

BIOLOGY



Important Questions

➤ Multiple Choice Questions:

1. Which of the following is used as an atmospheric pollution indicator?
 - (a) Lepidoptera
 - (b) Lichens
 - (c) Lycopersicon
 - (d) Lycopodium.
2. The theory of spontaneous generation stated that
 - (a) life arose from living forms only
 - (b) life can arise from both living and non-living
 - (c) life can arise from non-living things only
 - (d) life arises spontaneously, neither from living nor from the non-living.
3. Animal husbandry and plant breeding programmes are the examples of
 - (a) reverse evolution
 - (b) artificial selection
 - (c) mutation
 - (d) natural selection.
4. Palaeontological evidences for evolution refer to the
 - (a) development of embryo
 - (b) homologous organs
 - (c) fossils
 - (d) analogous organs.
5. The bones of forelimbs of whale, bat, cheetah and man are similar in structure, because
 - (a) one organism has given rise to another
 - (b) they share a common ancestor
 - (c) they perform the same function
 - (d) they have biochemical similarities.
6. Analogous organs arise due to
 - (a) divergent evolution
 - (b) artificial selection
 - (c) genetic drift
 - (d) convergent evolution.
7. $(p + q)^2 = p^2 + 2pq + q^2 = 1$ represents an equation used in
 - (a) population genetics

- (b) Mendelian genetics
(c) biometrics
(d) molecular genetics.
8. Appearance of antibiotic-resistant bacteria is an example of
- (a) adaptive radiation
(b) transduction
(c) pre-existing variation in the population
(d) divergent evolution.
9. Evolution of life shows that life forms had a trend of moving from
- (a) land to water
(b) dry land to wet land
(c) fresh water to sea water
(d) water to land.
10. Viviparity is considered to be more evolved because
- (a) the young ones are left on their own
(b) the young ones are protected by a thick shell
(c) the young ones are protected inside the mother's body and are looked after they are born leading to more chances of survival
(d) the embryo takes a long time to develop.
11. Fossils are generally found in
- (a) Sedimentary rocks
(b) Igneous rocks
(c) Metamorphic rocks
(d) Any type of rock.
12. For the MN-blood group system, the frequencies of M and N alleles are 0.7 and 0.3, respectively. The expected frequency of MN-blood group bearing organisms is likely to be
- (a) 42%
(b) 49%
(c) 9%
(d) 58%.
13. Which type of selection industrial melanism observed in moth *Biston betularia*?
- (a) Stabilising
(b) Directional
(c) Disruptive
(d) Artificial.

14. The most accepted line of descent in human evolution is

- (a) Australopithecus → Ramapithecus → Homo sapiens → Homo habilis
- (b) Homo erectus → Homo habilis → Homo sapiens
- (c) Ramapithecus → Homo habilis → Homo erectus → Homo sapiens
- (d) Australopithecus → Ramapithecus → Homo erectus → Homo habilis → Homo sapiens.

15. Which of the following is an example for connecting link species?

- (a) Lobe fish
- (b) Dodo bird
- (c) Sea weed
- (d) Tyrannosaurus rex.

➤ Very Short Question:

1. Name one fish like reptile that evolved from land reptile about 200 million years ago?
2. For a long time, it was believed that life originated from decaying matter. What is this theory known as? Name the scientist who experimentally disproved this theory.
3. If abiotic origin of life is in progress on a planet other than earth, what should be the conditions there?
4. Name the person who proposed that population tends to increase geometrically while food production increases arithmetically.
5. Name the scientist who had also come to similar conclusion as that of Darwin about natural selection as a mechanism of evolution. Which place did he visit to come to conclusions?
6. Name any two vestigial organs found in human body?
7. What is the cause of speciation according to Hugo De Vries?
8. Name the phenomenon by which rapid speciation takes place?
9. Name the two scientists who set up a special experiment to prove Oparin's theory of origin of life?
10. Name the common ancestor of apes & man?

➤ Short Questions:

1. Explain Oparin-Haldane theory of chemical evolution of life.
2. Distinguish between convergent and divergent evolution giving one example of each.
3. What is adaptive radiation? Explain with an example.
4. How did Louis Pasteur disprove spontaneous generation theory?
5. Define homologous organs? Give one example of organ homologous to hand of man?

6. What is the role of variation in evolution?
7. Describe one evidence which decisively proves that birds have evolved from reptiles?
8. Why has natural selection not eliminated sickle – cell anaemia?

➤ Long Questions:

1. What are homologous organs? Give similar or different functions are catted examples.
2. How has the study of fossils helped in convincing scientists that organisms have come into existence through evolution?
3. Explain antibiotic resistance observed in light of Darwinian selection theory.

➤ Assertion & Reason Questions:

1. For two statements are given-one labelled Assertion and the other labelled Reason. Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.
 - a. Both assertion and reason are true, and reason is the correct explanation of assertion.
 - b. Both assertion and reason are true, but reason is not the correct explanation of assertion.
 - c. Assertion is true, but reason is false.
 - d. Both assertion and reason are false.

Assertion: Organic compounds first evolved in earth required for origin of life were protein and nucleic acid.

Reason: All life forms were in water environment only.

2. For two statements are given-one labelled Assertion and the other labelled Reason. Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.
 - a. Both assertion and reason are true, and reason is the correct explanation of assertion.
 - b. Both assertion and reason are true, but reason is not the correct explanation of assertion.
 - c. Assertion is true, but reason is false.
 - d. Both assertion and reason are false.

Assertion: Primitive atmosphere was of reducing type.

