REVIEW QUESTIONS PAGE: 193

A. MULTIPLE CHOICE TYPE
(Select the most appropriate option in each case)
1. The first scientist who proposed his theory for evolution was
(a) Darwin **(b) Mendel**
(c) Lamarck **(d) Wallace**
Solution:-
(c) Lamarck

2. The theory of Natural Selection was proposed by
(a) Mendel **(b) Lamarck**
(c) Wallace **(d) Darwin**
Solution:-
(d) Darwin

3. The organism studied for industrial melanism was a
(a) Butterfly **(b) Moth**
(c) Honeybee **(d) Cockroach**
Solution:-
(b) Moth

4. Identify the pre-human ancestor.
(a) Ramapithecus **(b) Australopithecus**
(c) Neanderthal man **(d) Cro-Magnon**
Solution:-
(a) Ramapithecus

B. SHORT ANSWER TYPE
1. Why Neanderthal man and modern man belong to two distinct species?
Solutions:-

Neanderthal Man	Modern man
1. Neanderthal men were successor of Homo erectus	1. Modern man evolved from Cro-Magnon man towards the end of the last Glacial period
2. Their cranial capacity was about 1450 cm^3	3. Their cranial capacity was about 1450 cm^3 to 1600 cm^3

3. Neanderthal man exhibit absolute bipedalism	3. Bipedal locomotion, with four reversed curves in the spine.
4. large head, broad – flat and sloping forehead	4. Upright head, skull on top of the vertebral column, forehead steep.
5. prominent brow ridges, almost no chin and less hair on the body	5. Reduced brow ridges, well developed and prominent chin. Hair on limbs and body highly reduced.

2. The range of cranial capacities in the following ancestral forms were
(a) Australopithecus…….
Solution:-
450 cm^3 to 600 cm^3

(b) Homo habilis……
Solution:-
680 cm^3 to 735 cm^3

(c) Homo erectus……..
Solution:-
800 cm^3 to 1125 cm^3

(d) Cro-magnon……
Solution:-
1450 cm^3 to 1600 cm^3

(e) Homo sapiens sapiens…….
Solution:-
1450 cm^3 to 1600 cm^3

3. Mention the two principles through which Lamarck explained his ideas.
Solution:-
The two principles are,
1. Use and disuse: - It states that parts of the body that are used extensively, become larger and stronger while those which are not used, deteriorate.
2. Inheritance of acquired characters:- It states that an organism could pass its modifications to its offspring.

4. Name any three vestigial organs found in humans.
Solution:-
The three vestigial organs found in humans are vermiform appendix, pinna and wisdom teeth.

5. Give the scientific name of the organism which is cited as the classical example of 'natural selection'.
Solution:-
The scientific name of the organism which is cited as the classical example of 'natural selection' is Biston betularia.

6. Tick mark (√) the correct option in the following statements.
(a) The fossil history of humans is complete/fragmentary.
Solution:-
The fossil history of humans is fragmentary.

(b) The first remarkable human fossil was that of H. habilis/H. africanus.
Solution:-
The first remarkable human fossil was that of H. habilis.

(c) Evolution is an ever continuing/promptly ending process.
Solution:-
Evolution is an ever continuing.

C. LONG ANSWER TYPE
1. Briefly discuss the Theory of Natural Selection as given by Darwin.
Solution:-
In 1859, Darwin published his famous book “The Origin of Species” in which he proposed the idea of natural selection. Darwinism does not exactly mean what evolution is, but it explains how evolution might have occurred in nature. His “Theory of Natural Selection” is based on certain observable facts. These facts are:
(i) Overproduction:- living beings, both plants and animals, have an innate desire to produce their own progeny so that their race may continue. It has been observed that more individuals are produced to increase the chance of their survival.
(ii) Struggle for existence:-According to Darwin, individuals multiply in a geometric ratio whereas space and food remain almost constant. This leads to a struggle for existence among the organism. In this struggle, there is intense competition between organisms

for favorable shelter, climate, food supply and breeding places.
(iii)Variation:- Even the progeny of the same parents are not exactly alike in all respects. Such difference are known as variations.
(iv) Survival of the fittest:- During the struggle for existence, only those individuals can survive which have advantageous adaptions or variations.

