

Class 10 Heredity and Evolution CBSE Solved Test paper-3

Q. 1. Define evolution.

Ans: It is a slow gradual process which occurs due to cumulative effects of adaptations and helps it to survive in a better way.

Q. 2. How are fossils helpful in developing evolutionary relationships?

Ans: Fossils form a connecting link between groups of organisms.

Q. 3. Cat's paw, human hand and horse's legs—are these organs homologous or analogous? Give reason.

Ans: They are homologous organs as they are of same origin performing different functions. origin is forearm.

Q. 4. Wings of bird and wings of insect—are these organs homologous or analogous? Give one suitable reason to support your answer.

Ans: They are analogous organs as both have developed from different origin and perform same function of flying.

Q.5. Give one difference between eyes and eye spot. Which animal possesses eye spots?

Ans: Eyes are well developed organs helping to form an image, but eye spots just enable the animal to distinguish between day light and darkness. e.g. planaria and euglena possess eye spots.

Q.6. Give one difference between artificial selection and natural selection.

Ans: Artificial selection is that in which man selects the beneficial gene and modifies it according to his requirement whereas in natural selection nature selects the advantageous gene and helps it to multiply.

Q.7. What is true—humans have evolved from chimpanzees or humans and chimpanzees both have evolved from a common ancestor?

Ans: Both have evolved from a common ancestor because both are existing today. Man has not replaced chimpanzees.

Q.8. What is the mechanism behind the expression of a particular trait? Explain briefly.

Ans - The mechanism behind the expression of a trait is the presence of a functional gene. When a gene is functional it is capable of producing a hormone or enzyme which helps in the expression of that trait. But sometimes genes get altered and become non-functional, then the enzyme is not produced and the trait does not get expressed.

Q.9) What will happen to the expression of a particular trait if a gene gets altered?

Ans - When gene gets altered the corresponding enzyme is not produced, hence the hormone related to it is not produced and the particular trait does not expressed. there are chances that instead a disease maybe seen due to altered gene

Q.10. What are various ways by which genes can enter a population?

Ans. The various way are

(a) GENE MIGRATION is gene flow which occurs when some members of main population migrate to other areas and may not come back. this is geographical isolation.

(b) GENETIC DRIFT - is change in gene frequency due to chance or accident and not by natural selection.

(c) NATURAL SELECTION - is a process in which better quality genes selected by nature are allowed to multiply.

(d) MUTATIONS arise suddenly - they are sudden changes in the gene inherited by offsprings for at least 4-6 generations.

Q .11. How will new species arise in case:

(a) Two sub-populations are separated due to a huge mountain in between them?

(b) A small population of individuals gets drifted away from the main land due to sea?

Ans. New species will arise;

a) The huge mountain acts as a geographical barrier and the members of the two sub-population will not be able to mate with one another due to this mountain. this will keep mating within the members of their own sub-population and hence two new species will arise.

b) When the small population gets drifted away from main land by sea, here also chances are that there may be some kind of gene flow between the partly separated populations, but if the two populations do not meet, chances are that two new species would arise.

Q.12. Only advantageous variations help in the evolution of an organism giving rise to a new species. Explain with the help of an example.

Ans : This is because the advantageous variations are selected by nature and allowed to multiply or propagate fast to increase their members. because such variations help an individual to survive in a better manner in changing environment the population increases. this can be explained as under

A- EVOLUTION OF EYE which has occurred bit by bit and not in one step. even the rudimentary eye was advantageous to Planaria or Octopus even though a clear image was not formed as in humans still it gave a fitness advantage.

B-EVOLUTION OF WING-earlier feathers were formed to provide warmth to the body, later these feathers helped in flying.

Type-II SHORT ANSWER QUESTIONS (2 marks)

1. 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 complementary property of the nucleotides of DNA is the most powerful tool in genetic engineering.

2. Explain how the sex of the child is determined at the time of conception in human beings.

Ans. Male human beings have XY sex-chromosomes and female human beings have XX sex-chromosomes. If a sperm carrying x-chromosome fertilizes with the ovum, then sex of the baby will be female. If a sperm carrying y-chromosome fuses with the ovum, the sex of the baby will be male.

3. By comparing the similarity of nucleotide sequences in DNA of different kinds of organisms, evolutionary relationships can be established.

a) Arrange the following according to their evolutionary closeness (You may use your knowledge of classification also) Cockroach, mango tree, gorilla, fish.

b) Whose DNA among the following do you think is most similar to that of humans.

Ans. a) cockroach – fish – gorilla b) Gorilla

4. Mention the ways by which variant genotypes are produced in organism?

Ans. a) gene mutation b) Crossing over c) Hybridization

5. In human beings blue eye colour is recessive to brown eye colour. If a brown eyed man has a blue eyed mother then find (a) What are the possible genotypes of his father?

(b) What is the genotype of the man and his mother?

Ans. BB, Bb B. Man: Bb, mother: bb

6. What are fossils? Of what interest are fossils to the evolutionary biologists?

Ans. A fossil is the remnant or impression of an organism that lived in the Remote past. Use of Fossils

(a) Phylogeny, the evolutionary history can be reconstructed from the fossils.

(b) The fossil record has helped in building the broad historical sequence of biological evolution.

SHORT ANSWER QUESTION (3 marks)

1. a) Who isolated DNA for the first time from pus cells? (b) Why is DNA called polynucleotide?

c) Name two purine nitrogenous bases found in a DNA molecule.

Ans. (a) F.Meishcer, named it nuclein.

(b) DNA is called polynucleolide because it is a polymer or long chain of nucleolide.

(c) Purine:- Adenine and Guanine.

2. a) Who put forward the double helical model of DNA?

b) What are the three chemically essential parts of nucleotides constituting a DNA?

Ans. (a) Watson and Crick.

(b) Nucleotide constituting –DNA Nitrogen bases (Purines and Pyrimidines),

Pentose sugar(Deoxyribose sugar) and a phosphate molecule.

3. Guinea pig having black colour when crossed with guinea pig having same colour produced 80 offspring, out of which 60 were black and 20 were white. Now, find out:

(a) What is the possible genotype of the guinea pigs?

(b) Which trait is dominant and which trait is recessive?

(c) What is this cross called as and what is its phenotypic ratio?

Ans. (a) Bb x Bb b)Black is dominant and white is recessive.

(c) Monohybrid cross, phenotypic ratio=3:1

4. Write a brief account on salient points of Lamarck's theory. Who disproved this theory?

A. Lamarckism

1. The use and disuse of an organ leads to acquiring of change in the features of that organ.

2. These changes are inherited by the offspring.

3. Favourable variations result in evolution of new species. August Weisman.

LONG ANSWER QUESTIONS – (5marks)

1. a. What is genetics?

b. Give the common name of plant on which Mendel performed his experiments.

c. What for did Mendel use the term factors and what are these factors called now.

d. What are genes? Where are the genes located?

Ans. A. The branch of biology that deals with the study of heredity and variation.

b. Garden pea – Pisum sativum.

c. The units of inheritance of characters. These factors are now called as genes.

d. Gene is a hereditary unit, a segment of DNA. It is located on a chromosome at a particular locus or position.