Reason: First hydrogen atoms combined with all oxygen.

✓ Answer Key-

➤ Multiple Choice Answers:

1. (b) Lichens
2. (c) life can arise from non-living things only

3. (b) artificial selection
4. (c) fossils
5. (b) they share a common ancestor
6. (d) convergent evolution.
7. (a) population genetics
8. (c) pre-existing variation in the population
9. (d) water to land.
10. (c) the young ones are protected inside the mother's body and are looked after they are born leading to more chances of survival
11. (a) Sedimentary rocks
12. (a) 42%
13. (b) Directional
14. (c) Ramapithecus → Homo habilis → Homo erectus → Homo sapiens
15. (a) Lobe fish

➤ Very Short Answers:

1. Ichthyosaurs.
2. Theory of Spontaneous generation; Louis Pasteur.
3. Very high temperature, volcanic storms, Reducing atmosphere containing CH₄, NH₃, H₂ and water vapours.
4. Thomas Malthus
5. Alfred Wallace, Malay Archipelago
6. Vermiform appendix, wisdom teeth.
7. Mutations.
8. Genetic Drift.
9. Urey & Miller.
10. Dryopithecus.

➤ Short Answer:

1. The first life form could have come from the pre-existing, non-living organic molecules (like RNA, Proteins, etc.) and the formation of life was preceded by chemical evolution.
2. Divergent Evolution – Development of different functional structures from a common ancestral form is called divergent evolution.

Homologous organs show divergent evolution.

Examples: Darwin's Finches, Australian Marsupials, locomotion in mammals.

Convergent Evolution – Development of similar adaptive functional structures in unrelated groups of organisms is called convergent evolution.

Analogous organs show convergent evolution.

Examples: Australian Marsupials and Placental mammals, various aquatic vertebrate and wings of insect, bird and bat.

3. Adaptive radiation is an evolutionary process that produces new species from a single, rapidly diversifying lineage. This process occurs due to natural selection. An example of adaptive radiation is Darwin finches, found in Galapagos Island. A large variety of finches is present in Galapagos Island that arose from a single species, which reached this land accidentally. As a result, many new species have evolved, diverged, and adapted to occupy new habitats. These finches have developed different eating habits and different types of beaks to suit their feeding habits. The insectivorous, blood sucking, and other species of finches with varied dietary habits have evolved from a single seed eating finch ancestor.
4. Louis Pasteur showed that in pre-sterilized flasks, life did not come from killed yeast while in another flask open to air, new organisms arose from 'killed yeast'.
5. Homologous organs are those organs which are similar in basic structure & embryonic developments but perform different functions. e.g. bones of forelimbs of whales, bat, birds and human beings.
6. Variations are useful for survival of species in changed environmental situations. If a population of reproducing organisms are suited to a particular niche & if the niche is drastically altered the population could be wiped out however if some variations were to be present in few individuals, there would be some chances for them to survive.
7. Missing link between birds & reptiles called. Archaeopteryx showed that "Birds have evolved from reptiles". These are organisms which show the characters of both birds (e.g. presence of wings & feathers in the body) as well as of reptiles (e.g. gong tail & jaws with identical teeth).
8. Sickle cell anaemia is not eliminated during natural selection because in some cases, sickle cell anaemia is beneficial as it provides natural defense against malarial parasite.

➤ Long Answer:

1. Homologous organs: Organs that have a common origin, embryonic development, and the same fundamental structure but perform similar or different functions are called homologous organs.

Examples of homologous organs:

- i. The wings of bird and bat, flipper embryonic development, and same (fin) of whale and human forearm are fundamental structures but perform differently in forms because these have to perform different functions. Studies of the bones forming the skeleton of

these organs would reveal similarity in construction. In fact, these are the forms of forearms that have originated from pentadactyl forms and due to the different functions they are performing, they transformed into different forms.

- ii. In plants, the homologous organs may be a thorn of *Bougainvillea* or a tendril of *Cucurbita* both arising in axillary position. Both have different forms depending on their function to perform.

2. Fossils are important for man because of many reasons:

- i. They provide evidence of past life.
- ii. They furnish direct and most convincing proofs in favor of organic evolution.
- iii. They afford some information of ancient environment and climate.
- iv. The most primitive forms of life are in the oldest rocks.
- v. Ancient forms were simpler than those found today.
- vi. None of the plants and animals of the past were exactly similar to those found today.
- vii. A complete fossil record has been found in the evolution of horses.

3. Antibiotics were considered to be very effective against diseases caused by bacteria. But within two or three years of the introduction of antibiotics, new antibiotic-resistant bacteria appeared in the population. Sometimes a bacterial population happens to contain one or a few bacteria having mutations that make them resistant to the antibiotic. Such resistant bacteria survive and multiply quickly as the competing bacteria have died.

Soon the resistance-providing genes become widespread and the entire bacterial population becomes resistant. Some hospitals harbor antibiotic-resistant bacteria due to the extensive use of antibiotics.

➤ Assertion and Reason Answers:

1) b) Both assertion and reason are true, but reason is not the correct explanation of assertion.

Explanation:

Organic compounds that first evolved in earth which required for origin of life were protein and nucleic acid. All life forms were in aquatic environment only.

2) a) Both assertion and reason are true, but the reason is correct explanation of assertion.

Explanation:

The interstellar dust from which earth originated was especially rich in hydrogen. It readily combine with nitrogen forming ammonia, with carbon forming methane, and with oxygen forming water leaving no free oxygen. Thus, early atmosphere of primitive earth was strongly reducing, it contains hydrogen, methane, ammonia and water vapours.