

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

M.Sc.-I Semester (Microbiology)

COURSE CODE (CREDITS): 21MSMB112 (03)

MAX. MARKS: 25

COURSE NAME: Molecular Biology

COURSE INSTRUCTORS: Dr Anil Kant

MAX. TIME: 1 Hour 30 Min

Note: (a) All questions are compulsory. (b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	Marks
Q1	Attempt any four of following questions a. What happens during abortive initiation of transcription? b. What is specific about the carboxyl terminal domain (CTD) of RNA polymerase II of eukaryotes? c. Mention two reasons that are responsible for termination of transcription after the formation of hair pin structure in RNA transcript at termination signals? d. Explain nature of following proteins/sequence elements i) rho protein and rut sequence ii) Tus protein and ter sequence e. What role does DNA topoisomerase play in replication?	4
Q2	Attempt any six of following questions i. Why is priming required in DNA synthesis? Which enzymes are responsible for primer synthesis in prokaryotes and eukaryotes? ii. Why can DNA not be synthesized continuously on lagging strands? How is the lagging strand synthesized? iii. What is the function of DNA helicases in replication and transcription? Give examples of some DNA helicases you studied in replication and transcription. iv. How is RNA primer removed and replaced? Name the enzymes and their key activities that are used for these tasks? v. Write any four distinct differences between prokaryotic and eukaryotic transcription? vi. Name different major eukaryotic DNA polymerases and write their main function? vii. Enlist different types of RNA polymerase found in eukaryotes along with their location, sensitivity of amanitin and types of genes transcribed by these?	12
Q. 3	Do any three of following questions a. Explain the rolling circle model of replication? Draw suitable diagrams. b. Explain how transcription is regulated during sporulation in <i>Bacillus subtilis</i> by the sigma factor activation, highlighting sequence of events in the spore mother cell and forespore. c. What is a promoter? With help of suitable diagrams explain the key conserved regions in prokaryotic and eukaryotic promoters? d. What are transcription factors? Discuss the initiation of eukaryotic transcription considering the role of transcription factors TFIIB, TFIIF, TFIID, TFIIH, TFIIIE, and TFIIB in a correct sequence these join the transcription initiation complex.	9