes.
(IV) Plantae is the autotrophic and animalia is the consumers of multicellular eukaryotic kingdoms.
(a) I, III and IV only   (b) I, II and IV only
(c) **I, II, III and IV**   (d) II, III and IV only

6. Identify the correct statements from the below
(I) Thermus aquatics is a bacterium which can tolerate high temperatures.
(II) The first DNA polymerase enzyme was isolated from thermus aquatics.
(III) T. aquatics used in polymerase chain reaction (PCR) for DNA amplification.
(IV) Cyanobacteria are photosynthetic blue green algae.
(a) I and IV only   (b) II and III only
(c) I and II only (d) **I, II, III and IV**

III. IDENTIFY THE WRONG STATEMENTS :

1. Identify the wrong statement from the below.
(a) **Binomial Nomenclature was proposed by Huxley and Stricklandt.**
(b) The scientific names of any two organisms are not similar.
(c) Generic name's first alphabet should be in uppercase.(d) The scientific name ensures that each organism has only one name.

2. Identify the wrong statement from the below.
(a) DNA barcoding is a short genetic marker in an organisms.
(b) DNA hybridisation measures the degree of genetic similarity.

(c) ABIS is Automtic Bird Identification system.
(d) DNA fingerprinting to identify an individual from a sample of DNA.

3. Identify the wrong statement from the below.
(a) The scientific name *Homo sapiens* denotes human.
(b) Animals with blood is calssified as *Enaima*.
(c) Aristotle would have not classified Ostrich, emu and penguin as birds.
(d) The species name should be in uppercase.

IV. IDENTIFY THE CORRECT ASSERTION AND REASON:

1. Assertion (A) : The Prokaryotes which have the ability to grow in extreme condition.
Reason (R) : Prokaryotes can grow in volcano vents, hot springs and polar ice caps, hence are called extremophites.
They are capable of synthesizing their food without sunlight and oxygen by utilizing hydrogen sulphide and other chemicals from the volcanic vents.
(a) Both (A) and (R) are wrong
(b) (A) is correct and (R) explains (A)
(c) (A) is wrong and (R) is correct
(d) (R) is wrong and (A) is correct

2. Assertion (A) : Group of classes with similar distinctive characteristics constitute a phylum.
Reason (R) : These classes share some common features like presence of a notochord and a dorsal tubular nerve cord.
(a) Both (A) and (R) are wrong
(b) (A) is correct and (R) is wrong
(c) (A) is correct and (R) explains (A)
(d) (A) is wrong and (R) is correct

3. Assertion (A) : Cyanobacteria are photosynthetic blue green algae which produce oxygen.
Reason (R) : Cyanobacteria played a key role in the changes of atmospheric oxygen levels from anaerobic to acerobic during the geologic periods.
(a) (A) is correct and (R) explains (A)
(b) Both (A) and (R) are wrong
(c) (A) is correct and (R) does not explains (A)
(d) (A) is wrong and (R) is correct

V.VERY SHORT ANSWERS

1. What are methanogens? *[HY-2018]*
Ans. The domain archaea includes single celled organisms, the prokaryotes which have the ability to grow extreme conditions like polar ice caps, volcano vents, etc., Some of them produced methane is called methanogens.

2. What is Biodiversity?
Ans. **1.** The presence of a large number of species in a particular ecosystem is called '**Biological diversity**' or in short '**Biodiversity**'.
2. The term Biodiversity was first introduced by Walter Rosen (1985), and defined by E.D. Wilson.

3. Define Taxonomy.
Ans. **1.** Taxonomy (G. taxis- arrangement ; nomoslaw) is the science of arrangement of living organisms along with classification, description, identification, and naming of organisms which includes all flora and fauna including microorganisms of the world.
2. The word taxonomy was coined by Augustin Pyramus de Candole (1813).

4. How did Aristotle classify animals based on the presence or absence of red blood?
Ans. Based on the presence or absence of red blood he classified the animals into two categories.
1. *Enaima* - with blood
2. *Anaima* - without blood.

5. Mention the subdivisions of Five Kingdom classification.
Ans. **1.** R.H.Whittaker (1969) proposed the Five Kingdom Classification.
2. The Kingdoms defined by him were Monera, Protista, Fungi, Plantae, and Animalia based on the cell structure, mode of nutrition, mode of reproduction and phylogenetic relationships.

