

Chapter 1: The Living World

NCERT Exemplar · Class 11 · Biology

Multiple Choice Questions

Question 1

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

A.

Will decrease

B.

Will increase

C.

Remain same

D.

May increase or decrease

Answer

Correct option: A

Solution

Ans: (a) Will decrease

Explanation: The number of familiar characters is maximum among members of a particular species. On the other hand, the number of familiar characters is minimal among members of a specific kingdom.

Question 2

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

A.

Ales

B.

One

C.

Araceae

D.

Ae

Answer

Correct option: C

Solution

Ans: (c) Araceae

Explanation: You can use family names such as Solanaceae, Fabaceae, and so on

Question 3

The term 'systematics' refers to

A.

Identification and study of organ systems

B.

Identification and preservation of plants and animals

C.

The variety of organisms and their interactions

D.

The study as well as classification of organisms' environments

Answer

Correct option: C

Solution

Ans: (c) The diversity between organisms and their interactions

Explanation: In fact, the need for a proper classification system was felt because of the vast diversity of organisms. Based on specific relationships, organisms were classified into different groups and sub-groups.

Question 4

Genus represents

A.

An individual plant or animal

B.

A collection of plants or animals

C.

Group of closely related species of plants or animals

D.

None of these

Answer

Correct option: C

Solution

Ans: (c) Group of closely related species of plants or animals

Explanation: The taxon genus is just above the taxon species.

Question 5

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

A.

Class

B.

Order

C.

Division

D.

Family

Answer

Correct option: C

Solution

Ans: (c) Division

Explanation: The kingdom comes first in the animal kingdom, followed by species. Similarly, division occurs after the kingdom in the plant kingdom.

Question 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

Answer

Correct option: C

Solution

Ans: (c) Collection of endemic and exotic living species

Explanation: You can learn more about this by visiting a zoo in Delhi or Kolkata. Giraffes, as well as tigers and lions, can be found in Google picture searches. Tigers and lions are native species, but giraffes are considered exotic.

Question 7

One of the taxonomic tools used in the identification and classification of plants and animals is a taxonomic key. It is employed in the

A.

writing of monographs.

B.

Flora

C.

Both (a) and (b)

D.

None of these

Answer

Correct option: C

Solution

Ans: (c) Both (a) and (b)

Question 8

All living organisms are linked to one another because

A.

They have the common genetic material of the same type.

B.

They share common genetic material but to varying degrees.

C.

All have a common cellular organization.

D.

All of the above.

Answer

Correct option: B

Solution

Ans: (b) They share common genetic material but to varying degrees

Explanation: The whole theory of evolution is based on the similarity of genetic materials, which indicates common ancestry for living organisms. Variations in the similarity of genetic material give biodiversity, which we see all around us.

Question 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

Answer

Correct option: D

Solution

Ans: (d) Response to external stimuli

Explanation: The rest of the characters may not be apparent at every instance of time. But the response to external stimuli can always be confirmed as and when required. So, this is considered a defining characteristic of living organisms.

Question 10

Match the following and choose the correct option:

A	Family	(i)	Tuberosum
B	Kingdom	(ii)	Polymoniales
C	Order	(iii)	Solanum
D	Species	(iv)	Plantae
E	Genus	(v)	Solanacea

A.

(i)-D, (ii)-C, (iii)-E, (iv)-B, (v)-A

B.

(i)-E, (ii)-D, (iii)-B, (iv)-A, (v)-C

C.

(i)-D, (ii)-E, (iii)-B, (iv)-A, (v)-C

D.

(i)-E, (ii)-C, (iii)-B, (iv)-A, (v)-D

Answer

Correct option: A

Solution

Ans: (a) (i)-D, (ii)-C, (iii)-E, (iv)-B, (v)-A

Explanation: The order of taxa is as follows: Kingdom Order Family Genus Species

Classification of potato:

Kingdom: Plantae

Order: Solanales

Family: Solanaceae

Genus: Solanum

Species: Tuberosum

Very Short Answer Questions

Question 1

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

Solution

Ans: Joseph Dalton Hooker and G Bentham Both are well-known for their contributions to "plant classification based on natural traits."

Question 2

What does ICZN stand for?

Solution

Ans: ICZN stands for International Code for Zoological Nomenclature.

Question 3

Couplet in taxonomic key means?

Solution

Ans: A pair of contrasting characters of an organism is known as a couplet.

Question 4

What is a Monograph?

Solution

Ans: A monograph is a book that offers information on a certain taxon. A monograph is a collection of primary research papers.

Question 5

Amoeba multiplies by mitotic cell division. Are these phenomena of growth or reproduction? Explain.

Solution

Ans: There is not any increase in the size of the organism after mitosis in Amoeba. Rather two new organisms are formed. Hence, the formation of new cells in Amoeba is reproduction.

