

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

**B.Sc.(Hons.) Horticulture**

Semester	: I (New)	Term	: First	Academic Year	: 2022-23
Course No.	: H/BOT 112	Title	: Principles of Genetics and Cytogenetics		
Credits	: 3 (2+1)	Time	: 10:00 to 13:00 hrs.	Total Marks	: 80
Day & Date	: Monday, 20.03.2023				

- 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 a) State and explain the law of independent assortment with example.  
b) State law of segregation. Give the reasons of Mendel's success.
- Q.2 a) What is gene interaction? Enlist different types of gene interactions along with their  $F_2$  phenotypic ratio.  
b) Explain the external structure of chromosome.
- Q.3 a) Describe in detail different stages of mitosis.  
b) Enlist different stages of meiosis and give its significance.
- Q.4 Write the difference between following:  
a) Plant cell and Animal cell  
b) Qualitative characters and Quantitative characters
- Q.5 a) Write short note on multiple alleles.  
b) Explain multiple factor hypothesis with suitable example.
- Q.6 a) Define linkage and explain coupling phase with example.  
b) Define cytoplasmic inheritance. Give the characteristics of cytoplasmic inheritance.
- Q.7 a) Define polyploidy. Give the classification of polyploidy.  
b) What is mutation? Give its classification in detail.
- Q.8 a) Define crossing over. Explain the different factors affecting crossing over.  
b) Define and explain sex-influenced characters with examples.
- Q.9 a) Describe different components of Operon model.  
b) Define genetic code. Explain the characteristics of genetic code.
- Q.10 a) Describe in detail deletion structural chromosomal aberration.  
b) Write the differences between DNA and RNA.

(P.T.O.)

## SECTION 'B'

Q.11 Match the pairs:

'A'

- 1) Blakeslee
- 2) Ideogram
- 3) McClintock
- 4) Atavism
- 5) Benzer
- 6) Transcription
- 7) Schleiden and Schwann
- 8) Charles Darwin

'B'

- a) Theory of natural selection
- b) Jumping genes
- c) Diagrammatic representation of chromosomes
- d) Cell theory
- e) mRNA synthesis
- f) Fine structure of gene
- g) Reappearance of ancestral characters
- h) Use of colchicines for induction of polyploidy

Q.12 Fill in the blanks:

- 1) \_\_\_\_\_ genes are found on Y chromosome in male.
- 2) \_\_\_\_\_ are the sites of protein synthesis.
- 3) The \_\_\_\_\_ character is never expressed in  $F_1$ .
- 4) Ability of a gene to express phenotypically, is known as \_\_\_\_\_.
- 5) Chance of simultaneous occurrence of more than one crossing over, is known as \_\_\_\_\_.
- 6) Combination of deoxyribose sugar and nitrogen base, is termed as \_\_\_\_\_.
- 7) Phenotypic trihybrid ratio is \_\_\_\_\_.
- 8) When one gene affects more than one character, it is called as \_\_\_\_\_.

