

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER- VI EXAMINATION – SUMMER 2026

Subject Code:3160512

Date:01-06-2026

Subject Name:Biochemical Engineering

Time:10:30 AM TO 01:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) List out the process in Biochemical engineering, which required knowledge of other engineering field.	03
	(b) List out the product of industrial importance involved the use of fermenter. How the fermenter is operated under controlled conditions in industry?	04
	(c) Explain the reason behind higher selectivity of enzyme catalyzed reaction over conventional chemical reaction. List out factor affecting activity of enzymatic reaction.	07
Q.2	(a) What are major sources of carbon, nitrogen, and phosphorus in industrial fermentations?	03
	(b) Compare between Monosaccharides, Disaccharides and Polysaccharides.	04
	(c) What is a major constituent of lipid? Are steroid and fat considered in lipid? What is the role of steroid and fat in living organism?	07
	OR	
	(c) What is denaturation of protein? List out the five major biological functions of proteins.	07
Q.3	(a) List out three industrial enzymes, its source and its application.	03
	(b) What is the effect of temperature, pH and concentration of substrate on enzyme activity?	04
	(c) Explain the following plots for evaluation of parameters	07
	(1) Lineweaver–Burk plot	
	(2) Eadie–Hofstee plot	
	(3) Hanes–Woolf plot.	
	OR	
Q.3	(a) Write assumption involved in enzyme kinetics for the Michaelis-Menten approach.	03
	(b) List out merit of immobilization techniques for enzymatic reaction.	04
	(c) Differentiate between competitive and non-competitive inhibition.	07
Q.4	(a) Define the product and substrate inhibition with a suitable example?	03

- (b) Briefly discuss the following: **04**
 (1) Cell death kinetics (2) Oxygen demand
- (c) Explain with a neat diagram the characteristics equation of continuous culture. **07**

OR

- Q.4** (a) List out the types of agitator used and its application in fermenter. **03**
 (b) Explain the importance of product recovery in biochemical synthesis? List out the important product recovery operation. **04**
 (c) List out the utilities of fermenter plant. Explain the importance of media preparation in fermenter? **07**
- Q.5** (a) Define the following: **03**
 (1) Oxygen uptake rate (2) Fluid rheology.
 (b) Give the merit and demerit of continuous culture over batch culture. **04**
 (c) Discuss the various methods to determine the K_La value? List out the factor affecting it. **07**

OR

- Q.5** (a) Discuss the use of valve and steam trap in fermentation unit. **03**
 (b) What is electrophoresis? Explain principal involved in electrophoresis. **04**
 (c) What is cell disruption. Discuss the Chemical and biological methods involved in it. **07**
