BIOLOGY

Important Questions

Multiple Choice questions-

1. Scientific name are drawn form
   - **A.** Latin
   - **B.** English
   - **C.** Sanskrit
   - **D.** Arabic
2. Binomial nomenclature was given by
   - **A.** Linnaeus
   - **B.** Pliny
   - **C.** Bentham and Hookes
   - **D.** Aristotle
3. Systematics is the study of
   - **A.** Diversity amongst groups
   - **B.** Grouping of organisms
   - **C.** Identification and grouping of organisms
   - **D.** Nomenclature and classification or organisms
4. Taxonomy refers to
   - **A.** Classification
   - **B.** Nomenclature
   - **C.** Identification
   - **D.** All of these
5. Which of the following has more characters In chtnmon?
   - **A.** Species
   - **B.** Genus
   - **C.** Class
   - **D.** Division
6. Any type of taxonomic group of the organisms is called
   - **A.** Taion

B. Category

C. Classification

D. Rank of hierarchy

7. A rank or level in the hierarchial classification of organisms is a

A. Taxon

B. Category

C. Key

D. All of these

8. Which of the following is not a correct hierarchial order?

A. Phylum, order, family

B. Class, family, genus

C. Class, order, family

D. Family, class, order

9. Father of Taxonomy is

A. Linnaeus

B. Aristotle

C. John Ray

D. None of the above

10. 'Systema Nature' is a book written by

A. Linnaeus

B. Charak

C. John Roy

D. De Candole

Fill in the blanks

1. All living organisms _____ Increase in _____ and increase in _____ of individuals are twin characteristics of growth.
2. _____, this growth by cell division occurs continuously throughout their life.
3. _____, this growth is seen only up to a certain age.
4. The fungi, the filamentous algae, the protonema of mosses, all easily multiply by _____
5. All living organisms are made of _____
6. Celluar organisation of the body is the defining feature of life _____

7. We sense our environment through our _____
8. Plants respond to external factors like _____,_____,_____
9. Biology is the story of life on _____
10. Biology is the story of _____ of living organisms on earth.

True (T) or False (F)

1. There is a need to standardise the naming of living organisms such that a particular organism known by the same name all over world. This process is called nomenclature.

2. Biologists follow universally accepted principles to provide scientific name to known organisms. Each name has two components-the Generic name and the specific epithet

3. System of providing a name with two components is called Binomical nomenclature.

4. Biological names are generally in Latin and written in italics.

5. Both the words in a biological name, when handwritten, are separately underlined, or printe in italics to indicate their Latin origin.

6. The first word denoting the genus starts with a capital letter while the specific epithet starts with a small letter.

7. All living organisms can be classified into different taxa. This process of classification is taxonomy.

8. Taxonomic categories and hierarchy can be illustrated by an example.

Taxonomical studies of all known organisms have led to the development of common categories such as kindom, phylum or division (for plants), class order, family, genus and species

9. Herbarium is a store house of collected plant specimens that are dried, pressed and preserv on sheets.

Very Short Questions :

1. Name two organisms that do not reproduce?
2. Define 'living'?
3. Is regeneration a characteristic of living organisms?
4. What is biodiversity? or Define Biodiversity?
5. Name the International Authority who gives scientific name to the plants.
6. What is taxonomy?
7. How does taxonomy differ from systematics?
8. What is a species?

9. What is a taxon?

Short Questions :

1. How are zoological parks useful to biologists.
2. Write the universal rules of nomenclature.
3. Explain about taxonomical aids/tools?
4. "Consciousness is a defining property of living organisms." Explain.
5. Reproduction can't be an all-inclusive defining characteristic of living organisms? Illustrate the statement.

Long Answer Type

1. Explain two defining characteristics of living organisms.
2. Explain the utility of systematics for classification.

Assertion Reason Question-

1. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

   (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

   (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion

   (c) If Assertion is true but Reason is false.

   (d) If both Assertion and Reason are false.

   Assertion: Botany deals with the study of plants and zoology deals with the study of animals.

   Reason: Biology is the study of living beings.

2. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

   (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

   (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion

   (c) If Assertion is true but Reason is false.

   (d) If both Assertion and Reason are false.

   Assertion: Study of internal structure is called anatomy.

   Reason: It is useful for phylogenetic study.

Case Study Based Question-

1. Life is a unique process that is made from the aggregation of molecules. These molecules undergo various chemical reactions to perform their specific functions which are called

metabolism. This results in the production and utilization of energy. The metabolism will result in the growth, development, reproduction, adaptations, etc of the living organisms through the production of various biomolecules.

Living organisms contain certain important characteristics that include growth and development, body organization, homeostasis, reproduction, adaptation, and energy utilization.

The characteristic of living organisms is given below –

Growth – All living organisms can undergo the process of growth and development that results in an increase in the mass and number of cells. Multicellular organisms grow by cell division. The growth of plants and animals takes place with the help of cell division. In the case of plants, the cell division occurs throughout their life while in the case of animals the cell division occurs up to a certain age, and then the cells lose their capability to divide. It results in an increase in body mass and increases in the number of cells.

