

## MULTIPLE CHOICE QUESTIONS

**1. As we go from species to kingdom in a taxonomic hierarchy, the number of common characteristics**

- a. Will decrease
- b. Will increase
- c. Remain the same
- d. May increase or decrease

**Solution:**

Option (a) is the answer.

**2. Which of the following 'suffixes' used for units of classification in plants indicates a taxonomic category of 'family'.**

- a. – Ales
- b. – Onae
- c. – Aceae
- d. – Ae

**Solution:**

Option (c) is the answer.

**3. The term 'systematics' refers to:**

- a. Identification and study of organ systems of plants and animals
- b. Identification and preservation of plants and animals
- c. Diversity of kinds of organisms and their relationship
- d. Study of habitats of organisms and their classification

**Solution:**

Option (c) is the answer.

**4. Genus represents**

- a. An individual plant or animal
- b. A collection of plants or animals
- c. A group of closely related species of plants or animals
- d. None of these

**Solution:**

Option (c) is the answer.

**5. The taxonomic unit 'Phylum' in the classification of animals is equivalent to which hierarchical level in classification of plants**

- a. Class
- b. Order
- c. Division
- d. Family

**Solution:**

Option (c) is the answer.

**6. Botanical gardens and zoological parks have**

- a. Collection of endemic living species only
- b. Collection of exotic living species only
- c. Collection of endemic and exotic living species
- d. Collection of only local plants and animals

**Solution:**

Option (c) is the answer.

**7. A taxonomic key is one of the taxonomic tools in the identification and classification of plants and animals. It is used in the preparation of**

- a. Monographs
- b. Flora
- c. Both a & b
- d. None of these

**Solution:**

Option (c) is the answer.

**8. All living organisms are linked to one another because of**

- a. They have the common genetic material of the same type
- b. They share common genetic material but to varying degrees
- c. All have common cellular organization
- d. All of the above

**Solution:**

Option (b) is the answer

**9. Which of the following is a defining characteristic of living organisms?**

- a. Growth
- b. Ability to make sound
- c. Reproduction
- d. Response to external stimuli

**Solution:**

Option (d) is the answer

**10. Match the following and choose the correct option:**

Column I	Column II
A. Family	i. tuberosum
B. Kingdom	ii. Polymoniales
C. Order	iii. Solanum
D. Species	iv. Plantae
E. Genus	v. Solanaceae

**Options**

- a. A-v, B-iv, C-ii, D-i, E-iii
- b. A-iv, B-iii, C-v, D-ii, E-i
- c. A-iv, B-iii, C-v, D-i, E-ii
- d. A-iv, B-iii, C-ii, D-v, E-i

**Solution:**

Option (a) is the answer.

### VERY SHORT ANSWER TYPE QUESTIONS

**1. Linnaeus is considered as Father of Taxonomy. Name two other botanists known for their contribution to the field of plant taxonomy?**

**Solution:**

George Bentham and Joseph Dalton Hooker are known botanists who gave the natural system of classification of flowering plants.

**2. What does ICZN stand for?**

**Solution:**

ICZN stands for International Code of Zoological Nomenclature. It regulates a uniform system of zoological nomenclature.

**3. Couplet in taxonomic key means \_\_\_\_\_ .**

**Solution:**

The taxonomic key provides a certain structure on the basis of which the user can sort out the taxonomic position of the unknown species. Couplet means a pair which is of contrasting characters of an organism.

**4. What is Monograph?**

**Solution:**

A description of a single thing or a group of things is known as a monograph. It will have the information regarding anyone taxon.

**5. Amoeba multiplies by mitotic cell division. Is this phenomena growth or reproduction? Explain.**

**Solution:**

Amoeba is a single cell organism; its growth through mitosis is the same as reproduction since it divides to give rise to the new individual. Mitosis is responsible for growth.

**6. Define metabolism.**

**Solution:**

Metabolism is defined as the total of all biochemical reactions taking place within any living organism to sustain and maintain life.

**7. Which is the largest botanical garden in the world? Name a few well known botanical gardens in India.**

**Solution:**

The world's largest botanical garden is situated in London which is known as Kew Royal Gardens.

