

**CBSE Test Paper-01**  
**Chapter 09 Heredity and Evolution**

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1. Name the organ analogous to the wings of birds. **(1)**
  - a. Forelimb of human
  - b. None of these
  - c. wings of insect
  - d. Fore-leg of horse
2. Who was the first scientist to isolate DNA? **(1)**
  - a. Darwin
  - b. Watson and crick
  - c. Frederick
  - d. Weismann mishear
3. What are the carriers of factor? **(1)**
  - a. Chromosomes
  - b. Genes
  - c. Alleles
  - d. DNA
4. The genetic constitution of an organism is called **(1)**
  - a. genome
  - b. trait
  - c. genotype
  - d. phenotype
5. Human being belongs to the species of **(1)**
  - a. Homo habillis
  - b. Hominidae
  - c. Homo sapiens
  - d. Homo erectus
6. What is gene according to molecule structure? **(1)**
7. What is gene? Where are genes located? **(1)**

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8. Define variation. **(1)**
  9. Name the Father of Genetics. **(1)**
  10. Show how man has been able to produce crop plants by selective breeding. **(3)**
  11. What is speciation? List four factors that could lead to speciation. Which of these cannot be a major factor in the speciation of a self-pollinating plant species? Give reason to justify your answer. **(3)**
  12. Where are genes located? What is the chemical nature of gene? **(3)**
  13. Give difference between diploid and haploid. **(3)**
  14. Describe briefly Mendel's experiment. **(5)**
  15. Name any five vegetables generated from a common ancestor through artificial selection rather than natural selection. Also mention the features for which each vegetable is selected? **(5)**

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**Answers**

1. c. wings of insect

**Explanation:** Wings of bird and wings of insect both are analogous as both of them perform the same function of flight while structures and origin are different. Feathers of birds originate from their forelimbs, the wings of insects originate from the inner or outer surface of the insect's body.

2. c. Frederick

**Explanation:** DNA isolation is a process of purification of DNA from sample using a combination of physical and chemical methods. The first isolation of DNA was done in 1869 by Friedrich Miescher.

3. a. Chromosomes

**Explanation:** The carriers of factor (genes) are chromosomes and transfer hereditary information from one generation to another.

4. c. genotype

**Explanation:** The genotype is the part (DNA sequence) of the genetic makeup of a cell, and therefore of an organism or individual, which determines a specific characteristic of that cell/organism/individual.

5. c. Homo sapiens

**Explanation:** The billions of human beings living today all belong to one species: Homo sapiens. As in all species, there is variation among individual human beings, from size and shape to skin tone and eye color. But we are much more alike than we are different.

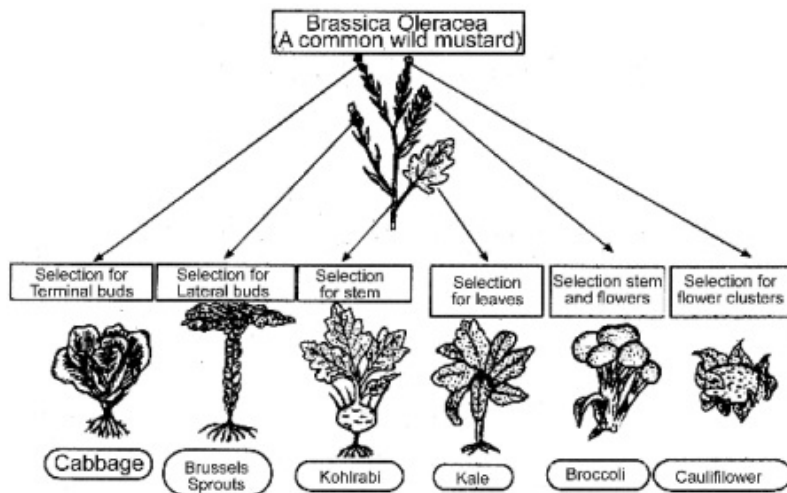
6. A section of DNA that provides information for one protein is called gene for the protein.

