ourdiu.com | Shared by Moinuddin Hasan Chisty

Daffodil International University

Department of Genetic Engineering and Biotechnology
Faculty of Health and Life Sciences
B. Sc. (Hons.) in Genetic Engineering and Biotechnology
Final Examination Spring 2026

Course Code: 0512-2101 | **Course Title: Molecular Biology**
Level and Term: L2, T1 | **Section: 252 (A+B)** | **Course Teacher Initials: DNH & SBN**
Time: 2 Hours | **Total Marks: 40**

				Marks
1	(a)	What is RNA polymerase in prokaryotes? Describe the catalytic mechanism of RNA polymerization.	[CLO1, PLO2, C1]	4
	(b)	Explain the major types of RNA with functions. Briefly describe the post-transcriptional modification of pre-mRNA.	[CLO1, PLO2, C3]	4
2	(a)	Define reverse transcriptase (RT)? Write its applications in biotechnology.	[CLO1, PLO1, C5]	2
	(b)	Explain the role of the lac operon in the regulation of transcription.	[CLO2, PLO1, C4]	3
	(c)	Why is the genetic code called degenerate, and how does the Wobble Hypothesis explain this degeneracy?	[CLO2, PLO1, C4]	3
3	(a)	Briefly describe the major steps of translation: initiation, elongation, and termination.	[CLO2, PLO1, C2]	4.5
	(b)	What is the Shine-Dalgarno (SD) sequence, and briefly describe the structure of prokaryotic ribosomes.	[CLO1, PLO2, C1]	3.5
4	(a)	Explain how tautomeric shifts cause spontaneous mutations.	[CLO1, PLO1, C1]	3
	(b)	What is site-directed mutagenesis? Describe the DNA repair mechanisms in the cell of living organisms.	[CLO1, PLO2, C6]	5
5	(a)	Write a short note on mtDNA and explain how the organelle and nuclear genomes interact with each other.	[CLO2, PLO2, C2]	4
	(b)	What are transposable elements (TEs)? Explain their importance in plants.	[CLO2, PLO2, C6]	2
	(c)	Compare and contrast the of gene regulation in prokaryotes and eukaryotes.	[CLO2, PLO2, C6]	2