

(i) Printed Pages : 3

Roll No. ....

(ii) Questions : 9

Sub. Code :

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**M.Sc. Bio-Technology 2<sup>nd</sup> Semester**  
**(2056)**

**BIOSAFETY AND BIOETHICS**

**Paper : MBIO-205**

**Time Allowed : Three Hours] [Maximum Marks : 80**

**Note :—** Attempt **five** questions in all. Question 1 is compulsory.  
Attempt **one** question from each unit.

1. (a) Differentiate between biorisk and biosafety.
- (b) Write a short note on biorisk management.
- (c) What is BioRAM and its application in biorisk management?
- (d) Difference between primary and secondary containment.
- (e) Mention the various internal and external administrative controls.
- (f) What is meant by ethical behaviour in a laboratory?
- (g) Define Living Modified Organisms (LMOs).
- (h) Mention any two barriers in implementation of good laboratory practices. 2×8=16

## UNIT—I

2. (a) What is biorisk assessment? Explain the steps involved in conducting a systematic biorisk assessment in a laboratory setup.
- (b) Explain various biorisk mitigation strategies and their importance in laboratories. 8,8
3. (a) Discuss in detail the core components of AMP model for biorisk management.
- (b) Discuss the relationship between biosafety and biosecurity in effective biorisk management. How do these approaches complement each other in laboratory setup? 8,8

## UNIT—II

4. Discuss the different routes of exposure to biological agents in laboratories. Explain the types of Personal Protective Equipment (PPE) used to prevent these exposures. 16
5. (a) Discuss the importance of decontamination in biosafety laboratories. Compare physical and chemical methods of decontamination with suitable examples.
- (b) Explain the different categories of biological waste and the risks associated. 8,8

## UNIT—III

6. (a) What are Biological Safety Cabinets (BSCs)? Explain their principle and working mechanism in protecting personnel, product, and environment.

- (b) Explain the potential biosecurity threats in laboratories. Discuss the security measures that can be implemented to prevent unauthorized access and mishandling of biological agents. 8,8
7. (a) Explain the role of engineering controls and laboratory equipment in minimizing biological risks. Provide suitable examples.
- (b) Discuss the different types of Good Laboratory Work Practices (GLWP). 8,8

#### UNIT—IV

8. (a) Explain the concept of administrative controls in biorisk management. How do policies and training contribute to effective biorisk management?
- (b) What are Standard Operating Procedures (SOPs) in laboratories? Discuss the major components involved in the preparation, evaluation, and validation of SOPs. 8,8
9. (a) Describe the Cartagena Protocol on Biosafety. Discuss its objectives and significance in the safe transboundary movement of LMOs.
- (b) Define bioethics and explain the importance of ethical behavior in biological research. 8,8