

**MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE**  
**SEMESTER END THEORY EXAMINATION**

**B.Sc.(Hons.) Agriculture**

Semester : II (New)	Term : Second	Academic Year : 2023-24
Course No. : GPB 121	Title : Fundamentals of Genetics	
Credits : 3 (2+1)		
Day & Date : Thursday, 09.05.2024	Time : 10:00 to 13.00 hrs.	Total Marks : 80

- Note :**
1. Solve ANY EIGHT questions from SECTION 'A'.
  2. All questions from SECTION 'B' are compulsory.
  3. All questions carry equal marks.
  4. Draw neat diagram wherever necessary.

**SECTION 'A'**

- Q.1 Define Gene interaction. Enlist different gene interactions with modification of  $F_2$  phenotypic ratios. Explain Complementary gene interaction with suitable example.
- Q.2 a) What is Crossing over? Explain the factors affecting crossing over.  
b) Define Linkage and enlist the phases of linkage. How to detect the linkage?
- Q.3 Define Mutation. Give its classification in detail. Explain the applications of mutation in crop improvement.
- Q.4 Enlist Pre-Mendelian concepts of heredity. State different Laws of Inheritance. Write in detail the reasons for Mendel's success.
- Q.5 What is Gene? Explain in detail modern concepts of gene.
- Q.6 What do you mean by Sex determination? Explain in detail about chromosomal sex determination.
- Q.7 Explain in detail the process of protein synthesis.
- Q.8 a) What is Cytoplasmic inheritance? Mention important features of cytoplasmic inheritance.  
b) What is Multiple allele? Give the main features of multiple allele.
- Q.9 Differentiate between the following (Any Two):
- a) Mitosis and Meiosis
  - b) Qualitative character and Quantitative character
  - c) Mendelian inheritance and Cytoplasmic inheritance
- Q.10 Write short notes on (Any Two):
- a) Watson and Crick DNA model
  - b) Lac Operon model
  - c) DNA replication

**(P.T.O.)**

## SECTION 'B'

Q.11 Define the following terms:

- 1) Recon
- 2) Chromosome mapping
- 3) Lethal gene
- 4) Codominance
- 5) Probability
- 6) Phenotype
- 7) Allosomes
- 8) Mutagen

Q.12 Fill in the blanks:

- 1) Exchange of chromosomal segments between non-homologous chromosomes, is known as \_\_\_\_\_.
- 2) Two ends of chromosome, are known as \_\_\_\_\_.
- 3) The tendency of one crossover to reduce the chance of another crossover in its adjacent region, is called as \_\_\_\_\_.
- 4) \_\_\_\_\_ number of hydrogen bonds join Adenine and Thymine in a DNA molecule.
- 5) Sites within gene that show high rate of mutation, are known as \_\_\_\_\_.
- 6) Nucleus was first discovered by \_\_\_\_\_ in 1833.
- 7) Chiasma slowly moves towards the ends of homologous chromosome; this is known as \_\_\_\_\_.
- 8) Monohybrid test cross ratio is \_\_\_\_\_.

