

**M.Sc. BOTANY
THIRD SEMESTER
CYTOGENETICS AND PLANT BREEDING
MSB-304 A**

**SET
A**

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 1hr. 30 mins.

Full Marks: 35

Time: 15 mins.

(Objective)

Marks: 10

Choose the correct answer from the following:

1×10=10

- In males, where is the gene for color blindness located?
 - X-chromosomes
 - Y-chromosomes
 - Both X and Y chromosomes
 - Either X or Y Chromosome
- Which statement is true about chromosomes during metaphase?
 - A chromosome is thickest during the metaphase
 - A chromosome is shortest during the metaphase
 - A chromosome is longest during the metaphase
 - Both a and b
- What is the role of a linker DNA in a nucleosome?
 - It connects adjacent nucleosomes
 - It serves as a binding site for transcription factors
 - It encodes ribosomal RNA
 - It codes for specific acids in proteins
- What was the reason for the scientific community not accepting Mendel's proposal?
 - Mendel's factors blended, but natural changes were somewhat discrete
 - Mendel's factors were discrete, but natural changes blended
 - Mendel's factors were discrete, and natural changes were also discrete
 - Mendel's factors blended and natural changes blended
- Which of the following is true about the Chromatids?
 - It is a haploid chromosome
 - It is a complete chromosome
 - It is a duplicate chromosome
 - It is one-half of the replicated chromosome
- Which of the following statements is true regarding the "law of segregation"?
 - Law of segregation is the law of purity of genes
 - Alleles separate from each other during gametogenesis
 - Segregation of factors is due to the segregation of chromosomes during meiosis
 - All of the above
- Crossing over in diploid organism is responsible for:
 - Dominance of genes
 - Segregation of alleles
 - Recombination of linked genes
 - Linkage between genes

8. The phenomenon of linkage was first observed in the plant:
- a. *Lathyrus odoratus*
 - b. *Pisum sativum*
 - c. *Datura*
 - d. *Mirabilis jalapa*
9. Which of the following is not true about inversion?
- a. Two DNA strands with an inverted segment will not pair
 - b. Inverted chromosomes are generally viable
 - c. Inversion including centromere is known as paracentric
 - d. Inversion can cause chromosome breakage
10.is one of the methods for production of mapping population.
- a. Population developed by Mass selection
 - b. Backcross population
 - c. F1 population
 - d. Population developed by Pedigree selection

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(Descriptive)

Time : 1 hr, 15 mins.

Marks : 25

[Answer question no.1 & any two (2) from the rest]

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|-----------------------------------------------------------------------------------------|--------|
| 1. Explain the molecular mechanism of recombination. | 5 |
| 2. Describe briefly the process of Linkage and Crossing over. | 10 |
| 3. Describe the steps in linkage map construction. | 10 |
| 4. Define in situ hybridization. Describe the technique with special reference to FISH. | 2+8=10 |
| 5. Briefly describe <i>any one</i> : | 10 |
| a) Chromosome banding | |
| b) Nucleosomes | |
| c) Chromosome painting | |

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