Metabolism– As the body and organs are the constituents of different chemicals, they perform various metabolic functions that result in the conversion of chemicals into other biomolecules. All plants, animals, and microbes exhibit metabolism. It is absent in the case of non-living organisms but may be introduced through the in-vitro method.

Sensitivity – The living organisms whether prokaryotes or eukaryotes respond according to their surroundings and the stimuli present around them, it may be physical, chemical, or biological. The living organisms are sensitive about their surroundings and are responsible in accordance with their stimuli. The stimuli can either be biological, physical, or chemical.

Reproduction – The ability to produce young ones is the process of reproduction which is observed only in the case of living organisms. In the case of fungi, reproduction occurs through asexual spores, while in the case of hydra budding occurs and in planaria regeneration occurs which are all the asexual methods of reproduction. Reproduction is the increase in the number of cells while in the case of mules, infertile human couples, etc reproduction is absent. So, reproduction is simply synonymous with growth which is not appropriate to distinguish the living organisms.

Cellular Organization: It is the defining characteristic of living organisms since all living organisms are made up of cells that help in performing various cellular functions resulting in the growth and development, reproduction, metabolism, etc in the body. Since non-living organisms are not made up of cells so they do not have cellular organization.

Movement: The lining organisms show movement and locomotion and more specifically plants move according to the movement of the sun.

(1) Which among the following best describes the word “Growth” in living organisms?

(a) Increase in mass either due to accumulation or due to changes that body undergoes internally

(b) Increase in mass due to internally cell division and increase in number due to replication are twin characteristic of growth

(c) All living organisms grow throughout their life

(d) Growth is a sufficient characteristic to determine whether an organism is living or non-living

(2) Reproduction in hydra takes place through _____

(a) Budding

(b) Binary Fission

(c) Asexual spores

(d) Fragmentation

(3) Consciousness and cellular organization of the body are the defining features of living organisms.

(a) True

(b) False

(4) Define metabolism.

(5) Write short noteon growth?

2. Taxonomy is the study of the classification, characterization, nomenclature, and identification of organisms and it is a branch of science. Systematics is another branch of science that includes the study of the classification, nomenclature, identification, and evolutionary history of an organism. Thus, the taxonomic characteristics of an organism along with its evolutionary history come under systematics. In 1813, A.P de Candolle was the first to introduce the term taxonomy while systematics was introduced as the time of human civilization.

   The term Systematics is derived from the Latin word 'systema' which means the systematic arrangement of organisms. Linnaeus (father of taxonomy) published his book Systema Naturae where the classification of plants, animals were based on taxonomy.

   Neo-systematics is the branch of systematics that deals with the species to be the product of evolution. In 1940, Julia Huxley was the one who developed this concept. It involves the known characteristics of an organism and also the known evidence from different fields of biology.

   Identification – It is the method of pacing the organisms in their exact place based on their classification. The identification of organisms can be done with the help of taxonomic keys.

   Classification – The classification is the process of grouping various living organisms based on th common features that they share. A single group consists of those organisms that have similar common features. To make classification easier various groups are forms in which different organisms are placed depending upon their characteristics.

Characterization – The studying and understanding of characters of organisms and categorizing them like external and internal structure (morphology and anatomy), the structure of the cell (cytology), developmental process (embryology), and ecological information (ecology) of the organism.

(1) Who is the Father of New Systematics?

(a) Aristotle

(b) Linnaeus

(c) Theophrastus

(d) Julian Huxley

(2) Which of the following takes into account evolutionary relationships between organisms?

(a) Cladistics

(b) Artificial System of Classification

(c) Natural System of classification

(d) Systematics

(3) Who is the father of taxonomy?

(4) Define taxonomy.

(5) What is mean by Systematics?

ANSWER KEY –

➢ Multiple Choice Answer:

1. Latin
2. Linnaeus
3. Diversity amongst groups
4. All of these
5. Species
6. Taxon
7. Category
8. Family, class, order
9. Linnaeus
10. Linnaeus

➢ Fill in the blanks :

1. grow, mass, number

2. In plants
3. In Animals
4. fragmentation
5. Chemical
6. Forms
7. sense organs
8. light, water, temperature
9. earth
10. evolution

➢ Write true (T) or false (F) :

1. True
2. True.
3. True
4. True
5. True
6. True
7. True
8. True
9. True
10. True

➢ Very Short Answer :

1. Mules, sterile worker bees.
2. Organisms exhibiting distinctive characters like growth, reproduction, etc. are called living.
3. Yes, because fragmented organisms regain the lost part of the body.
4. The number and variety of organisms present on earth are referred to as biodiversity.
5. International Code for Botanical Nomenclature (ICBN)
6. Taxonomy is the science of classification that is grouping them on the basis of certain similarities.
7. Systematics is the study of the diversity of plants. The study of systematics leads to their taxonomic grouping.
8. A population of identical individuals which can freely interbreed to produce fertile off-

springs.