6. Differentiate between probiotics and pathogenic bacteria. *[QY-2018]*

S.No.	Probiotic bacteria	Pathogenic bacteria
1.	1. Beneficial bacteria.	Disease Causing bacteria.
2.	Converts Milk into Curd	Causes Disease in plants & animals
3.	**Eg:** Lactobacillus	**Eg:** Vibrio cholerae (cholera)

7. Why mule is sterile in nature?

Ans. Mules are produced by mating of male donkey and female horse. Mules are sterile animals because they cannot produce gametes due to problems in pairing up of chromosomes. They have odd number of chromosomes.

8. Which is the basic unit of classification?

Ans. Species is the basic unit of classification in the taxonomic hierarchical system. It is a group of animals having similar morphological features (traits) and is reproductively isolated to produce fertile offspring.

9. What is Binomial Nomenclature?

Ans. **1.** Biologists follow universally accepted principles
to provide scientific names to known organisms.
2. Each name has two components, a generic name and a specific epithet. This system of naming the organism is called **Binomial Nomenclature** which was popularised by Carolus Linnaeus.
Eg: The National Bird (Indian Peafowl) –
Pavo cristatus,
The National Animal (tiger) – *Panthera tigris*,
The Tamil Nadu State bird (common Emerald dove) – *Chalcophaps indica*.

10. Does Indian Cobra come under the list of tautonymy? Why?

Ans. The practice of naming the animals in which the generic name and species name are the same, is called Tautonymy. **Eg:** *Naja naja* (The Indian Cobra).

11. Name the classical taxonomical tools.

Ans. **1.** Taxonomical keys
　　2. Museum
　　3. Zoological park
　　4. Printed Taxonomical tools
　　5. Marine parks

12. Name some Molecular taxonomic tools used.

Ans.　**1.** DNA barcoding
　　2. DNA hybridization
　　3. DNA Finger printing
　　4. Polymerase chain Reaction (PCR)
　　5. Restriction Fragment Length olymorphisms analysis (RELP)

13. Give examples of Cyber tools employed in taxonomic studies. (any two)

Ans. **1. ALIS** - **A**utomated **L**eaf hopper **I**dentification **S**ystem.
2. DAISY - **D**igital **A**utomated **I**dentification **S**ystem.

14. What is INOTAXA?

Ans. **1.** e-Taxonomic resources – INOTAXA is an electronic resource for digital images and description about the species which was developed by Natural History Museum, London.
2. INOTAXA means **IN**tegrated **O**pen **TAX**onomic **A**ccess.

15. Name the books written by Linnaeus.

Ans. **Species Plantarum** (1753) and **Systema Naturae** (1758).

VI. SHORT ANSWERS

1. What is the need for classification?

Ans. The basic need for classification is:
1. To identify and differentiate closely related species.
2. To know the variation among the species.
3. To understand the evolution of the species.
4. To create a phylogenetic tree among the different groups
5. To easily study living organisms

2. Give a Schematic representation of Three domain classification.

Three Domains
(Carl Woese, 1977)

Archaea	Bacteria	Eukarya
Extremophiles Methanogens, Halophiles, Thermoacidophiles	Cyanobacteria & Eubacteria, Beneficial & pathogenic	(Eukaryotes) Protista, Fungi, Plants and Animals

3. What are the salient features of three domain classification?

1. Carl Woese and his co-workers classified organisms based on the difference in 16s rRNA genes.
2. This system adds the taxon 'domain' higher than the kingdom.
3. Prokaryotes are separated into two domains - Bacteria and Archaea and all the Eukaryotes are placed in the domain Eukarya.
4. Archaea appears to have more in common with the Eukarya than the Bacteria.
5. Archaea differ from bacteria in cell wall composition and differs from bacteria and eukaryotes in membrane composition and rRNA types

4. Mention the Subdivisions of the seven kingdom classification.
1. Cavalier-Smith revised the six kingdom system to Seven Kingdom system.
2. The concept of super kingdom was introduced and revised to seven kingdom classification.