2. Industrial melanism provides a good example of natural selection. Discuss.
Solution:-
A classical example of natural selection is provided by peppered moth, biston nitularia. This moth with its light coloured wings dotted woth spots blended well with lichens growing on the houses and tree trunks on which it rested. The light coloured moth as seen in large number as it was well concealed while resting on houses and tree trunks. This situation was observed in this area before industrial revolution. But after industrial revolution in Manchester, the entire situation changed. The pollution in this area caused death of lichens and darkening of the tree trunks with soot.
Natural selection acted through the agency of the birds and light coloured moth easily became the prey. So, the dark variety of moth survived better, left more offspring's and almost nearly replaced the light form. This phenomenon has been called industrial melanism.

3. How would you justify that Australopithecus was a human ancestor?
Solution:-
They were small statured, averaging about 120 cm and their cranial capacity ranged from 450-600 cm^3. It walked nearly straight. The vertebral column had a distinct lumbar curve with broad pelvis. The teeth were strikingly man-like because the dental arch was a smoothly rounded parabola, canines did not project beyond the level of other teeth, and a simian gap was absent. Australopithecus had a prognathous face, and the chin was absent. Eyebrow ridges projected over the eyes.

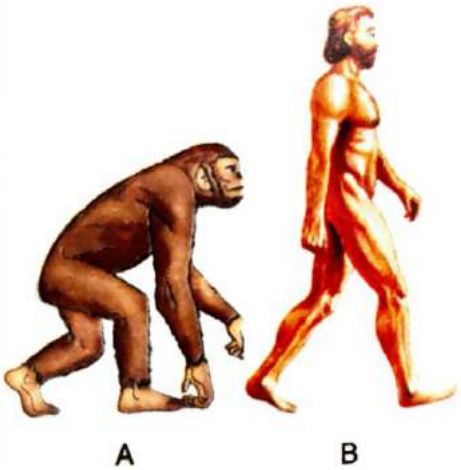
4. Name the six ancestral forms in their correct sequence through which modern man has evolved.
Solution:-
The six ancestral forms are,
(1) Australopithecus
(2) Homo habilis
(3) Homo erectus
(4) Neanderthals

(5) Cro-Magnon
(6) Homo sapiens sapiens (modern man)

5. Briefly discuss Lamarckian Theory of Inheritance, citing an appropriate example.
Solution:-
Lamarck proposed his idea of evolution on the basis of his studies on the patterns of fossils and matching the organisms to their environment. It states that parts of the body that are used extensively, become larger and stronger while those that are not used, deteriorate. This theory is explained by taking example of a giraffe. Lamarck suggested that the giraffe evolved from ground-feeding herbivores. But at a later stage, the area fell short of its ground level vegetation, and thus the giraffe took to feeding from trees. Constant stretching of its neck and fore-limbs over many generations resulted in these structures becoming longer and stronger so as to reach higher foliage.

6. Explain the occurrence of vestigial organs on the basis of Lamarck's theory of use and disuse.
Solution:-
Vestigial organs are the remnants of features that served important functions in the organism's ancestors.
In man, there are over a hundred vestigial organs. Some of them are given below:
(a) Wisdom teeth:- Wisdom teeth are the last molars on each side of both the jaws. The wisdom teeth are so called as they appear last at an age of about 17-20 years.
(b) Vermiform appendix:- Vermiform appendix projects from the blind end of the caecum as a narrow worm-like tube. It is a functionless organ in humans, but its corresponding organ in herbivores mammals is quite helpful in digesting cellulose.
(c) Pinna:- Pinna is the projecting lobe-like part of the external ear which simply provides a passage from auditory canal leading to the ear drum. We cannot move the pinna together the sound waves which is its main function in other mammals.

D. STRUCTURED/APPLICATION/SKILL TYPE
1. Given alongside are two figures (A and B) representing the two stages of evolution of human beings.



Answer the following:

(a) Mention any two contrasting characters between the two stages.

Solution:-

The two stages are,

Stage A is Australopithecus

Stage B is Homo sapiens sapiens

Australopithecus	Homo sapiens sapiens
1. Cranial capacity is 450 cm^3 to 600 cm^3.	Cranial capacity is 1450 cm^3 to 1600 cm^3.
2. Low forehead, eye brow ridges projecting over the eyes.	2. Steep forehead, reduced brow ridges, flattened face.

(b) Write all the stages of human evolution in their correct sequence.

