

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2EXAMINATION- 2024

B.Tech-IV Semester (BT)

COURSE CODE(CREDITS): 18B11BT412 (3)

MAX. MARKS: 25

COURSE NAME: Molecular Biology

COURSE INSTRUCTOR: Dr. Jitendraa Vashistt

MAX. TIME: 1 Hour 30 Minutes

*Note: (a) All questions are compulsory. (b) Marks are indicated against each question in square brackets. (c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.*

- Q1. The bacterial genomes are usually smaller in size as compared to eukaryotic genomes and require 35-40 minutes for replication. Eukaryotic genomes are much larger and if replication occurs at the rate of a bacterium it would require days for completion, however the entire eukaryotic genome gets replicated in several hours. How is this possible? Justify your answer with process of replication initiation. (4 marks) (CO-III)
- Q2. How do you quantify the concentration of DNA (in microgram/ml) using optical density (OD) in a spectrophotometer, if OD of the given DNA sample is 1.5? (4 marks) (COI)
- Q3. Although bacterial DNA replication process occurs at fast rate, even that the process has an extraordinary degree of fidelity and the process is not allow to get an error in joining of nucleotides against template DNA due to proof read activity. Define the role of different bacterial enzymes and their activity which prevent errors in the process. (4 mark) (CO-IV)
- Q4. Explain the similarity and dissimilarities between replication, transcription and Polymerase chain reaction. (4 mark) (CO-II)
- Q5. Define the role of following enzymes in the biological process. (4 marks) (COIII)  
a) Epsilon polymerase b) delta polymerase c) RNA pol II d) DNA ligase
- Q6. You need to amplify a gene segment using Polymerase chain reaction (PCR). However, the target is not get amplified in several attempts. How will you troubleshoot this problem on the basis of a) template, b) enzyme c) cofactor of the reaction d) dNTPs? Justify your answer with principle of each component. (5 marks) (COV)