



types of environment. As the organisms can be graded in order of increasing complexity, it indicates the concept of evolution.

6. Explain the terms homologous and analogous organs with examples.

**Ans.** The organs which are similar in origin, similar in structure but dissimilar in function in different species are called homologous organs.

**Example:** The fore limbs of a man, a lizard, a frog, a bird and bat seem to be built from the same basic structure of bones but they perform different functions. It indicates that all these organisms have evolved from a common ancestor.

The organs which are dissimilar in origin, dissimilar in structure but similar in functions in different species are called analogous organs.

**Example:** The wings of an insect and a bird have different structures but they perform the same function of flying.

7. Explain the importance of fossils in deciding evolutionary relationships.

**Ans.** Fossils and their study is useful in knowing about the species which are no longer alive. They provide evidence and missing links between two classes. They are helpful in forming a sequence of organisms in the pathway of evolution. Thus, fossils have an importance in deciding evolutionary relationship.

8. What evidence do we have for the origin of life from inanimate matter?

**Ans.** Haldane theory was experimentally confirmed by Stanley. L. Miller and Harold. C. Urey in 1953. They assembled an apparatus to create an early earth atmosphere which consists of methane, ammonia, hydrogen sulphide, etc. over water. This was maintained at a temperature below 100°C and electronic sparks were then passed through the mixture of gases for about one week. Then they found the formation of amino acids which make up protein molecules found in living organisms. This provides the evidence that the life originated from inanimate matter like inorganic molecules.

9. Explain how sexual reproduction gives rise to more viable variations than asexual reproduction. How does this affect the evolution of those organisms that reproduce sexually?

**Ans.** The process of sexual reproduction involves the process of division called meiosis. During the process of meiosis segregation of chromosomes takes place before the formation of gametes. This segregation itself introduces many variations in the chromosomes.

After the formation of gametes, during their fusion re-combination of chromosomes from the parent cells takes place. When the gametes fuse, the

normal chromosome complement is restored but the chromosomes become different from the parents. With every new generation there is a notable variation in the genetic material, which over the time makes the progeny very different from the ancestors. However, during asexual reproduction only very small changes occur due to DNA duplication in the progeny.

Thus, the progeny is more or less genetically similar to the parent.

Sexual reproduction induces variations in the progeny that accumulate over the time and help species to adapt to changes in the environment and continue the species forward. Therefore, evolution in sexually reproducing organisms proceeds at a faster pace than in asexually reproducing organisms.

**10.** How is the equal genetic contribution of male and female parents ensured in the progeny?

**Ans.** The gametes, responsible for the formation of progeny, develop by the process of meiosis. During meiosis only one set of chromosome (50% of genes) is transferred to the gamete. In reproduction when the male and female gametes fuse, one set of chromosomes from each parent cell come together and complete the genetic pool. So, progeny receives 50% genetic contribution through each gamete (male and female).

**11.** Only variations that confer an advantage to an individual organism will survive in a population. Do you agree with this statement? Why or why not?

**Ans.** Yes, it is only the variations that provide adaptive advantage to an organism and is naturally selected by the environment. These variations accumulate over generations and also proliferate faster than the previous variations.