

(i) Printed Pages : 3

Roll No.

(ii) Questions : 9

Sub. Code :

2	5	9	3	9
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Exam. Code :

0	4	3	5
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M.Sc. Biotechnology 1st Semester
(2125)

MOLECULAR BIOLOGY

Paper— MBIO104

Time Allowed : Three Hours]

[Maximum Marks : 80

Note :— Question No. 1 is compulsory, attempt any *one* question each from Unit 1, Unit 2, Unit 3, and Unit 4. Draw well-defined diagrams wherever required.

1. (i) What is Chromatin material?
- (ii) Describe the function of RNA Polymerase Enzyme.
- (iii) Discuss the role of Capping in eukaryotes.
- (iv) What is Shine Dalgarno Sequence?
- (v) Define promoter and write down its importance.
- (vi) Explain the role of insulators and silencers in regulation of eukaryotic gene expression.
- (vii) What are different applications of AFLP?
- (viii) Write down the Principle of multiplex PCR. 2×8

UNIT—1

2. (a) Diagrammatically explain the process of replication initiation in prokaryotes. 6
- (b) Describe the structure and functions of DNA polymerase of prokaryotic cell. 6
- (c) Discuss the role of enzymes used in prokaryotic transcription. 4
3. (a) Explain the role of DNA polymerase in eukaryotes replication. 6
- (b) Explain eukaryotic transcription initiation. 6
- (c) Compare the mechanisms of eukaryotic and prokaryotic transcription termination. 4

UNIT—2

4. (a) Describe the importance of spliceosome. 6
- (b) Discuss the regulatory elements involved in eukaryotes transcription regulation. 6
- (c) Explain the role of exchange of GTP to GDP in translation. 4
5. (a) Explain the mechanism of post-transcriptional gene silencing. 6
- (b) Describe the mechanisms of translation in prokaryotes. 6
- (c) Write down the process of transcription regulation in prokaryotes. 4

UNIT—3

6. (a) Discuss the process of gene regulation of the *lac* operon in *E. coli*. 6
- (b) Explain the role of chromatin remodeling complexes in regulating eukaryotic gene expression. 6
- (c) Describe the role of pRb in cancer development. 4
7. (a) Explain the mechanism of gene repression in eukaryotes. 6
- (b) Write a short note on post-transcriptional gene silencing. 6
- (c) Discuss the structure, function, and mechanism of action of the p53. 4

UNIT—4

8. (a) Describe the principle and procedure of chemical degradation method of sequencing. 6
- (b) Explain inverse PCR and hot start PCR and their specific applications. 6
- (c) Discuss the Physical Mapping technique used to locate specific DNA sequences on chromosomes. 4
9. (a) Explain the principle of PCR. What are the factors affecting the success of PCR ? 6
- (b) Describe the role of molecular markers such as RFLP and RAPD in genetic mapping. 6
- (c) Discuss the principles and applications of FISH in genome analysis. 4