Question 6

Define metabolism.

Solution

Ans: Metabolism refers to all of a living being's biological responses as a whole. Anabolism and catabolism are the two forms of metabolism.

Question 7

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

Solution

Ans: The Royal Botanical Garden in Kew in London is the world's largest botanical garden. The following are some of India's most well-known botanical gardens:

1. Indian Botanical Garden, Shibpur, Kolkata
2. Lloyd Botanical Garden, Darjeeling
3. Botanical Garden of FRI, Dehradun
4. National Botanical Garden, Lucknow

Short Answer Questions

Question 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

Ans: Yes, a snowball indeed gains mass, volume, and size; when it is rolled over. But in this case, the increase in the size of the ball is due to the accumulation of material from outside. In the case of growth in a living being, the growth happens because When the cell cycle is completed in the cell, i.e. meiosis and mitotic divisions leading to the generation of new protoplasm and nuclear mass, material accumulates inside the cells of organisms. As a result, the growth of a snowball differs from the growth of a live organism.

Question 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

Ans: Whenever we discuss biodiversity, we consider all the life forms on the earth. In other words, the term 'biodiversity' is a broad word that encompasses all life organisms on the planet. However, when

referring to a smaller geographical area, such as an ecosystem or a specific habitat, the term "diversity" is used. In other terms, diversity refers to the range of life that can be found in a single location at a given time. As a result, the habitat example provides a visual representation of diversity.

Question 3

International Code of Botanical nomenclature (ICBN) has provided a code for the classification of plants. Give hierarchy of units of classification botanists follow while classifying plants and mention different 'Suffixes' used for the units.

Solution

Ans: As per the ICBN, various hierarchies of units for classifying plants and suffixes used for such hierarchies are as follows:

Hierarchy	Suffix
Kingdom	Plantae
Division	Phyta
Class	Angiosperms
Order	Malvales
Family	Malvaceae or – Malvaceae
Genus	It is the first term of an organism's scientific name, which usually has Latin origin and is written in italics.
Species	It is the second term of the scientific name, usually of Latin origin and written in italics.

Question 4

A plant species shows several morphological variations in response to the 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

Ans: Biotypes are the names given to these variations. Genetically, all biotypes are similar, yet morphologically, they differ. Abiotic elements like temperature, soil pH, climate, and other abiotic factors create morphological changes. Different altitudinal gradients result in differences in abiotic variables.

Question 5

How do you prepare your own 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 taxonomic studies?

Solution

Ans: Following are the steps of preparing a herbarium:

1. Collection: This step entails the gathering of a certain species.
2. Pressing: This procedure entails spreading the specimen between two sheets of paper and pressing it to preserve the majority of the pieces.
3. Drying: This phase is normally done outside in the sun.
4. Poisoning: To preserve a specimen for a longer period of time, antifungal treatment may be required.
5. Mounting: The specimen is mounted on a herbarium sheet in this step.
6. Labeling: This stage entails writing down all of the specimen's details and categorization.

Digger and pruning knife, sickle, vasculum, polythene bags, old newspaper or magazine, blotting paper, plant press, field notebooks, herbarium sheets, adhesive, labels, and other instruments must be taken while gathering plants for the production of a herbarium. The information and classification on the saved item should be complete. The names of the division, order, family, genus, and species should all be included.

Question 6

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

Solution

Ans: The flora of a specific geographical area is the total number of plant species found there. The fauna of a specific geographical area is the total number of animal species found there. The term 'vegetation' has a broader definition than 'flora.' The term "vegetation" is frequently used to refer to a considerably larger geographical area than an ecosystem. The term 'vegetation' is frequently used to refer to all plants on a worldwide scale.

Endangered Species: The term endemic species refers to a species that can only be found in a specific geographical location. *Rauvolfia serpentina*, for example, is uniquely found in India as a result, it is considered an endemic species in India.

Exotic Species: An exotic species is one that is not naturally found in a given location but has survived via deliberate selection and breeding or by being imported. *Eichhornia crassipes*, for example, is native to another nation but was introduced to India. As a result, it is considered an alien species in India.

Question 7

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

Solution

Ans: In different places of the world, people speak a variety of languages and dialects. This means that a plant's name may vary depending on where it is found in the country or the world. This exacerbates the problem because no one can remember all of those names. Botanists established the binomial naming system to alleviate this difficulty by giving each species a distinct name for scientific study. A botanical name is made of two terms: the genus name and the species name. A lot of thought goes into coming up with a unique name for a species.

