

## CHAPTER 14

# GENETICS AND HEREDITY

### LONG ANSWER TYPE QUESTIONS:

1. How do Mendel's experiments show that traits may be Dominant or recessive? Hence define the Law of Dominance and the law of purity of gametes.
2. How do Mendel's experiments show that Inheritance of two traits is independent of each other? Hence define the law of Independent Assortment.
3. A man with blood group A marries a woman with blood group O and their daughter has blood group O. Is this information enough to tell you which of the traits -- blood group A or O—is dominant? Why or why not?
4. Will geographical isolation be a major factor in the speciation of:
  - (a) A self-pollinating plant species? Why or why not?
  - (b) An organism that reproduces asexually? Why or why not?
5. A study found that children with light-coloured eyes are likely to have parents with light-coloured eyes. On this basis, can we say anything about whether the light eye colour trait is dominant or recessive? Why or why not?
6. What do you understand by analogous and homologous organs? Explain these terms with examples.
7. Outline a project which aims to find the dominant coat colour in dogs?
8. 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?
9. How do traits get expressed?
10. Define evolution. How does occur? Describe how fossils provide us evidences in support of evolution.

### SHORT ANSWER TYPE QUESTIONS:

1. If a trait 'A' exists in 10% of population of an asexually reproducing species and a trait 'B' exists in 60% of the same population, which trait is likely to have arisen earlier?
2. How does the creation of variation in a species promote survival?
3. How is the sex of a child determined in human beings?
4. Out of the two parents, mother and father, whose genetic combination plays a role in determining the sex of a new born in humans and why?

5. What are the different ways in which individuals with a particular trait may increase in a population?
6. Why are traits acquired during the life-time of an individual not inherited?
7. Why are the small numbers of surviving tigers a cause of worry from the point of view of genetics?
8. Give an example of characteristics being used to determine how close two species are in evolutionary terms.
9. How are the areas of study—evolution and classification—interlinked?
10. Can the wing of a butterfly and the wing of a bat be considered – homologous organs? Why or why not?
11. What are fossils? What do they tell us about the process of evolution?
12. Explain the importance of fossils in deciding evolutionary relationships.
13. What evidence do we have for the origin of life from inanimate matter?
14. How is the equal genetic contribution of male and female parents ensured in the progeny?
15. Why are human beings who look so different from each other in terms of size colour and looks said to belong to the same species?
16. In evolutionary terms, can we say which among bacteria, spiders, fish and chimpanzees have a better body design? Why or why not?
17. 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?

### **VERY SHORT ANSWER TYPE QUESTIONS:**

1. What is heredity?
2. What are acquired traits? Do they inherit to next generation?
3. What is speciation?
4. List any two factors that could lead to speciation.
5. Define variations.
6. What is the role of variations in evolution?
7. What is the role of natural selection in evolution?
8. What do you mean by phenotype and genotype?
9. Define genetic drift.
10. What is DNA? Where is it found in a cell?
11. Who gave the hypothesis that evolution took place due to natural selection?
12. What is the contribution of J.B.S Haldane?
13. Who experimentally proved that the complex organic molecules originated from simple inorganic molecules in remote past?

14. As per recent evidences where did human species, *Homo sapiens* originate?
15. A couple has six sons and a daughter. The husband thinks that he produces more y-bearing sperms. Is his thinking right?

**OBJECTIVE/MULTIPLE CHOICE TYPE QUESTIONS:**

1. A Mendelian experiment consisted of breeding tall pea plants bearing violet flowers with short pea plants bearing white flowers. The progeny all bore violet flowers, but almost half of them were short. This suggests that the genetic make-up of the tall parent can be depicted as:  
(a) TTWW (b) TTww  
(c) TtWW (d) TtWw
2. An example of homologous organs is:  
(a) Our arm and a dog's fore-leg  
(b) Our teeth and an elephant's tusks  
(c) Potato and runner of grass  
(d) All of the above.
3. In evolutionary terms, we have more in common with:  
(a) A Chinese school-boy  
(b) A chimpanzee  
(c) A spider  
(d) A bacterium
4. Exchange of genetic material takes place in:  
(a) Vegetative reproduction  
(b) Asexual reproduction  
(c) Sexual reproduction  
(d) Budding
5. Which of the following statement is incorrect?  
(a) For every hormone there is a gene.  
(b) For every protein there is a gene.  
(c) For production of every enzyme there is a gene.  
(d) For every molecule of fat there is a gene.
6. Law of purity of gametes is also called :  
(a) Law of dominance  
(b) Law of segregation  
(c) Law of independent assortment  
(d) None of the above
7. A trait in an organism is influenced by:  
(a) Only maternal DNA (b) Only paternal DNA  
(c) Both maternal and paternal DNA (d) none of the above

8. Which of the following statements on sex determination is correct?
- (a) In some animals temperature at which fertilized eggs are kept determines the sex of individuals.
  - (b) In snails sex is not genetically determined.
  - (c) In human beings sex is genetically determined.
  - (d) All of the above.
9. A cross between a tall plant (TT) and a short plant (tt) resulted in progeny that were all tall plants as:
- (a) Tallness is the dominant trait.
  - (b) Shortness is the dominant trait.
  - (c) Tallness is the recessive trait.
  - (d) Height of the plant is not governed by the gene T or t.
10. In human males all chromosomes are paired perfectly except:
- (a) Large chromosomes.
  - (b) Small chromosomes.
  - (c) Autosomes
  - (d) Sex chromosomes.

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