



K26P 0738

Reg. No. : .....

Name : .....

**IV Semester M.Sc. Degree (C.B.C.S.S. – O.B.E. – Regular/Supple./Imp.)**  
**Examination, April 2026**  
**(2023 Admission Onwards)**  
**ZOOLOGY**  
**MSZGY04C17 : Microbiology and Biotechnology**

Time : 3 Hours

Max. Marks : 60

**PART – A**

Answer **any five** of the following. **Each** question carries **3** marks.

1. Distinguish between the Taxonomic criteria used in the Bergey's Manual of Systematic Bacteriology versus traditional morphological classification.
2. Describe the molecular architecture and function of bacterial pili and fimbriae.
3. Define the term Eutrophication and list three microbial toxins contributing to hazardous water transformations.
4. Outline the specific roles of Alkaline Phosphatase and Polynucleotide Kinase in recombinant DNA technology.
5. Define RNA Interference (RNAi) and its role in natural gene silencing.
6. Differentiate between patent and copyright in the context of biological research.

(5×3=15)

**PART – B**

Answer **any three** of the following. **Each** question carries **6** marks.

7. Design a standardized protocol for the selection of a pure culture from a mixed microbial population. Evaluate the importance of the growth curve in industrial fermentation.

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8. Critically evaluate the differences between Exotoxins and Endotoxins. How does their virulence influence the clinical progression of a disease like Tetanus ?
9. Justify the choice of BAC over standard plasmids for the construction of a large-scale Genomic Library.
10. Compare the chemistry of Sanger Sequencing with Pyrosequencing. Judge which method is more efficient for high-throughput clinical diagnostics.
11. "Biosafety guidelines are an impediment to scientific innovation." Debate this statement by analyzing the hazards of Environmental Engineering. (3×6=18)

**PART – C**

Answer **any three** of the following. **Each** question carries **9** marks.

12. Analyze the molecular regulation of the Lac Operon in E. coli. Predict the phenotypic outcome of a mutation in the operator region that prevents repressor binding.
13. Discuss the epidemiology and pathogenesis of Tuberculosis and Hepatitis. Evaluate the mechanisms through which Mycobacterium develops drug resistance against frontline antibiotics.
14. Design a comprehensive strategy to develop a Transgenic Plant expressing Terminator Genes. Analyze the ethical and agricultural consequences of this technology.
15. Evaluate the use of RFLP and RAPD as genetic markers. Analyze a scenario where these markers are used to identify a specific pathogen in a contaminated food supply.
16. Formulate a step-by-step methodology for the detection of a pathogen using polymerase chain reaction. Give an account on different types and applications of PCR. (3×9=27)