

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 2 EXAMINATION- 2025

M.Sc. (Biotechnology) - I Semester

COURSE CODE (CREDITS): 20MSIBT114 (2)

MAX. MARKS: 25

COURSE NAME: MICROBIOLOGY

COURSE INSTRUCTORS: Dr. Rahul Shrivastava

MAX. TIME: 1 Hour 30 min

Note: (a) All questions are compulsory. (b) Calculators are NOT ALLOWED

Q. No.	Question	Marks
Q1.	You inoculated 10 bacterial cells into 10 mL of Nutrient medium. With Generation time of 20 minutes, calculate the CFU per mL when the tube was incubated for: i. 80 Minutes ii. 95 minutes	[1.5 X 2 = 3]
Q2.	A swab from a patient body was collected and put into 10 mL buffer. You estimate there were ~60 viable organisms on the swab initially. The organisms was multiplied for four generations during the incubation step. a. What is the final concentration (cells/mL) in the 10 mL suspension after incubation? b. If you plated 0.10 mL of the same sample, how many colonies do you expect on the plate after incubation.	[1.5 X 2=3]
Q3.	Case Study: A beverage industry produces orange juice. During sterility testing of a batch of the juice, <i>Bacillus subtilis</i> was isolated from the juice. The manufacturer claimed that they used filtration and gamma irradiation for sterilization. Answer the following questions: i. Explain why the bacteria have survived despite the sterilization measures. ii. Compare the mode of action of gamma radiation and filtration. iii. Suggest modifications in the sterilization protocol to ensure complete sterility.	[1+3+2=6]
Q4.	Draw labelled diagrams of Gram-negative and Gram-positive and cell walls. Give important differences between Gram-negative and Gram-positive bacterial cell walls.	[5]

Q5.	Correct the following <u>WRONG STATEMENTS</u> and provide <u>Justification</u> for your answer. [ANY FOUR] a. Heat sensitive culture media and Vitamin solutions are sterilized by Autoclaving. b. Silver chloride is used to kill algae in pools and fish tanks. c. Enrichment media inhibits growth of selected microorganisms. d. Stationary phase cultures are usually used for testing of antimicrobial (chemical / physical) agents. e. Lag phase culture is characterized by no bacterial multiplication as the cells have no metabolic activity during the phase.	[1.5 X 4 = 6]
Q6.	Discuss measurement of a bacterial growth by its Turbidity. What are the advantages and limitations of such measurement?	[2]