3. The classification is divided into two Super Kingdoms (Prokaryota and Eukaryota) and seven kingdoms, two Prokaryotic Kingdoms (Eubacteria and Archaebacteria) and five Eukaryotic Kingdoms (Protozoa, Chromista, Fungi, Plantae and Animalia).

Seven kingdom						
Eubacteria	Archae	Protozoa	Chromista	Fungi	Plantae	Animalia
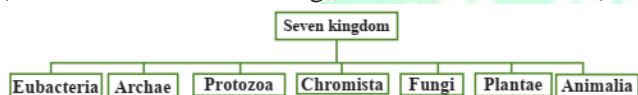
VII LONG ANSWERS 5 MARKS

1. Why elephants and other wild animals are entering into human living area?
Ans. **1.** Man is destroying forests. Deforestation is increasing due to rapid urbanisation and increase in human population.
2. When habitats are destroyed, the animals living there could not find food and shelter.

3. They tend to wander outside of forest in search of food or shelter and enter into human living area.
4. Decrease in availability of clean water due to pollution.
5. The reality is that we have entered into the habitats of animals.

2. What is the difference between a Zoo and wild life sanctuary?
Ans. **Zoo:**
1. A Zoo is a place where animals are held in captivity and Public is allowed to visit and see the animals. It is a artificially created habitat.
2. A Zoo can sell, buy, breed or trade animals.
Wild life sanctuary:
1. A wild life sanctuary is a large area with natural surrounding where the animals are allowed to roam freely.
2. A boundary wall/barrier is in place to ensure that humans cannot enter the area. The animal gets the feel of a natural surrounding.
3. In many cases sanctuaries focus on maintaining and increasing the population of a particular species. Eg: **Kaziranga sanctuary in Assam focuses on Rhinoceros population.**

3. Can we use recent molecular tools to identify and classify organisms? [OR]
Name the molecular taxonomical tool and their application. *[QY-2018]*
Ans. Yes, we can.
Molecular taxonomical tools :
Technological advancement has helped to evolve molecular taxonomical tools from classical tools to molecular tools. The accuracy and authenticity is more significant in the molecular tools.
I. The following methods are being used for taxonomical classification.
a) DNA barcoding - Uses short genetic marker in an organism's DNA to identify it as belonging to a particular species.
b) DNA hybridization - measures the degree of genetic similarity between pools of DNA sequences.

c) DNA fingerprinting - to identify an individual from a sample of DNA by looking at unique patterns in their DNA.
d) Restriction Fragment Length Polymorphisms (RFLP) analysis - difference in homologous DNA sequences that can be detected by the presence of fragments of different lengths after digestion of the DNA samples.
e) Polymerase Chain Reaction (PCR) - sequencing to amplify a specific gene, or portion of gene.
II. Neo taxonomical tools – This is based on Electron Microscopy images to study the molecular structures of cell organelles.

4. What are the rules of Nomenclature? [OR]

List the rules of Nomenclature as given by ICZN?
Ans. **Rules of Nomenclature :**
1. The scientific name should be italicized in printed form and if handwritten, it should be underlined separately.
2. The generic name's (Genus) first alphabet should be in uppercase.
3. The specific name (species) should be in lowercase.
4. The scientific names of any two organisms are not similar.
5. The name or abbreviated name of the scientist who first publishes the scientific name may be written after the species name along with the year of publication. **Eg:** Lion-F*elis leo* Linn., 1758 or F*elis leo* L.,1758.
6. If the species name is framed after any person's name the name of the species shall end with i, ii or are. **Eg:** A new species of a ground-dwelling lizard (Cyrtodactylus) has been discovered and named after Scientist Varad Giri, C*yrtodactylus varadgirii.*

5. **Write a note on the classical taxonomical tools.**

Ans. **The classical taxonomical tools :**

1. Taxonomical Keys: Keys are based on comparative analysis of the similarities and dissimilarities of organisms. There are separate keys for different taxonomic categories.

2. Museum: Biological museums have collection of preserved plants and animals for study and ready reference. Specimens of both extinct and living organisms can be studied.

3. Zoological parks: These are places where wild animals are kept in protected environments under human care which enables us to study their food habits and behaviour.

4. Marine parks: Marine organisms are maintained in protected enviroments.

5. Printed taxonomical tools consist of identification cards, description, field guides and manuals.