

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

M.Sc.-II Semester (BT/Micro.)

COURSE CODE (CREDITS): 24MS1BT211 (3)

MAX. MARKS: 35

COURSE NAME: Molecular Diagnostics and Forensic Biology

COURSE INSTRUCTORS: 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.*

Q.No	Question	Marks
Q1	If you need to check the viral disease and expression of viral pathogen in an individual, which molecular diagnostic technique will be suitable for above mentioned problem? Justify your answer with suitable example.	5
Q2	How do you check the differential proteomes of a diseased person and a healthy individual using gel based proteomics? Design the experimental method using proteomics for identification of diseased specific biomarker.	5
Q3	A person was suffering from typhoid and he consulted a clinician. Doctor advised him the course of an antibiotic. This antibiotic has a molecular target an enzyme (which relieves the topological stress caused by the unwinding of the DNA double helix) of bacterial replication. Name this class of antibiotic and mode of action with enzyme name. Also define if the prescribed antibiotic will not be effective, what will be possible reason?	5
Q4	Define the following in brief. a) Soft ionization Techniques for biological samples b) F.I.S.H.	5X2=10
Q5	Explain the cellular differences between a cancer cell and a normal cell. Also explain the molecular details of tumor suppressor genes function in maintaining the steady state of the cellular homeostasis and effect of mutation in these genes as cancer progression.	5
Q6	a) What are the different types of biological samples utilized as forensic evidence in criminal investigations? Define the method of sample collection and preservation that are crucial for maintaining the integrity of sample. b) Which biological sample will be utilized for RFLP technique for forensic investigations? Define the principle of above mentioned technique for criminal investigation.	5