

**M. SC. (ZOOLOGY) (MSCZOO)**

**Term-End Examination**

**December, 2025**

**MZO-002 : GENETICS AND ANIMAL  
BIOTECHNOLOGY**

*Time : 2 Hours*

*Maximum Marks : 50*

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**Note :** (i) *Attempt any five questions.*

(ii) *All questions carry equal marks.*

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1. (a) Describe penetrance and expressivity with suitable examples. 5
- (b) How can pedigree analysis be used to detect the inheritance of genetic traits? 5
2. (a) Discuss the fine structure of a gene based on rII locus. 5

- (b) Explain the organization of different genes in a *lac* operon. 5
3. Describe the different mechanisms responsible for the repair of DNA damage with suitable diagrams. 10
4. (a) Discuss the molecular mechanism of X-chromosome inactivation. 3
- (b) Distinguish between Acute Myeloid Leukemia (AML) and Chronic Myeloid Leukemia (CML). 7
5. Describe the principle and procedure of blotting technique used for gene expression studies. Mention its advantages and applications. 10
6. (a) Explain the different types of gene therapy. 5

(b) Discuss the principle for the production of transgenic sheep Dolly with diagram. 5

7. Describe the following terms :  $4 \times 2\frac{1}{2} = 10$

- (a) Bacterial artificial chromosome
- (b) DNA methylation as epigenetic regulation
- (c) Multiple alleles
- (d) Gene knock-out

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