JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

M.Sc.- II Semester (Microbiology)

COURSE CODE (CREDITS): 21MS1MB211 (03)
MAX. MARKS: 25

COURSE NAME: Enzymes & Bioprocess Technology

COURSE INSTRUCTORS: Dr. Saurabh Bansal
MAX. TIME: 1 Hour 30 Min

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	What are the important characteristics of an industrial microbial strain?	2
Q2 a.	Why culture preservation is important?	1
Q2 b.	How can periodic transfer on agar slants be used to maintain microbial cultures, and what are its drawbacks compared to modern preservation techniques?	2
Q3	What are the major steps involved in a strain improvement program? Give an example of strain improvement for solving an industrial-related concern.	3
Q4 a.	What are the advantages and limitations of using batch culture for industrial fermentation processes?	3
Q4 b.	A researcher observes a prolonged lag phase in their batch culture. What could be the potential reasons, and how might this issue be addressed?	2
Q5 a.	In a batch fermentation process, the initial substrate concentration is 50 g/L, and 40 g/L of the substrate is consumed to produce 10 g/L of biomass. Calculate the biomass yield coefficient ($Y_{x/s}$).	1
Q5 b.	A bioreactor operating in batch mode produces 30 g/L of product after 36 hours. Calculate the volumetric productivity (Q_P) of the process.	1
Q6 a.	What are the consequences of operating a chemostat above the critical dilution rate?	2
Q6 b.	Differentiate between Chemostat and a fed-batch culture.	3

Q7	Why is fed-batch culture preferred over batch culture for the production of secondary metabolites?	2
Q8 a.	A chemostat operates with a flow rate of 10 L/h and a working volume of 5 L. Calculate the dilution rate.	1
Q8 b.	If the maximum specific growth rate (μ_{max}) of the microorganism is 0.5 h^{-1}, determine whether washout will occur.	2