

Roll No.

Total Pages : 3

MDE/M-24

4715

MOLECULAR GENETICS

Paper–BOT–204

Time Allowed : 3 Hours]

[Maximum Marks : 80

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. Answer the following questions : 8×2=16

- (a) How does a B-DNA form differ from A-DNA?
- (b) What are the functions of RNase and sliding DNA clamps?
- (c) How does an AU-rich element determine mRNA stability?
- (d) Enlist the enzymes involved in the maturation of pre-tRNA.
- (e) What are the functions of RecA and LexA in DNA repair?
- (f) How do the structural genes differ from regulatory genes?
- (g) Is genetic code truly universal? Comment.

- (h) How does the TBP differ from other DNA-binding proteins?

UNIT–I

2. (a) What are Transposable genes? Explain various types of Transposable elements in prokaryotes. 8
- (b) Describe DNA replication machinery in *E. coli*. 8
3. (a) Explain the unusual features of a Eukaryotic genome. 8
- (b) Discuss the characteristics of different prokaryotic DNA polymerases. 8

UNIT–II

4. (a) How can the phages be used for gene mapping in bacteria? 8
- (b) Describe the molecular bases of mutations. 8
5. (a) Discuss the different methods of Mutant selection. 8
- (b) Give an account of different types of DNA repair systems. 8

UNIT–III

6. (a) Describe the mechanisms used by a ribosome to select against incorrect aminoacyl tRNA. 8
- (b) Explain the steps involved in the removal of introns by the spliceosome. 8

7. (a) Discuss how the transcription and splicing machinery overlap with each other ? 8
- (b) Contrast the translation initiation in Prokaryotes and Eukaryotes. 8

UNIT-IV

8. Describe the modes of regulation of gene expression in prokaryotes. 16
9. Write on the following :
- (a) mRNA stability in eukaryotes. 3
- (b) Positive control of *lac* operon. 5
- (c) Histone modifications in gene regulation. 8