

Question Paper

Exam Date & Time: 07-Dec-2023 (02:30 PM - 05:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

VII Semester B. Tech Chemical Engineering
End Semester Examination December 2023

INTRODUCTION TO BIOCHEMICAL ENGINEERING [CHE 4064]

Marks: 50

Duration: 180 mins.

Descriptive Questions

Answer all the questions.

Section Duration: 180 mins

- 1) Differentiate between Biotechnology and Biochemical Engineering. (2)
 - A) (2)
 - B) How do bacterial cells divide? (4)
 - C) What macromolecules are necessary for human life? Explain in detail. (4)
- 2) Explain factors affecting enzyme activity. (2)
 - A) (2)
 - B) Define K_M and explain the effect of substrate concentration on enzyme activity. (4)
 - C) Urease enzyme hydrolysed urea at $[S]=0.03$ mmol/L with a K_M value of around 0.06 mmol/L. The initial velocity observed was 1.5×10^{-3} mmol/L.min. Calculate the initial velocity of the enzymatic reaction when using $[S]=0.12$ mmol/L. (4)
- 3) Define Electron Transport Chain. (2)
 - A) (2)
 - B) Write short note on ATP, ATP hydrolysis, ATP synthase & ATPase. (4)
 - C) What is glycolysis? What is the rate limiting enzymes of glycolysis? (4)
- 4) Comment on metabolism of hydrocarbons. (2)
 - A) (2)
 - B) Describe the biological nitrogen fixation process. (3)
 - C) Discuss about the factors regulating microbial growth in detail. (5)
- 5) Define mean generation time and growth rate of a cell. (2)
 - A) (2)
 - B) How many bacteria are present after 8 hours if a culture that doubles every 2 hours is inoculated (4)

with 10^5 CFU/ml? and after 24, 48 and 96 hours?

C) Why do we need to control microbial growth? How it can be controlled?

(4)

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