7. Gene is a segment of DNA on chromosomes occupying specific position. Genes are located on chromosomes.

8. The occurrence of differences among the individuals of a species is called variation.

9. Gregor Johann Mendel

10. Crop plants produced by selective breeding



11. Speciation is the process by which new species develop from the existing species.

Factors responsible for speciation are as follows

- i. Genetic drift
- ii. Mutation
- iii. Natural selection
- iv. Migration

Out of the following, geographical isolation will not be a major factor in the speciation of a self-pollinating plant species. Because, here single parent is involved as male and female gametes both are contributed by same individual. Hence, even though if a self-pollinating plant is separated geographically they can reproduce without creating much variation.

12. Genes are located at a specific position on a chromosome.

**Chemical nature of gene:** Chemically gene is a segment of deoxyribonucleic acid (DNA) consisting of specific sequence of the nucleotides. The sequence of the constituent nucleotides determines the functional property of a gene.

13.

<b>Diploid</b>	<b>Haploid</b>
Two chromosomes set.	One chromosome set.
Chromosomes are present in pairs.	Chromosomes are not present in pairs.

Formed due to mitosis.	Formed due to meiosis.
Found in Human beings and higher plants.	Found in lower plants.

14. **Mendel's Experiment:** Gregor Mendel (1822 - 1884) was an Austrian monk. He conducted experiments with garden pea (*Pisum sativum*). The results thus formulated the laws of inheritance. He studied inheritance of each character separately.

**Method of experiment:** In breeding experiments (artificial mating) the undeveloped anthers are removed from the flowers of one of the plants to prevent self-pollination. This removal of anther is called as emasculation. On the stigma of this plant are placed the mature pollen of the other selected plant. The artificially pollinated flowers are then covered with bags to prevent access of the other pollen. The seeds produced this way are collected. They are called hybrid seeds.

Now let us follow one of Mendel's breeding experiments. He selected two pure varieties of pea (*Pisum sativum*) which different in size. One of them was tall and the other dwarf. He cross - pollinated them in the way described above. He placed the pollen of tall one of the stigmas of dwarf and vice versa. The hybrid seeds obtained in both the cases were sown. Which ever way the cross was made, on germination the seeds grew into plants which were all tall. This first hybrid generation, is called the first filial generation and is usually written as  $F_1$ . The hybrids of  $F_1$  generation were all similar to the tall parent. The result of this generation surprised Mendel. He expected the hybrids to be intermediate in size. Accordingly the character which appeared in the  $F_1$  generation (tallness in this case) he called dominant and the other which did not appear he called recessive.

Mendel's next step was to allow the  $F_1$  hybrids to self - pollinate and produce seeds. He collected the seeds, planted them and observed the results. He found that three-fourths of the plant of  $F_2$  generation were tall like the original tall parent and one-fourth dwarf like the original dwarf parent. The result of  $F_2$  generation was all the more surprising to Mendel.

He continued the experiment. He allowed the dwarf plants and tall plants of  $F_2$  generation to self-pollinate. The dwarf plants which formed one-fourth of  $F_2$  generation bred true. They produced dwarf offspring in the  $F_3$  generation. The tall

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which formed three fourth of  $F_2$  generation did not breed true for tallness in the  $F_3$  generation. One third of them produced tall pea plants in  $F_3$  generation. These bred true like the dwarfs of  $F_3$  generation. The two thirds, again gave the same ratio, 3 tall : 1 dwarf in generation. All these experiments gave result of the same sort. He was greatly surprised by the ratio of two parental types of 3 : 1 in all the seven cases.

15. Humans have, for more than two thousand years, cultivated wild cabbage. They have selected various character artificially rather than selecting naturally, which led to development of various species. It has resulted in generation of the following vegetables due to some specific characters such as:
- i. Cabbage selected for short distance between leaves.
  - ii. Broccoli selected for arrested flower development and thick stem.
  - iii. Cauliflower selected for sterile flowers forming a large flower.
  - iv. Kohlrabi selected for a swollen edible stem.
  - v. Kale selected for large leaves.