

Class 10 Heredity and Evolution CBSE Solved Test paper-4

Board Based Questions with answer: X Chapter : Heredity and Evolution

1. Q. Why did Mendel chosen pea plant for his experiments?

Answer: Mendel chose pea plant for his experiments because it is:

(a) Easy to grow (b) Short lifespan (c) Easily distinguishable characters (d) Larger size of flower
(e) Self-pollinated.

2. Q. What do you understand by evolution?

Ans:-Evolution is the sequence of gradual changes which takes place in the primitive organisms over million of years in which new species are produced.

3. Q. What is a gene?

Ans :Gene is a small segment of DNA on a chromosome occupying specific position in which is a hereditary determinant or unit of a biological function.

4. Q. With the help of suitable examples, explain why certain traits cannot be passed on to the next generation. What are such traits called?

Solution: The traits which are acquired during the lifetime of a person are called acquired traits. These traits involve changes in non reproductive cells (somatic cells) which are not transferred to germ cells. So, these traits cannot be passed on to the next generation. For example: Learning skills like swimming, dancing, cooking, body building, etc are acquired traits and cannot be passed on to the next generation.

5. Q. A trait may be inherited, but may not be expressed." Justify this statement with the help of a suitable example.

Ans: When a tall plant was crossed with a short plant, the first (F1) generation plants were all tall. But when the F1 generation plants were crossed, the second (F2) generation plants were not all tall: there were both tall and short plants.

This shows that the F1 plants had inherited their trait from the short plants but did not express it in the presence of the tallness, and had transferred it to the next generation.

6. Q. 'It is a matter of chance whether a couple will give birth to a male child or a female child.' Justify this statement with the help of a flow chart showing the fusion of sex chromosomes.

Ans: Sex is determined at the time of fertilization and the two sexes are produced in approximately equal numbers. A human male has XY sex-chromosomes and produces two types of sperms (heterogametic). Either with X-chromosome or with Y-chromosome.

A human female has XX sex-chromosomes and produce ova of one type (homogametic) all with

X-chromosomes.

| | | |
|---------|--------------|------------|
| Parents | Male | Female |
| Gametes | X Y | X |
| Progeny | XX | XY |
| | Female (50%) | Male (50%) |

7. Q. What are homologous organs? How do they provide evidence in support of evolution?

Ans: Homologous organs are those organs which have the same basic structure and developmental origin but have different functions and appearance.

Homologous organs support evolution:

(i) The similarities of structure and origin of organs indicate that all vertebrates had common ancestors. For example, the forelimbs of humans, whale and bat show structural similarities but functional dissimilarities. Forelimbs in humans used for grasping or holding the things, in whale for swimming and in bat for flying.

(ii) All the organs and systems of the vertebrates show fundamental similarities i.e. homology, which indicate towards common ancestry. Thus, homologous point that organic evolution has taken place.

8. Q. What is a retrovirus?

Ans: A virus having RNA (Ribonucleic acid) as genetic (heredity) material is called Retrovirus. For example, Human immunodeficiency virus (HIV) is a retrovirus.

9. Q. Who provided the evidence of DNA as a genetic material? Write the names of components of DNA?

Ans: Griffith, Avery, McLeod and McCarty established that DNA is the genetic material.

Components of DNA: A DNA molecule consists of two polynucleotide chains. Each nucleotide consists of (a) nitrogenous base (Adenine/guanine/Thymine or Cytosine), a pentose sugar (deoxyribose) and a phosphate group.

10 Q. How many types of nitrogenous bases are present in DNA? Name them.

Ans: In DNA two types of nitrogenous bases are present. These are

(i) PURINES which are adenine and guanine (ii) PYRIMIDINES which are Thymine and cytosine.

11.Q. How do embryological studies provide evidence for evolution?

Ans: The similarities in embryonic development reinforce the idea of evolution from common ancestors. The sequence of embryonic development in different vertebrates shows striking similarities. Notochord and gill clefts appear in the embryos of all vertebrates.

11. Q. Define evolution. And Describe the contribution of Lamarck?

Ans: Evolution is the sequence of gradual changes which takes place in the primitive organisms over millions of years in which new species are produced.

Contribution of Lamarck:

(i) Lamarck proposed a theory called “The Theory of inheritance of Acquired Characters” to explain the origin and evolution of species.

(ii) The theory was explained in his book ‘Philosophic Zoologique.

12. Q. What are transgenic organisms? Which property of DNA is used as a tool in genetic engineering?

Ans: The organisms that contain a segment of foreign DNA are known as transgenic organisms. The complimentary property of the nucleotides of DNA is the most powerful tool in genetic engineering.

13. Q. Name the two homologous structures in vertebrates. Why are they so called? How do such organs help in understanding an evolutionary relationship?

Ans: Limbs of birds, reptiles and humans are all the examples of homologous structures in the vertebrates. They are called so as the basic structure of the limbs is similar. Though it has been modified to perform different functions in various vertebrates.

These are organs which are inherited from a common ancestor. Such a homologous characteristic helps to identify an evolutionary relationship between apparently different species.

14. Q. What are the different ways in which individuals with a particular trait may increase in a population?

Ans: The different ways in which individuals with a particular trait may increase in a population, are:

Genetic drift ; Geographical isolation ; Natural selection and Artificial selection

15. Q. Why are the small numbers of surviving tigers a cause of worry from the point of view of genetics?

Ans: If they all die out and become extinct, tiger gene will be lost forever and the coming generation will not be able to see tiger at all.