

**MZO-002**

**ASSIGNMENT BOOKLET**

**M.Sc. (Zoology) Programme**

**(MSCZOO)**

**Genetics and Animal Biotechnology**

**Valid from 1<sup>st</sup> January, 2025 to 31<sup>st</sup> December, 2025**



**School of Sciences  
Indira Gandhi National Open University  
Maidan Garhi  
New Delhi-110068**

**(2025)**

Dear Student,

Please read the Section on assignments in the Programme Guide for M.Sc. (Zoology). A weightage of 30 per cent, as you are aware, has been earmarked for continuous evaluation, which would consist of one tutor-marked assignment for this course. The assignment is in this booklet. The total marks for this assignment is 100, of which 40 marks are needed to pass it.

### Instructions for formatting your Assignments

Before attempting the assignment please read the following instructions carefully:

- 1) On top of the first page of your answer sheet, please write the details exactly in the following format:

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**ROLL NO.:** .....

**NAME:** .....

**ADDRESS:** .....

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**COURSE CODE:** .....

**COURSE TITLE:** .....

**ASSIGNMENT NO.:** .....

**STUDY CENTRE:** .....

**DATE:** .....

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**PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.**

- 2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.
- 3) Leave 4 cm margin on the left, top and bottom of your answer sheet.
- 4) Your answers should be precise.
- 5) Solve this assignment, and **submit the complete assignment answer sheets within the due date.**
- 6) The assignment answer sheets are to be submitted to your Study Centre within the due date. **Answer sheets received after the due date shall not be accepted. We strongly suggest that you retain a copy of your answer sheets.**
- 7) This assignment is valid from 1<sup>st</sup> January, 2025 to 31<sup>st</sup> December, 2025. If you have failed in this assignment or fail to submit it till its validity, then you need to get the assignment for the next year and submit it as per the instructions given in the Programme Guide.
- 8) **You cannot fill the examination form for this course** until you have submitted this assignment.

We wish you good luck.

## ASSIGNMENT

Course Code: MZO-002  
Assignment Code: MZO-002/TMA/2025  
Maximum Marks: 100

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**Note: Attempt all questions. The marks for each question are indicated against it.**

1. How did Mendel's use of controlled crossbreeding in pea plants lead to the discovery of dominant and recessive traits? Describe the Mendel's laws of heredity. (4+6=10)
2. What is epistasis, and how does it affect the expression of traits? Provide examples to describe the different types of epistasis, such as dominant epistasis and recessive epistasis. (2+8=10)
3. What are the different types of mutations and how do they affect the genetic code and protein synthesis? (10)
4. How do transcription factors and enhancers regulate gene expression in eukaryotic cells, and what role do epigenetic modifications such as DNA methylation and histone modification play in this process? (10)
5. Compare the X-Y sex determination system with the Z-W sex determination system, providing suitable examples. (10)
6. Describe the key cytogenetic techniques of karyotyping and fluorescence *in situ* hybridization (FISH) used to identify chromosomal abnormalities. (10)
7. What are cloning vectors? How are they used in recombinant DNA technology to insert foreign genes into host cells? Discuss the different types of cloning vectors and their features. (2+2+6=10)
8. Compare the processes of constructing a genomic library and a cDNA library. Which type of library is used for studying gene expression? (10)
9. What are transgenic animals? What are the key techniques used in the creation of transgenic animals, and how do these methods contribute to advancements in fields such as medicine and agriculture? (2+8=10)
10. What is gene therapy and how does it work to treat genetic disorders? Discuss the various types of gene therapy and their applications. (4+6=10)