Other known botanical gardens are:

1. Sanjay Gandhi Jaivik Udyan in Patna
2. Hyderabad Botanical Garden
3. NTR Garden, Hyderabad
4. Botanical Garden Sarangpur
5. Cubbon Park, Bangalore

**SHORT ANSWER TYPE QUESTIONS**

**1. A ball of snow when rolled over snow increases in mass, volume and size. Is this comparable to growth as seen in living organisms? Why?**

**Solution:**

The growth in case of ice ball is completely indifferent from growth. This happens due to the extrinsic growth by the deposition of the same material.

**2. In a given habitat we have 20 plant species and 20 animal species. Should we call this ‘diversity’ or ‘biodiversity’? Justify your answer.**

**Solution:**

Biodiversity is nothing but the total of organism present in a particular area whereas diversity is termed for a large area which may be used for living or non-living things.

**3. International Code of Botanical Nomenclature →ICBN) has provided a code for classification of plants. Give hierarchy of units of classification botanists follow while classifying plants and mention different ‘Suffixes’ used for the units.**

**Solution:**

The hierarchy followed in plants:

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

Suffixes used by botanists are as follows:

Taxon Suffix

- a) Division -phyta
- b) Class -ae
- c) Order -ales
- d) Family –aceae

**4. A plant species shows several morphological variations in response to an altitudinal gradient. When grown under similar conditions of growth, the morphological variations disappear and all the variants have common morphology. What are these variants called?**

**Solution:**

These variants are called the ‘ecotypes’. Plants show changes in morphological features in response to the altitudinal gradient.

**5. How do you prepare your herbarium sheets? What are the different tools you carry with you while collecting plants for the preparation of a herbarium? What information should a preserved plant material on the herbarium sheet provide for taxonomical studies?**

**Solution:**

For preparing a herbarium sheet, the paper is cut in the desired length →say, 29 x 41 cm.)

The dried specimen is taken and mounted on the sheers with the help of glue. You may use sellotape if desired.

Labels are out underneath each specimen.

Collections tools will include:

- 1. Digger

2. Knife and Scissors
3. Newspaper
4. Blotting sheet
5. Plant press
6. Notebook
7. Magnifying glass

The information that will be provided:

1. The scientific name of the specimen
2. Taxonomical details
3. Common name
4. Collector's name
5. Place of collection
6. Date and Time

**6. What is the difference between flora, fauna and vegetation? *Eichhornia crassipes* is called as an exotic species while *Rauwolfia serpentina* is an endemic species in India. What do these terms exotic and endemic refer to?**

**Solution:**

Flora is a plant life occurs in a particular region or time.

Fauna is the total number of animals found in a particular region or time

Vegetation is a term used for plant forms which do not include particular taxa or botanical characteristics

Exotic species is any species of a plant living in any other place except its native and endemic species which are restricted to a particular area.

**7. A plant may have different names in different regions of the country or world. How do botanists solve this problem?**

**Solution:**

They have given a scientific name for each plant and animals. It became the common name throughout the world. Example: Mango is scientifically termed as *Mangifera indica*. Mango is called as Aam in India. But the scientific term is common.

**8. Brinjal and potato belong to the same genus *Solanum*, but two different species. What defines them as separate species?**

**Solution:**

In terms of reproduction, these two species varies. They share the same genus but they remain different species.

**9. Properties of cell organelles are not always found in the molecular constituents of cell organelles. Justify.**

**Solution:**

This phenomenon of all living organism is due to underlying interactions. The properties of cellular organelles are not present in the molecular constituents.

**10. The number and kinds of the organism are not constant. How do you explain this statement?****Solution:**

Some factors are there which plays an important role in this.

Season, extinction and human activities. Many of the living organisms are present at a particular time and some species are wiped out and mainly the deforestation by the hands of human being causes depletion in population.

**LONG ANSWER TYPE QUESTIONS****1. What is meant by living? Give any four defining features of life forms.****Solution:**

The ability of an object which can self-replicate and self regulate is known as Living.

The 4 defining characteristics are-

- i) Growth
- ii) Reproduction
- iii) Metabolism
- iv) Consciousness

Growth: There are two types. Extrinsic and intrinsic growth. Which is deposited on the outer surface and one is inside the cell

Reproduction: Biological process in which an organism gives rise to individuals similar to themselves.

The process is of two types. Asexual and sexual reproduction.

Metabolism: It is the total of all chemical & biological reactions occurring simultaneously inside the cells. It is two types catabolism and anabolism. One involves the breakdown of molecules and one is building up of biomolecules

Consciousness: Ability of the body to sense & respond to the external stimuli.

