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**Max Time : 1 hr** **Class = 12th Biology Test**  **Max Marks : 25**

**PRINCIPLES OF INHERITANCE & VARIATION**

**[Dihybrid Cross and Linkage]**

1. Multiple choice questions : [ 1 X 5 = 5]
2. Distance between gene and percentage of recombination shows :

|  |  |  |  |
| --- | --- | --- | --- |
| a) a direct relationship | b) an inverse relationship | c) a parallel relationship | d) no relationship |

1. Mendel’s law of independent assortment holds good for genes situated on the :

|  |  |
| --- | --- |
| a) non-homologous chromosomes | b) homologous chromosome |
| c) Extra nuclear genetic element | d) same chromosome |

1. In the F2 generation of a Mendelian dihybrid cross the number of phenotypes and genotypes are :

|  |  |
| --- | --- |
| a) Phenotypes – 4 ; Genotypes – 16 | b) Phenotypes – 9 ; Genotypes – 4 |
| c) Phenotypes – 4 ; Genotypes – 8 | d) Phenotypes – 4 ; Genotypes – 9 |

1. The distance between the gene is measured by :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Angstrom | b) map unit | c) Dobson unit | d) millimeter |

1. In maize, chromosome number is 2n = 20. The number of linkage group in it will be :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 20 | b) 40 | c) 10 | d) 5 |

1. Why is it that the father never passes on the gene for haemophilia to his sons? Explain. [ 1 ]
2. Write the symptoms of Colourblind and Haemophilia in humans. [ 2 ]
3. Who proposed Chromosomal theory of Inheritance? Point any two similarities in the behaviour of chromosomes and genes. [ 2 ]
4. A colour-blind man marries a woman with normal vision whose father was colour blind. Work out a cross to show the genotype of the couple and their respective sons. [ 2 ]
5. Who proposed Chromosomal theory of linkage? list the postulates of Chromosomal theory of linkage. [ 3 ]
6. A true breeding pea plant homozygous for axial voilet flowers (AAVV) is crossed with another pea plant with terminal white flowers (aavv) [ 5 ]
7. What would be the phenotype and genotype of F1 and F2 generations?
8. Give the phenotypic ratio of F2 generation.
9. List the Mendel’s generalisations (law) that can be derived from the above case and explain it.
10. (a) Write the scientific name of the organism Thomas Hunt Morgan and his colleagues worked with for their experiments. Explain the correlation between linkage and recombination with respect to gene as studied by them. [ 5 ]

(b) How did Sturtevant explain gene mapping while working with Morgan?

(c) In the given figure which of the following gene pair will show more recombination frequency? Give reason in support of your answer.