Question 8

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

Solution

Ans: Because they share certain characteristics, brinjal and potato are classified as members of the same genus, *Solanum*. Common features in these plants include phyllotaxy, venation, inflorescence, and others, all of which identify them as members of the same genus. However, there is no way to cross a brinjal plant with a potato plant. Because the ability to interbreed is the most important criterion for distinguishing members of a species, brinjal and potato are classified as different species, despite the fact that they belong to the same genus.

Question 9

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

Solution

Ans: No matter the function of a particular cell organelle; all the cell organelles are made up of more or less similar molecules. To form a specific cell organelle, all of the molecules come together in a specific way. It's similar to the same brick used to build a little house or a large factory or palace. The constituents remain the same, but the function and purpose of the finished product change. Hence, the properties of cell organelles are not always found in the molecular constituents of cell organelles.

Question 10

The number and kinds of organisms are not constant. How do you explain this statement?

Solution

Ans: This question should be considered from two angles: quantity and variety. For any organism, the population can not remain constant. Because of favorable conditions, pollution may be more in some generations. In some other generations, the population can be less because of unfavorable conditions. The kinds of organisms cannot be constant because evolution is a never-ending process. In every era, new species come into the origin, and some old species become extinct.

Long Answer Questions

Question 1

What is meant by living? Give any four defining features of life forms.

Solution

Ans: A living organism is a self-replicating, evolving, and self-regulating interacting system that can respond to cues from the environment. Living beings have diverse properties such as growth, reproduction, feeding, excretion, and so on. However, most of these properties aren't considered defining characteristics of life forms.

The following characteristics define a living form: The term "growth" refers to a rise in mass. Plants continue to grow throughout their lives, but most animals only reach a specific age. However, some non-living entities, such as clouds and snowballs, can also grow in numbers. As a result, growth cannot be considered a defining characteristic of life.

Reproduction is the process by which a live being reproduces its type.

Many species reproduce sexually, whereas others reproduce asexually, using a variety of techniques. Many biological beings, on the other hand, do not reproduce at all, such as the worker bee in a beehive. However, because we regard it to be a living being, reproduction cannot be considered an all-encompassing defining element of life. Because non-living creatures are unable to reproduce, reproduction might be considered a distinguishing property of life (with certain exceptions).

Metabolism involves various biochemical processes during which various molecules are formed, and many others get broken down. Metabolic reactions cannot occur in a cell-free system. While several in-vitro reactions have been tested in laboratories, they are not considered to be true metabolisms. As a result, metabolism is one of life's defining characteristics.

Another characteristic of living beings is a structural organization, which begins with a cellular organization or the highest level of organization. To make a cell organelle, some molecules come together and act in perfect synchrony, and different cell organelles accumulate together to form a cell. Cells eventually create tissue, which then becomes organs, and the system made up of those organs eventually forms the entire organism. It is the finest and most advanced level found in most multicellular organisms. Cells are altogether different from their constituent organelles; in terms of characters and functions. Similarly, a tissue is entirely different from its component cells; in terms of functions. Similar demarcation and hierarchy of organization are not possible in non-living things. Hence, the cellular organization is a defining feature of life.

External stimuli can reach in various forms to a living organism, either externally as external stimuli like temperature, light, etc., or internal stimulus like hormones. And the living being responds to each stimulus in a different way.

This can be termed as consciousness of the environment. Such a consciousness is not possible in non-living things. Hence, response to external stimuli is a defining feature of life.

Question 2

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

Solution

Ans: The scientist should examine the plant's morphological characteristics. He should start with broad characteristics like root type and venation. If the plant has fibrous roots, it is most likely monocotyledonous. The plant may be dicotyledonous in the case of the taproot. The existence of parallel or reticulate venation, as well as the number of cotyledons in the seeds, might further support this.

The scientist should then examine the type of phyllotaxy, inflorescence, and other characteristics that will aid in classifying the plant into order and family. If it's a flowering plant, a close examination of the various floral parts might reveal a lot about the family or order. The arrangement of seeds inside the fruits can be used to determine the kind of placentation.

Finally, the arrangement of antheridium and gynoecium can aid scientists in confirming the new species' family. Scientists' study on the basis of these characteristics should be confirmed before concluding that a new species has been discovered. Before coming up with a unique name for the new species discovered, the scientist must rule out any exact parallels with any other existing species.

Question 3

Brassica Campestris linn

- (a) gives 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

Ans: The common name of *Brassica campestris* linn is mustard.

Ans: The first part denotes the genus of the plant, while the second part denotes the species.

Ans: To emphasize their Latin origins, these names are written in italics. Furthermore, it is a mandatory rule that scientific names be written in italics.

Ans: Linnaeus was the first to identify and study this species, as the epithet 'linn' implies.

Question 4

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

Solution

Ans: Taxonomic aids are tools that aid scientists in the study of plants and animals. Live plants and animals, as well as preserved remains, are used as taxonomic aids. When it comes to animals, museum specimens are carefully preserved. Herbariums are used to store preserved specimens in the case of plants.

