JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- 2025
B.Tech-IV Semester (BT)

COURSE CODE (CREDITS): **18B11BT412 (3)** MAX. MARKS: **25**
COURSE NAME: **Molecular Biology**
COURSE INSTRUCTORS: **Dr. Jitendraa Vashistt** 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 problem.

Q.No	Question	CO	Marks
Q1	A scientist amplified a conserved gene segment of 300 base pairs form insulin gene. However, in a previous day he also did amplification of actin gene with same gene length. Mistakenly, he put both the amplicons in a same box. Now, you need to help him to identify both the gene products using molecular biology methods.	II	4
Q2	If you have isolated the DNA from *E.coli*, how do you check the integrity and purity of isolated DNA?	III	4
Q3	Define the name and biological role of following enzymes in molecular processes. a) Polymerase enzyme utilized for nick translation b) Main polymerase of *E.coli* replication	IV	4
Q4	Polymerase Chain Reaction (PCR) and DNA replication share several similarities in nucleotide extension mechanisms. However, these processes also exhibit distinct differences. Elucidate similarities and differences between PCR and natural DNA replication, highlighting their unique features.	II	4
Q5	Define a molecular technique if you need to check that a specific protein is present towards the inner leaflet of cytoplasmic membrane? Explain the experimental method for the above required technique.	III	4
Q6	Molecular processes like DNA replication, DNA transcription etc. occurs by various interactions of DNA with 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