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January 2023

M.Sc. (Microbiology/Biotechnology/Botany/Zoology)

1st SEMESTER

Molecular Biology (MLS 104)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART–A

1. (a) What is the importance of Shine-Dalgarno sequence? (1.5)

(b) How antisense technology can be used for the inhibition of mRNA slicing? (1.5)

(c) What is the importance of second genetic code? (1.5)

(d) State the function of p53 tumor suppressor proteins. (1.5)

(e) What do you understand by Holliday Junction? (1.5)

(f) Enlist the enzymes/proteins involved in mismatch repair system of *E.coli*. (1.5)

(g) Discuss rho independent termination of transcription in *E.coli*. (1.5)

(h) State the function of eukaryotic translation initiation factor eIF4B and eIF4A. (1.5)

(i) Distinguish between physical map and genetic map. (1.5)

(j) With the help of appropriate reaction state the action mechanism of the DNA ligase. (1.5)

PART–B

2. (a) Describe the splicing mechanism of eukaryotic mRNA primary transcripts. (10)

   (b) Discuss base excision repair system of *E.coli*. (5)

3. (a) Explain the process of 5' cap formation in eukaryotic mRNA. (5)

   (b) Elaborate the elongation step of prokaryotic DNA replication of both the strands. (10)

4. Elucidate nuclear and mitochondrial protein localization process. (15)

5. (a) Explain Wobble hypothesis and also state how it contributes for the degeneracy of genetic code? (5)

   (b) Describe the formation of bacterial translation initiation complex. (10)

6. (a) Elaborate Cre/Lox recombination mechanism and also state it's various applications in DNA modification. (10)

   (b) Elucidate the process of southern hybridization used for genome analysis. (5)

7. What are ribozymes? Explain it using group I and group II intron removal systems. (15)