

2125

M.Sc. (Bio-Informatics) First Semester  
MBIN-8003: Fundamentals of Modern Biology

Time allowed: 3 Hours

Max. Marks: 60

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

*x-x-x*

I. Answer the following:-

- a) Explain telomerase.
- b) Explain DNA polymerase in prokaryotes.
- c) Define exon shuffling.
- d) Enlist enzymes involved in trp operon.
- e) Give basic features of genetic code.
- f) Give function of DNA ligase.
- g) Explain BACs and YACs.
- h) What is the function of His-tag in recombinant protein purification? (8x1½)

**UNIT - I**

- II. a) Describe the structure of DNA with reference to its components and bonding pattern.  
b) Explain the mechanism of replication fork formation and elongation in prokaryotes. (5,7)

III. Write short note on following:-

- a) Initiation of transcription in prokaryotes.
- b) Discuss the role of transcription factors in gene regulation. (8,4)

**UNIT - II**

- IV. a) Explain RNA splicing and the role of spliceosome machinery.  
b) Discuss the significance of alternative splicing and RNA editing. (7,5)

- V. a) Explain the lac operon model and its regulation.  
b) Write short notes on the Wobble hypothesis. (8,4)

P.T.O.

(2)

**UNIT - III**

- VI. a) Describe the principle and working of polymerase chain reaction and its applications.  
b) Differentiate between cloning and expression vectors with examples. (6,6)
- VII. a) Explain the process of screening recombinant clones using  $\alpha$ -complementation.  
b) Discuss Phagemids and cosmids. (6,6)