

19/12/23

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M. Sc. Biotechnology, Semester-I Examination, 2023
Paper Title: Molecular Biology
Paper Code: MBT-CC101

Time: 2.5 Hrs

Max Marks: 60

Note: This paper has 3 Sections, A, B, and C. Attempt all three sections. Section A : Answer all the questions ; Section B : Answer any two ; Section C : Answer all the questions, each question in this section has an internal choice

Abbreviations Used:

CO- Course Outcome, PO- Program Outcome, BTL- Bloom Taxonomy Level: BT level 1- Remember; BT level 2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate, BT level 6-Create

Section A (Attempt all questions)

(10 x 1 marks=10 Marks)

Q. No	Questions	BTL	COs
1.	What is the primary difference between eukaryotic and prokaryotic genomes?	K2	CO1
2.	Name one type of RNA polymerase involved in eukaryotic transcription.	K3	CO2
3.	Define mutagenesis and provide an example of a chemical mutagen.	K4	CO3
4.	What is the molecular clock and how is it used in molecular evolution studies?	K1	CO4
5.	Explain the concept of supercoiling in chromatin organization.	K2	CO1
6.	What is the role of Rho factor in prokaryotic transcription termination?	K5	CO2
7.	What is the role of Shine-Dalgarno Sequence?	K4	CO3
8.	Mention the difference of origin of replication in Prokaryotes and Eukaryotes.	K1	CO4
9.	Write down the Start and Stop codons?	K6	CO1
10.	What is the significance of the cap addition process in eukaryotic transcription?	K2	CO2

Section B: Long type Questions (Attempt any two out of four)

(2x15 marks=30 Marks)

Q. No	Questions	BTL	COs
11.	Describe the mechanisms of DNA replication, highlighting the role of DNA polymerases, proofreading, and the fidelity of the process.	K2	CO1
12.	Explain the molecular mechanisms involved in replicative and non-replicative transpositions.	K1	CO4
13.	Summarize the post-transcriptional modifications in eukaryotes, including splicing, intron-exon junctions, nuclear splicing, and RNA editing.	K3	CO2
14.	Discuss DNA damage and repair mechanisms in both prokaryotes and eukaryotes, including base excision, nucleotide excision, and mismatch repair.	K2	CO3

Section C: Short-type Questions (Attempt all questions, each question has an internal choice)

(4 x 5 marks=20 Marks)

Q. No	Questions	BTL	COs
15.	Summarize the different DNA sequencing strategies, such as Maxam & Gilbert's, Sanger's, and Next Generation Sequencing (454, Solexa, SOLiD) OR Explain the concept of Cot curves and their significance in dissociation-reassociation kinetics of DNA.	K5	CO1
16.	Explain Polarity effect and its significance. OR Highlight the differences in transcription between prokaryotes and eukaryotes, including RNA polymerases and termination processes.	K1	CO2
17.	Describe transposable elements in bacteria and mobile elements in eukaryotes. OR Explain the molecular clock hypothesis and discuss evolution by gene duplication and exon shuffling.	K3	CO4
18.	Give an account of the structure of nucleosome and its functions. OR Draw a well labelled diagram of tRNA. Explain the function of tRNA as an important molecule in central dogma of Molecular biology.	K4	CO5

Table I: Distribution of question & marks among the units of syllabus

Unit	Question Numbers	Total Marks
1	15, 11, 9, 1, 5	23
2	16, 13, 2, 6, 10	23
3	17, 14, 3, 7	22
4	18, 12, 4, 8	22