

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS-2022

M.Sc.- II Semester (Microbiology)

COURSE CODE (CREDITS): 21MS1MB211 (3)

MAX. MARKS: 25

COURSE NAME: Enzymes and Bioprocess Technology

COURSE INSTRUCTORS: Dr. Saurabh Bansal

MAX. TIME: 1 Hour 30 Min

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

- Q1. An enzyme reaction exhibits Michaelis-Menten Kinetics. For this reaction, on doubling the concentration of enzymes while maintaining $[S] \gg [E_0]$. What will happen to K_m and V_{max} values whether they will increase, decrease or remain same? Give an appropriate justification to your answer. [3]
- Q2. a) Determine the doubling time of the bacteria with a specific growth rate 0.5 hr^{-1} while assuming first order growth kinetics. [1]
- b) At the end of a batch culture, glucose solution is added at a flow rate of 200 ml/h. If the culture volume after 2 h of glucose addition is 1000 ml, Determine the initial culture volume (in ml). [2]
- Q3. Differentiate between following: [6]
- a) Steady state and Quasi Steady state
 - b) Growth Associated and Non-Growth Associated products
 - c) Chemostat and Turbidostat
- Q4. a) Why the preservation of industrially important culture is important? [1]
- b) Why the strain improvement is important for developing the industrially important strains? [2]
- c) How the sweetness of an alcoholic beverage can be improved using strain improving programme? [2]

Q5. Though the productivity in chemostat is found to be higher than that of in batch culture, the batch culture is still preferred choice for the production of various biomolecules. What are the major reasons for this? [2]

Q6. In a chemostat, how the biomass concentration at steady state is affected by the following:

a) Increase in initial substrate concentration [1.5]

b) Increase in dilution rate [1.5]

Q7. For a substrate, enzyme-catalyzed reaction, double-reciprocal plots were determined for three different enzyme concentrations. Which of the following three families of curve would you expect to be obtained? Explain. [3]