**2. A scientist has come across a plant which he feels is a new species. How will he go about its identification, classification and nomenclature?****Solution:**

A new identify species can be easily classified by taxonomic aids. The scientist has to do comparative studies of the morphological & anatomical features with the features of existing plants present in the taxonomical aids and according to binomial nomenclature given by Carl Linnaeus, the species can be classified. Some of the taxonomical aids that can be used are flora, manuals, monographs, catalogues etc.

**3. Brassica campestris Linn**

**a. Give the common name of the plant.**

**b. What do the first two parts of the name denote?**

**c. Why are they written in italics?**

**d. What is the meaning of Linn written at the end of the name?**

**Solution:**

a. Mustard

b. The first name represents genus and second denotes specific epithet

c. To indicate their Latin origin

d. It refers to Linnaeus, Linnaeus was the first to discover this plant.

He identified & classified the plant hence to give him credit and honour Linnaeus is added as the suffix.

**4. What are taxonomical aids? Give the importance of herbaria and museums. How are Botanical gardens and Zoological parks useful in conserving biodiversity?**

**Solution:**

Collection of information, techniques, procedures which helps to identify & classify an individual is called taxonomic aids.

Importance of herbarium

- Collection of dried, pressed & preserved plants in sheets is called herbarium.
- These sheets are arranged systemically according to the accepted system of classification.
- It is used to provide information about flora.
- It is used to study the morphology of plants.
- Hence its comparative studies are used in the identification of unknown plants.

Importance of museums

It consists of a collection of preserved plants & animal used for study & references.

Many museums publish journals, research papers to make available the results of research in their collection.

**5. Define a taxon. What is meant by taxonomic hierarchy? Give a flow diagram from the lowest to the highest category for a plant and an animal. What happens to the number of individuals and number of shared characters as we go up the taxonomical hierarchy?**

**Solution:**

The grouping of organisms at any level is known as Taxon. This can be ranked as Species-genus-family-order-class-phylum/division-kingdom

As we go from species to kingdom there is a decrease in the number of common characteristics and the number of individuals goes on increasing. Higher the category, it will be very difficult to determine the relationship to other taxa at the same level.

**6. A student of taxonomy was puzzled when told by his professor to look for a key to identify a plant. He went to his friend to clarify what 'Key' the professor was referring to? What would the friend explain to him?**

**Solution:**

A key is used to identify plants and animals based on their similarities and dissimilarities. The keys made are based on the contrasting characters that are depicted by the organisms, these are known as couplets. Each statement in the key is called the lead.

**7. Metabolism is a defining feature of all living organisms without exception. Isolated metabolic reactions in vitro are not living things but surely living reactions. Comment.**

**Solution:**

Metabolism is defined as the total of all chemical reactions that take place inside the body. Metabolism is purely characteristic of living beings. No living organism can exhibit metabolism. In a cell-free system, these reactions can be replicated that is outside a living body.

These reactions never lead to a new life or maintenance of life. Therefore it can't be called living.

**8. Do you consider a person in coma-living or dead?****Solution:**

A coma is defined as a prolonged state of unconsciousness. The person who is suffering coma will be unaware of the surroundings. A state of mind which keep the person sleepy even though the person is alive. The working of the brain will be at its lower stage of alertness. The person will live with the help of machines which is linked to the organs. However, a lot many metabolic activities still take place and people often come out of their comatose state, so they are living.

**9. What is the similarity and dissimilarity between “whole moong daal” and “broken moong daal” in terms of respiration and growth? Based on these parameters classify them into living or nonliving?****Solution:**

Whole moong daal has an intact embryo whose respiration rate is slow during the phase of dormancy. When these are provided with growth condition, like providing it with water, growth is restored and the seed →moong daal) germinates and forms a new plant and the broken moong daal’s embryo isn’t intact. As a result of this, it cannot respire and doesn’t grow or germinate.

**10. Some of the properties of tissues are not the constituents of their cells. Give three examples to support the statement.****Solution:**

Blood is a connective tissue that is made up of RBCs, WBCs and Platelets. It functions as a nutrient transporter inside the body whereas the blood cells don not play this function.

Bone is a specialized connective tissue which functions as mechanical support that is made up of osteocytes. These osteocytes do not provide mechanical support.

Dry skin is made up of epithelial cells. Epithelial tissues will function as a protection from chemical and mechanical stress whereas epithelial cells do not play this role