

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2023

B.Tech-V Semester (BT/BI)

COURSE CODE (CREDITS): 18B11BT511 (04)

MAX. MARKS: 15

COURSE NAME: Bioprocess Engineering

COURSE INSTRUCTORS: Dr. Saurabh Bansal

MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.

[CO1]

1. Define the terms Productivity and Yield along with their significance in any bioprocess. [2]
2. Differentiate between following: [3]
 - a) Chemostat and Turbidostat.
 - b) Growth Associated and Non-Growth Associated Products

[CO2]

3. Calculate the doubling time if a culture has a specific growth rate of 1.386 hr^{-1} . [1]
4. The volume of a fermenter is doubled while keeping the cell concentration and other fermentation conditions the same. [2]
 - i) How is the volumetric productivity affected?
 - ii) How is the total productivity affected?
5. A chemostat is operated at a dilution rate of 0.6 h^{-1} . At steady state, the biomass concentration in the exit stream was found to be 30 g l^{-1} . Calculate the biomass productivity ($\text{g l}^{-1}\text{h}^{-1}$) of steady state operation. [1]

[CO3]

6. Why batch culture is recognized as a dynamic system? [1]
7. A chemostat operates at steady state. What does it mean? [1]
8. How can you minimize the unproductive time in a batch culture? [2]
9. Why most of the industrial fermentation processes carried out in a batch reactor? [2]