

DEPARTMENT OF BIOTECHNOLOGY
M.Sc. SEMESTER I ONLINE EXAMINATION, 2021
Paper Title : MOLECULAR BIOLOGY
Paper Code – MBT-CC102

Time : Three Hours

Maximum Marks : 75

Attempt all questions. All parts of a question must be attempted in continuation. Start answer of a fresh question on a new page. Cite examples and draw labeled diagrams.

Question No. 1:

A. Write one or two lines answers of the following:

[10x1 = 10]

- i. Chargaff's Rule
- ii. Catalytic activity of RNA
- iii. Multiple origins of replication
- iv. Self-splicing
- v. Role of sigma factor of *E. coli* RNA Polymerase
- vi. Processivity of DNA polymerase
- vii. mRNA stability
- viii. RNA polymerases in eukaryotes
- ix. Nucleoside vs nucleotide
- x. Rho factor

B. State whether TRUE or FALSE:

[5x1 = 5]

- i. mRNA genes are transcribed by RNA Polymerase II.
- ii. TATA binding protein (TBP) binds in the minor groove of DNA.
- iii. Beta (β) subunit of RNA polymerase is involved in promoter recognition.
- iv. The region homologous to TATA box in prokaryotes is called Pribnow Box.
- v. The splice site is found within the exon.

Question No. 2

Attempt **ANY THREE** of the following:

[3x5 = 15]

- A. How is the chromosomal DNA packaged inside the nucleus?
- B. Give an account of structure and function of tRNA.
- C. What is Pre-replication complex? Give an account of the enzymes involved in DNA replication.
- D. Discuss the principle and methodology of Sanger's sequencing.
- E. Classify RNA viruses on the basis of their replication cycle.

Question No. 3:

[2 x 7.5 = 15]

Answer **ANY TWO** of the following:

- A. Highlight the differences between prokaryotic and eukaryotic transcriptional process.
- B. Explain various modes of transcriptional termination in prokaryotes.
- C. Write a note on processing of eukaryotic pre-mRNA.
- D. Explain the process of mRNA splicing. What is alternative splicing?

Question No. 4:

[2 X 7.5 = 15]

Answer **ANY TWO** of the following:

- A. Elaborate UV induced damage and repair system.
- B. Give an account of chemical, physical and biological mutagens.
- C. How are site directed and oligonucleotide directed mutations induced?
- D. Discuss the mechanism of SOS response and its role in bacteria.

Question No. 5:

[3 x 5 = 15]

Attempt **ANY THREE** of the following:

- A. What is the basis of Eugenics?
- B. What is Molecular Clock hypothesis?
- C. Discuss the replicative and non-replicative transpositions.
- D. Give an account of transposable elements in bacteria.
- E. What is the role of Social Darwinism in molecular evolution?

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PLEASE NOTE

- You will be provided one hour additional time after exam for scanning and making PDF copy of the answer sheets.
- Email your PDF to biotechnologyexam2020@gmail.com
- Emails received after 2 PM will not be accepted for evaluation.