

Exam.Code:0436  
Sub. Code: 26523

2056  
M.Sc. (Biotechnology) Second Semester  
MBIO-201: Molecular Biology  
(Syllabus May - 2023)

Time allowed: 3 Hours

Max. Marks: 80

**NOTE:** Attempt five questions in all, including Question No. 1 which is compulsory and selecting one question from each Unit.

x-x-x

I. Answer the following briefly:-

- a) Differentiate between Southern and Northern blotting.
- b) What is the significance of Okazaki fragments?
- c) Define Holliday junction.
- d) What is post-transcriptional gene silencing?
- e) What are post-translational modifications of proteins with examples?
- f) What are proto-oncogenes?
- g) Define ribozymes.
- h) What are Microsatellites and minisatellites? (8x2)

**UNIT - I**

- II. a) Discuss the important milestones in genetics and molecular biology?  
b) Explain the principle, working and applications of PCR? (2x8)
- III. a) Explain DNA replication in prokaryotes with suitable diagrams?  
b) Describe the enzymes and accessory proteins involved in DNA replication?  
c) Explain homologous recombination and the role of RecA protein. (8,4,4)

**UNIT - II**

- IV. a) Compare transcription in prokaryotes and eukaryotes along with diagrams and all the factors required for it.  
b) Explain the role of transcription factors and regulatory elements in gene regulation? (2x8)

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(2)

- V. a) Describe the mechanism of translation in prokaryotes?  
b) Explain Lac and Trp operon models in regulation of gene expression.  
c) Discuss histone modifications and chromatin remodeling in eukaryotes? (6,4,6)

**UNIT – III**

- VI. a) What are oncogenes? Differentiate between viral and cellular oncogenes.  
b) Explain the structure and function of p53 and pRb proteins. Discuss their role in cancer development. (2x8)
- VII. a) Explain the molecular mechanism of antisense technology with examples of its application?  
b) Describe hammerhead and hairpin ribozymes and their applications in medicine? (2x8)

**UNIT – IV**

- VIII. a) What are genomic libraries? Explain the construction of YAC and BAC libraries?  
b) Describe the various strategies for whole genome sequencing? (2x8)
- IX. a) Differentiate between genetic and physical maps mentioning all the methods? Which is a better mapping method and why?  
b) Explain RFLP, RAPD and AFLP markers in genome analysis? Discuss applications of RFLP in forensic science and genetic counseling. (2x8)

x-x-x