JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -1 EXAMINATION- 2023
M.Sc.-I Semester (Microbiology)

COURSE CODE(CREDITS):21MSMB112 (3) MAX. MARKS: 15
COURSE NAME:Molecular Biology
COURSE INSTRUCTORS:Dr. Anil Kant MAX. TIME: 1 Hour

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. [1.5x2 = 3]

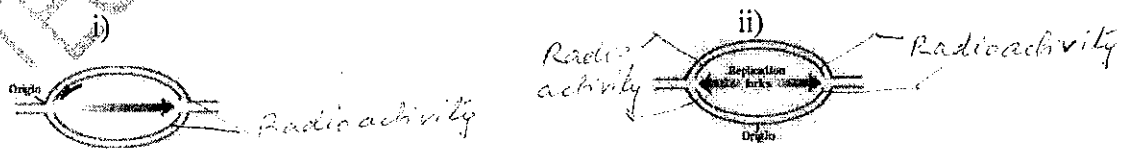
a. The UV absorbance of a DNA sample were recorded as λ260 = 1.8 and λ280 = 0.90. What would you conclude about the purity of DNA? Mention the scientific basis about your conclusion.
b. What is the central dogma of molecular biology? Briefly summarize the modern version of central dogma of molecular biology.

Q.2 Do any three of the following. [3x2 = 6]

a. Put forward discrete augment in favor of the conclusion that hydrogen bonds between complementary base pairs are not only forces to stabilize structure of nucleic acids?
b. Why is RNA less stable as compared to DNA at alkaline conditions and even neutral pH?
c. How buoyant density properties are used to separate nucleic acids and analyze GC content of DNA.
d. Make us understand nucleic acid hybridization? Give an overview of the central application and techniques based on this property of nucleic acids.

Q.3 Do any two of the following. [3x2 = 6]

a. Suppose E.coli cells were grown in a cell culture for a short period of time containing 3H-thymidine medium. Next the cells were resuspended in a non-radioactive medium for a short period. The DNA was extracted from these cells, diluted, gently layered on filters, and autoradiographed. If following types of autoradiographs were observed, what would this indicate about the nature of DNA replication in these cells? Why?



b. Explain characteristic features of *E.coli* origin of replication. Many origins of replication that have been characterized contain AT-rich core sequences. Are these AT-rich cores of any functional significance? If so, what?

c. Discuss three catalytic activities of DNA polymerases and their significance. Which activity is responsible for high fidelity of replication, as compared to thermodynamically expected, and how it operates to do so.