

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATIONS- 2026
M.Sc.-II Semester (B.T. and Microbiology)

COURSE CODE (CREDITS): 24MS1BT211 (3)

MAX MARKS: 35

COURSE NAME: Molecular Diagnostics and Forensic Biology

COURSE INSTRUCTOR: 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. (c) Use of calculator is not allowed.

Q. No.	Question	Marks
Q1	A person went to a clinic with a medical history of abdominal pain, loss of appetite, yellow skin and eyes. When clinician enquired related to food, person told him that he had taken water based food item from outside past day. Clinician suspected a liver based viral infection/s due to ingestion of contaminated food or water. Define the viral infection and explain the complication associated with this disease molecular method and define its detection method.	5
Q2a.	Define the molecular targets of following antibiotics and mode of action. a) Beta lactam b) Quinolones c) Aminoglycosides	2.5
Q2b.	Explain the significance of positive control and negative control in molecular diagnosis. Justify your answer with respect to false positive and false negative results.	2.5
Q3.	A progressive neurodegenerative disease in a patient has shown hallmark symptoms of involuntary movements (chorea), cognitive decline, and psychiatric disturbances. On molecular detection it was found a change in counts of the number of three repeats. Name the disease and define the phenomenon of disease progression due to expansion in repeat number. Also explain the detection of disease using molecular methods.	5
Q4a.	How do you define a molecular event, if there is a nucleotide substitution which results in the generation of a codon which leads to production of termination codon in a polypeptide sequence?	2.5
Q4b.	How do you define mutation? Which of the condition show a severe effect if the mutation occur in a) DNA sequence, b) RNA sequence or c) protein sequence? Justify your answer with suitable example.	2.5
Q5.	Design a proteomic based strategy for identification of a cancer protein biomarker in a population of 100 control and 100 cancer patients. Explain the different parameters for designing of experiment.	5
Q6.	Explain the similarities and dissimilarities of PCR and RT-PCR. Which form of polymerase chain reaction will be required for identification of viral pathogen having RNA genetic material? Justify your answer.	5
Q7.	How do you define latent tuberculosis and active tuberculosis disease? Explain the molecular method of identification of tuberculosis using DNA based as well as protein based markers.	5