CBSE Test Paper-05

Chapter 09 Science Heredity and Evolution

1. Which is the genetic material in retrovirus? **(1)**
   a. DNA
   b. Neither RNA nor DNA
   c. Both RNA and DNA
   d. RNA
2. Which plant was chosen by Mendel to work upon? **(1)**
   a. pea
   b. Gram
   c. rose
   d. All of these
3. Match the following with correct response. **(1)**

(1) Plica semilunaris	(A) Giant reptiles
(2) Dinosaurs	(B) Philosophies Zoologique
(3) Kohlrabi	(C) Artificial selection
(4) Lamarck	(D) Vestigial

   a. 1-A, 2-C, 3-B, 4-D
   b. 1-B, 2-D, 3-A, 4-C
   c. 1-D, 2-A, 3-C, 4-B
   d. 1-C, 2-B, 3-D, 4-A
4. Match the following with correct response. **(1)**

(1) Edible part in kale	(A) Terminal bud
(2) Edible part in kohlrabi	(B) Swollen stem
(3) Edible part in Broccoli	(C) Leaves
(4) Edible part in Cabbage	(D) Immature green flowers

   a. 1-B, 2-D, 3-A, 4-C
   b. 1-C, 2-B, 3-D, 4-A

c. 1-D, 2-A, 3-C, 4-B
d. 1-A, 2-C, 3-B, 4-D

5. Father of Human genetics is **(1)**
   a. H.G Khurana
   b. Sir Archibald Garrod
   c. Gregor Mendel
   d. Charles Darwin
6. Give the respective scientific terms used for studying **(1)**
   i. The mechanism by which variations are created and inherited.
   ii. the development of new types of organisms from the existing ones.
7. What is natural history? **(1)**
8. Give any one character of gene. **(1)**
9. Give one word for carrier of genetic material termed genes. **(1)**
10. How many contrasting characters did Mendel see in garden pea? Give any two of them. **(3)**
11. How can the pea plant be prevented from self pollination? How is cross pollination carried out? **(3)**
12. i. In humans, if gene B gives brown eyes and gene b gives blue eyes, what will be the colour of eyes of the persons having the following combination of genes? (a) Bb (b) bb (c) BB
    ii. What do you class this trait of eye colour in human? Explain. **(3)**
13. How does the creation of variations in a species promote survival? **(3)**
14. Explain the original idea of tracing evolutionary relationships. **(5)**
15. State Mendel's Laws of inheritance. **(5)**

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Answers

1. d. RNA

   Explanation: A retrovirus is any virus belonging to the viral family Retroviridae. All The genetic material in retroviruses is in the form of RNA molecules, while the genetic material of their hosts is in the form of DNA. When a retrovirus infects a host cell, it will introduce its RNA together with some enzymes into the cell.

2. a. pea

   Explanation: Mendel selected pisum sativum (a pea plant)of his ground to observe the characterstics of progeny produced.

3. c. 1-D, 2-A, 3-C, 4-B

   Explanation:

   - Plica semilunaris is a crescent-shaped fold of conjunctiva located at the inner canthus lateral to the caruncle. It is a vestigial structure that represents the third eyelid or nictitating membrane of lower vertebrates.
   - Dinosaurs are a diverse group of reptiles of the clade Dinosauria that first appeared during the Triassic period.
   - Artificial selection is a process in which man selects a particular desired traits for breeding, in order to generate new plants/ animals with improved characters. For e.g. Early farmers cultivated wild cabbage or Brassica oleracea. This wild cabbage developed into many varieties such as cabbage, broccoli, kohlrabi, cauliflower, kale, and brussels. These varieties were artificially selected because of their characteristic traits.
   - Philosophie Zoologique is an 1809 book by the French naturalist Jean-Baptiste Lamarck, in which he outlines his pre-Darwinian theory of evolution now known as Lamarckism.

4. b. 1-C, 2-B, 3-D, 4-A

   Explanation:

A. Part of kale which is eaten is it's leaf.
B. Part of kohlrabi which is eaten is it's swollen stem.
C. Part of broccoli which is eaten is it's immature flowers.
D. Part of cabbage which is eaten is terminal overlapped buds.

5. c. Gregor Mendel

   Explanation: Gregor John Mendel is considered as father of genetics as he laid down the principles or laws of inheritance for the first time. Though his works were based on plants but the laws governing inheritance patterns are also applicable to humans and hence we call them as " Mendel's Laws of Inheritance".

6. i. Genetics is the study of mechanism by which variations are created and inherited. These variations are far more in sexual reproduction due to crossing over in meiosis and also new diploid recombination.
   ii. Evolution is used for studying the development of new species of organisms from the existing ones through accumalation of variation.
7. It is the name used for the study of plants and animals during Darwin's period.
8. Gene has a fixed position on a chromosome.
9. Chromosome.
10. Mendel observed seven contrasting characters is pea plant. For Ex- flower position- axial and terminal. seed shape- round and wrinkled.
11. Pea plants can be prevented from self pollination by the process of emasculation. Emasculation is the technique in which the male parts of the flower (stamens and anthers) are carefully removed before the flower matures.
    Cross pollination occurs when pollen flower of one plant pollinates the flower of another plant. Cross pollination may occur naturally or manually by rubbing the pollens from a plant onto the stigma of the flower of another plant.
12. i. Bb will have brown eyes.
    bb will have blue eyes.
    BB will have brown eyes.
    ii. Eye colour in humans is an inherited trait. These are traits that are present in the DNA of an organism and are passed on to their progeny.

13. The useful variation in individuals of a species will enable them to adapt according to the changes and new needs. Thus they will enable the survival of species.

14. The idea of tracing the evolutionary relationships is presently known as molecular phylogeny, which focus on identifying the changes occuring in DNA during reproduction. Evolution does not occur because of a single change in DNA or mutation. Organs are complex both structurally and functionally; and are genetically regulated by many genes working together. Evolution occurs in many stages by slow changes in DNA or mutation that accumalate over time. The stages occurring during evolution can thus be identified by different structures formed from common ancestors.
    Comparing the DNA of different species helps to give a direct account of changes that occurred in DNA during the formation of specific species. These changes occur during cell divisions and modify the proteins that forms thereafter. These changes/variations accumulate and pass on to the following next generation. They can be used to trace back and identify the time of their initial occurrence. This approach is based on the idea that organism distantly related will accumulate greater number of differences in their DNA.

15. i. **Law of unit character:** According to this law, all the characters of body are represented in the gametes by certain units called factors or determiners which always occur in pair. These genes are present on different chromosomes of homologous pairs at the same locus.
    ii. **Law of Dominance:** Only one member of the contrasting pair of characters is capable of expressing itself while other remains hidden, is called principle of dominance.
    iii. **Law of Segregation:** According to this law, in a hybrid, the two unlike factors of a character do not affect each other but keep their identity. During gamete formation, they are free to segregate or separate from one another and to be redistributed in the next generation. This law is also called the purity of gametes.
    iv. **Law of independent assortment:** When two pairs of independent alleles are brought together, they show independent dominant effects. During the formation of gametes, the genes of different characters are independent of one another.