

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATIONS- 2026
B.Tech-IV Semester (BT)

COURSE CODE (CREDITS): 25B11BT416 (4)

MAX MARKS: 35

COURSE NAME : Molecular Biology

COURSE INSTRUCTOR: Dr. Jitendraa Vashistt

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory. (b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems. (c) Use of calculator is not allowed

Q. No.	Question	CO	Marks
Q1a.	An mRNA was synthesized by transcription with a sequence of 5'-AUGCUUCGAACAAUAACAAUGCAAGUGU-3'. What was the sequence of its corresponding template and coding-strand? Justify your answer with diagrammatic representation also.	III	2
Q1b.	Explain the molecular details of Rho dependent mechanisms of transcription termination in prokaryotes.	III	3
Q2a.	Genetic code is degenerate and 18 of 20 amino acids are coded by more than one codon. However, two amino acids are coded by single codon. Name these amino acids.	IV	2
Q2b.	Explain the biological significance of 'pribnow' box, 'shine dalgarno' sequences and 'Kozak' sequences with respect to the transcription and translation processes?	III	3
Q3.	Explain the key differences in eukaryotic and prokaryotic gene expression control. A group of positively charged proteins get acetylated or deacetylated for regulation of eukaryotic gene expression. Name these proteins and explain the principle of phenomenon for gene expression.	V	5
Q4.	Gene expression can be regulated through either "positive" or "negative" control by "inducible" and "repressible" operons. How do you define the regulation of a bacterial gene by a negative inducible operon? Justify your answer with suitable example.	V	5
Q5.	Explain the modifications of primary eukaryotic transcripts to form a mature mRNA. Also explain the biological significance of these modifications.	IV	5
Q6.	Molecular processes such as replication and transcription occur through specific interactions between DNA and proteins. How do you experimentally prove that a polymerase has binding affinity with a specific DNA sequence? Define the principle of the molecular technique employed for the proof of above mentioned process.	V	5
Q7.	Explain the structural features of t-RNA, which makes it different from other RNAs of cell? Why t-RNA charging is important for protein translation? Explain the molecular details of t-RNA charging.	IV	5