

1059

**B.A./B.Sc. (General) Fourth Semester  
Biotechnology**

**BIOT-Elect-Sem-IV-T: Fundamentals of Molecular Biology and Genetics**

Time allowed: 3 Hours

Max. Marks: 75

**NOTE:** Attempt five questions in all, including Question No. IX (Unit-III) which is compulsory and selecting two questions each from Unit I - II.

x-x-x

**UNIT - I**

- I. a) Describe the structure and properties and various forms of B- DNA and Z-DNA?  
b) Describe in detail the process of initiation and elongation of replication in prokaryotes? (7,8)
- II. a) Discuss the various types of DNA polymerases and their functions in both eukaryotes and prokaryotes?  
b) Discuss the molecular mechanism of DNA recombination in prokaryotes? (7,8)
- III. a) Diagrammatically explain the structure of a eukaryotic gene?  
b) What is rho dependent and rho independent termination of transcription? (8,7)
- IV. a) How is RNA processed and modified after its synthesis in eukaryotes?  
b) Explain the process and the factors involved in initiation and elongation in prokaryotes? (8,7)

**UNIT - II**

- V. a) Explain prokaryotic gene expression in relation to *Lac* operon?  
b) Describe the role of repressor in regulating gene expression?? (2x7½)
- VI. a) Describe the factors involved in the translation initiation process in eukaryotes?  
b) Describe the following post-translational modifications in eukaryotes:
  - i) N-Acylation
  - ii) N-Glycosylation (7,8)
- VII. a) Explain the two Mendelian laws of inheritance with examples?  
b) Discuss the various structural and numerical aberrations in chromosomes? (7,8)
- VIII. a) Describe the various kinds of chemical mutagens and their molecular mechanisms of causing mutations?  
b) What is the importance of induced mutations in animals and plants? (8,7)

P.T.O.

(2)

**UNIT – III**

IX. Attempt the following:-

- a) What are nucleotides and nucleosides? (2)
- b) What are Okazaki fragments? (2)
- c) Define non -sense mutation. (2)
- d) Role of N-formyl-methionyl-tRNA? (2)
- e) What is Shine-Dalgarno sequence and what is its significance? (2)
- f) What is reciprocal translocation? (2)
- g) What is TATA box? (2)
- h) Name the antibiotic which gets attached to the terminal adenosine of tRNA and inhibit protein synthesis. (1)

x-x-x