CBSE Test Paper-03

Chapter 09 Heredity and Evolution

1. The branch of biology related with heredity and variation is called **(1)**

    a. Livinglogy
    b. Genetics
    c. Evolution
    d. Taxonomy

2. Which of the following is not a nitrogenous base? **(1)**

    a. Cytosine
    b. Deoxyribose sugar
    c. Guanine
    d. Adenine

3. Checkerboard method of calculations was developed by **(1)**

    a. Mendel
    b. Bateson
    c. Morgan
    d. Punnett

4. Genetics is the study of- **(1)**

    a. resemblances amongst individuals
    b. differences amongst individuals
    c. Heredity and variations
    d. heredity and environment

5. Alternative forms of a gene are called **(1)**

    a. Chromosomes
    b. Multiples
    c. Loci

d. Alleles

6. Who is called father of genetics? **(1)**
7. What is the source of variation in monoparental (asexual) reproduction? **(1)**
8. Which other term can be used for natural selection? **(1)**
9. Genetic foot prints of human can be traced to which continent. **(1)**
10. Show by simple sketches how and what type of beetles survive due to variations in a population. **(3)**
11. (i) Who provided the evidence of DNA as genetic material? **(3)**
    (ii) Why DNA is called polynucleotide?
    (iii) List three important features of double helical model of DNA.
12. Name the following: **(3)**
    i) Who proposed the theory of inheritance of acquired characters?
    ii) Who first suggested organism never originate spontaneously from non-living?
    iii) Who wrote the book "Origin of Species"?
13. Give a suitable explanation for "geographical isolation of individual of a species lead to formation of a new species? **(3)**
14. How has the method of 'artificial selection' by humans helped in the evolution of different vegetables? **(5)**
15. How do Mendel's experiments show that gene may be dominant or recessive? **(5)**

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Answers

1. b. Genetics

   Explanation: Genetics is the study of genes, genetic variation, and heredity in living organisms. It is generally considered a field of biology, but intersects frequently with many other life sciences and is strongly linked with the study of information systems.

2. b. Deoxyribose sugar

   Explanation: A nitrogenous base is simply a nitrogen containing molecule that has the same chemical properties as a base. They are particularly important since they make up the building blocks of DNA and RNA: adenine, guanine, cytosine, thymine and uracil.

3. d. Punnett

   Explanation: Punnett's gametic checkerboard method is of great use in deducting the genotype and phenotype of the F2 offsprings of a hybridization cross. The gametic checkerboard has the equal number of squares in horizontal and vertical lines according to the number of gametic combinations of F1 hybrid.

4. c. Heredity and variations

   Explanation: Genetics is the study of genes, genetic variation, and heredity in living organisms.

5. d. Alleles

   Explanation: An alternative form of a gene is known as an allele. Alleles vary in their sequence which may or may not result in a variant phenotype of a particular trait. Alleles represent variations of a gene that is responsible for a particular trait.

6. **Father of genetics: Gregor Mendel.**

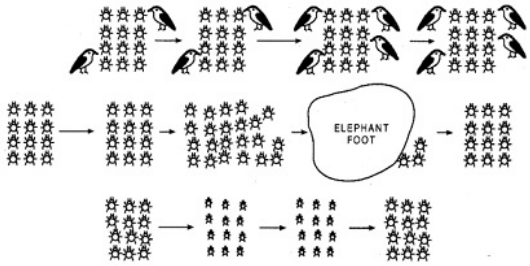
7. The chromosomal aberrations and gene mutations are the only source of genetic

variation in monoparental reproduction.

8. Better adaptability can be used for natural selection

9. Our genetic footprint can be traced back to our African roots.

10. Variations in a population of beetles



11. (a) Mendel.
    (b) DNA is made up many units of nucleotides.
    (c) Important features-
    (1) Both the chains in helix runs anti-parallel.
    (2) There are two types of nitrogenous bases Purine (A, G) and pyrimidine (T, C).
    (3) A always pairs with T and C always pairs with G.

12. i) Lamarck
    ii) Louis Pasteur
    iii) Charles Darwin

13. Reproduction barrier such as river (geographical is olation) between the sub population leading to:
    Geographical isolation of individuals of a species has the potential to lead to formation of a new species. Turtles of the Galapagos Islands show a good example of speciation due to geographical isolation. Turtles on different islands were geographically isolated. Individuals from one island could not meet with those from another island. So, genetic flow between different groups of turtle could not take place. Over several generations, the degree and types of variations were markedly different in different groups. This led to formation of new species. Turtles on different islands represent altogether different species.

14. A wild variety of a plant species may exhibit different variations. In due course of

time, humans had selected some of these variants and had grown them for generations and that they had become totally different species. For example, variants in wild cabbage were selected on the basis of certain features-

i. Short distances between leaves, led to the formation of green leaf buds-the common cabbage.
ii. Arrested flower development has bred broccoli.
iii. The variant with sterile flowers has made the cauliflower.
iv. Variant with swollen leaf parts-kohlrabi.
v. Variant with larger leaves-kale.

15. Mendel conducted experiments on garden pea plant selecting seven visible contrasting characters. He selected and crossed homozygous tall pea plant having the genotype TT with a homozygous dwarf pea plant having the genotype tt. F_1 generation consists only of tall plants, having genotype Tt. Since they have an allele for dwarfness also, they are all hybrids. The expressed allele T for tallness is dominant over the unexpressed allele t for dwarfness. The fact that the allele for dwarfness is present in the F_1 plants can be verified by interbreeding them when F_2 progeny will consist of both tall and dwarf plants in the ratio of 3 : 1. On this basis he proposed "Law of Dominance."