9. A level of classification is called taxon e g., species, genus, family, etc. all are taxons.

➢ Short Answer:

1. Zoological parks are places where animals are maintained and allowed to breed in natural habitats.

a) It gives information about endangered animals.

b) Helps the biologists in developing hybrids with superior quality.

c) Support the workers of biotechnology.

2. Biological names are generally in Latin and written in Italics. They are Latinised or derived from Latin irrespective of their origi

the First word in a biological name represents the genus while the second component denotes a specific epithet.

Both the words in a Biological name when written in hand are separately underlined or printed in Italics to indicate their Latin origin.

First-world denoting genus starts with a capital letter while the specific epithet is written starting with a small word. It can be illustrated with the example of Mangifera indica.

The name of the author appears after a specific epithet i.e., the end of the biological name, and is written in the abbreviated form e.g. Mangifera indica (Linn). It indicates that species was first described by Linnaeus.

3. Identification of organisms requires intensive laboratory and field studies. The information about an organism is collected and analyzed. The collection of actual specimens of plant species is essential and is a prime source of taxonomic studies.

These are also fundamental not only to study but also to training in systematics. It is used for the classification of an organism and the information gathered is also stored along with even the specimens. In some cases, the specimen is preserved for future studies.

Biologists have established certain procedures and techniques to store and preserve the information as well as the specimens. These techniques are, in fact, aids available for the identification and classification of organisms. The knowledge of these aids is quite helpful in biological studies. Some of these are explained to help to understand the usage of these aids.

Some of the taxonomical aids are:

1. Herbarium,
2. Botanical Gardens
3. Museums

4. Zoological Parks
5. Keys.

4. Flora and fauna both respond to physical-chemical or biological environmental stimuli. Awareness of their surroundings makes organisms live. Mimosa pudiea respond to touch. Photoperiodic affects flowering in plants. Thus unicellular microscopic to multicellular huge organisms show the property of consciousness

5. In nature, there are many organisms that can't reproduce. Mules, sterile worker bees are some examples of such organisms.

But the non-living object is strictly unable to reproduce.

Viruses are placed between living and non-living. They are crystallized like non-livings but replicate when enter inside living organisms.

➢ Long Answer :

1. Growth Unicellular and multicellular organisms increase their mass and number through cell-division. Non-livings increase their size by the accumulation of matter.

a) Cell has protoplasm which is living matter. Cell before division increases their mass through replication of genetic matter. It is absent in non-livings.

b) Metabolic Activity: Anabolic and catabolic reaction constantly occurs in living organisms, formation and conversion of biomolecules is metabolism.

'In Vitro, such reactions can be maintained. In non-living, there is the absence of metabolism.

2. For classification, systematic studies have to carried out.

1. First, the organisms have to be described for all their morphological and other characteristics.
2. Based on its characteristic, it is seen whether it is similar (or different) to any known group or taxa-identification is carried out.
3. Based on its similar characteristic it is then placed in known taxa or the organism is classified. Sometimes organisms are very different from the ones already described anywhere in the world, then they are placed in a new group or 'taxa' and named.
4. Once the organism has been placed in the right taxa-the last step is nomenclature or naming. If the organism is already known-its the correct name is determined. If an organism is not described before-it is given a new name.

Assertion Reason Answer-

1. (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

Explanation: Biology (Bio-living, logy-science). The study of living beings is called biology. Living beings on earth are mainly classified into two forms-plants and animals. Botany and zoology are

the fundamental branches of biology. Word botany has been derived from greek word botane which means pasture or plants and zoology has been derived from word zoo-animals, logosstud Theophrastus and Aristotle is called the father of botany and father of zoology respectively

2. (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion

Explanation: Anatomy is the study of internal structure which can be observed with unaided eye after dissection. By studying anatomy of large number of organisms, it is useful for knowing phylogenetic similarity (homology) and phylogenetic dissimilarity (analogy).

Case Study Answer-

1. **Answer:**

(1) B

(2) A

(3) True

(4) Metabolism refers to the sum total of all the reactions that occur in an organism. Conversion of chemicals in a living organism are called metabolic reaction.

(5) All living organisms can undergo the process of growth and development that results in an increase in the mass and number of cells. Multicellular organisms grow by cell division. The growth of plants and animals takes place with the help of cell division. In the case of plants, the cell division occurs throughout their life while in the case of animals the cell division occurs up t a certain age, and then the cells lose their capability to divide. It results in an increase in body mass and increases in the number of cells.

2. **Answer:**

(1) D

(2) D

(3) Carolus Linnaeus is the father of taxonomy.

(4) Taxonomy is the study of the classification, characterization, nomenclature, and identificatio of organisms and it is a branch of science.

(5) Systematics is another branch of science that includes the study of the classification, nomenclature, identification, and evolutionary history of an organism. Thus, the taxonomic characteristics of an organism along with its evolutionary history come under systematics.