Solution:-

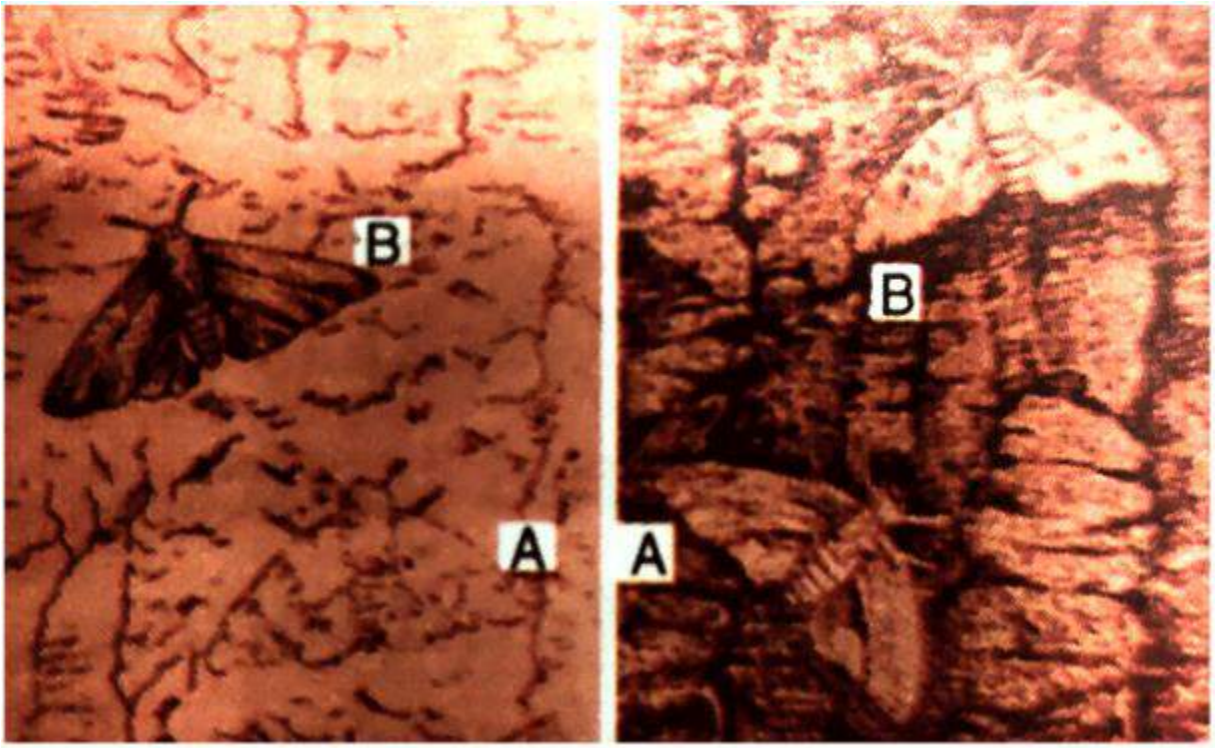
(1) Australopithecus
(2) Homo habilis
(3) Homo erectus
(4) Neanderthals
(5) Cro-Magnon
(6) Homo sapiens sapiens (modern man)

(c) State any two characteristic features of stage B.

Solution:-

1. Bipedal locomotion, with four reversed curves in the spine.
2. Upright head, skull on top of the vertebral column, forehead steep.

2. Given alongside are two figures (A and B) showing a phenomenon that was first observed in Manchester before and after the year 1850.



Answer the following.

(a) What name has been given to this phenomenon?

Solution:-

The name given to this phenomenon is Industrial melanism.

(b) Give the common name and the scientific name of the insect involved in this phenomenon.

Solution:-

The common name of the insect involved in this phenomenon is Peppered moth.
The scientific name of the insect involved in this phenomenon is Biston betularia.

(c) Briefly mention why the changes shown in the two figures appeared.

Solution:-

This moth with its light coloured wings dotted woth spots blended well with lichens growing on the houses and tree trunks on which it rested. The light coloured moth as seen in large number as it was well concealed while resting on houses and tree trunks. This situation was observed in this area before industrial revolution. But after industrial revolution in Manchester, the entire situation changed. The pollution in this area caused death of lichens and darkening of the tree trunks with soot.

Natural selection acted through the agency of the birds and light coloured moth easily became the prey. So, the dark variety of moth survived better, left more offspring's and almost nearly replaced the light form.

(d) The following phenomenon provides a classical explanation of a scientific theory given by a certain scientist.
(i) Name and explain the said theory.
Solution:-
The theory is Natural selection.
According to Darwin, individuals multiply in a geometric ratio whereas space and food remain almost constant. This leads to a struggle for existence among the organism. In this struggle, there is intense competition between organisms for favorable shelter, climate, food supply and breeding places.

(ii) Give the name of the scientist who gave this theory.
Solution:-
Charles Darwin.