Herbarium's Importance: Herbarium serves as a storage facility for specimens that will be used in the future. This also provides information regarding a specimen's classification in great detail. In many circumstances, the herbarium is used as a rapid reference system while researching a specific species or a higher taxonomic level. The herbarium is simple to construct and keep up with. A herbarium is also simple to travel.

Museums are important because they have a considerably larger collection of plant and animal specimens. Many extinct creatures' skeletons may be found in museums. As a result, a museum offers additional opportunities to learn about a particular plant or animal. Museums are usually run by educational institutions and serve as a valuable research resource for both students and scientists.

Botanical and Zoological Parks Play an Important Role in Biodiversity Conservation: Botanical and Zoological Parks play an important role in biodiversity conservation. The safest environment for plants and animals to live in their natural habitat is a botanical or zoological park. Plants and animals are cared for by specially trained workers. They also practise selective breeding of diverse plants and animals in order to ensure the survival of a species. Furthermore, if the plants and animals in such parks have a disease, effective treatment is provided. As a result, botanical and zoological parks can be regarded to serve an essential role in biodiversity conservation.

Question 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 taxonomic hierarchy?

Solution

Ans: A taxon is a level of biological taxonomy, such as phylum, order, family, and so on.

Taxonomic Hierarchy: Distinct taxa have different levels in taxonomy. This means that a specific taxon will only appear after another specific taxon. Species, for example, always come after the genus and never the other way around.

Plant Categories Flow Chart

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

Flow Chart of Animal Categories

Kingdom → Phylum → Class → Order → Family → Genus → Species

The common characteristics decrease as we progress up the taxonomic ladder. All members of a species, for example, will have the greatest amount of common traits. All members of a genus, on the other hand, will have a smaller number of common characters. The number of individuals increases as we go up the taxonomic hierarchy.

Question 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

Ans: A key is a useful tool for researching a taxonomic category. A key is made up of two distinct characters. These characters are usually found in pairs, which is known as a couplet. Either of the opposing characters is rejected or accepted while examining a key.

As a result, a decision must be made between the two opposing characters in a key. A lead is a name given to each assertion in the key. It's worth noting that most keys are analytical in character.

Furthermore, distinct keys for different taxonomic categories must be employed. Keys aid in the identification of a certain organism in a step-by-step manner. The presence or lack of a notochord, for example, can indicate whether an organism belongs to the Vertebrate or invertebrate subphylum. Similarly, whether an organism has lungs or not determines whether it belongs to the Tetrapoda or Pisces groups.

Question 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

Ans: "The total of all chemical reactions occurring in a live cell or organism" is how metabolism is defined. It involves the production of various compounds, as well as the breakdown of many molecules. Protozoans, algae, fungi, bacteria, and other creatures all have metabolism.

In a cell-free system, metabolic responses are impossible. Because they are carried in a controlled environment and are mimicked, isolated in-vitro reactions carried out in laboratories cannot be called metabolism. However, because such reactions occur within a living system, they are referred to as living reactions.

Question 8

Do you consider a person in coma-living or dead?

Solution

Ans: When it comes to humans, defining their living state is quite challenging. A person could be in a coma for a long time. The person is alive by technical definition because he is not brain-dead. Most of their essential organs, however, have stopped working. The life support system keeps such a person alive. The oxygenation and circulation functions of a heart and lung machine are performed continuously. To fulfill the function of the kidneys, a dialysis unit may be used. Intravenous fluids provide nutrients to the patient.

Because the person is in a coma, he is completely unaware of his surroundings. To put it another way, he is unable to respond to stimuli, which is one of life's defining characteristics. Metabolic activities are ongoing since the person is kept alive by the life support system. As a result, the individual can be considered deceased.

However, we must remember that once he is taken off the life support system, he will become brain-dead and, by technical definition, dead. So, determining whether a person in a coma is alive or dead is a challenging task.

Question 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

Ans:

Whole Moong Daal	Broken Moong Daal

The whole seed is intact.	The seed is broken into pieces.
Seed is capable of carrying out respiration.	Respiration does not take place.
Under favourable circumstances, the seed will undergo changes and would germinate to produce a new plant.	This will never be able to germinate.
This is a living thing.	This is a non-living thing.

Question 10

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

Solution

Ans: Some of the qualities of tissues are not the constituents of their cells, which is true. This statement is supported by the following three examples:

1. Although muscle tissue can contract, not all of its constituent cells may be able to do so.
2. Bones and cartilage make the skeletal system. A bone is hard and lightweight, while cartilage is soft. But they possess different constituents.
3. Blood is capable of carrying oxygen, but WBCs are not capable of doing so in spite of being the constituents of blood.