Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3160512 Date:24-05-2024

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 various unit operation encountered in bioprocessing operation.	**03**
	(b)	Discuss the role of impellers used for agitation in fermentor in brief.	**04**
	(c)	Write in brief notes on various steps involved in integrated bioprocessing.	**07**
Q.2	**(a)**	Discuss any two techniques used to extract intracellular product via Cell Disruption.	**03**
	(b)	Explain different methods for the determination of kLa	**04**
	(c)	State and briefly explain various steps, either sequential or concurrent of an integrated bioprocess in general.	**07**
		OR	
	(c)	What is carbohydrate? Explain the types and function of carbohydrates.	**07**
Q.3	**(a)**	Explain why oxygen needs to be supplied at a sufficient rate during aerobic fermentation.	**03**
	(b)	Explain various methods used for immobilization of enzymes.	**04**
	(c)	Explain the Lock and Key model with diagram for enzymatic reactions	**07**
		OR	
Q.3	**(a)**	List various types of valves used in biochemical process industry.	**03**
	(b)	Discuss the asceptic condition. State important considerations for maintenance of aseptic conditions.	**04**
	(c)	Discuss the air sterilization process for a large scale aerobic fermentor with a schematic diagram. Name a few materials used as air filters.	**07**
Q.4	**(a)**	Explain range of fermentation process	**03**
	(b)	Discuss briefly various constituents of a liquid media used for growth of yeast and give examples.	**04**
	(c)	What is a fed-batch reactor? Explain with diagram various configurations of fed-batch bioreactor.	**07**
		OR	
Q.4	**(a)**	Explain the importance of pH in fermentation or enzymatic process for product formation.	**03**
	(b)	Classify enzymes with examples. How does an enzyme work?	**04**
	(c)	Draw a schematic of a fermentation vessel. Label the major components and briefly explain their functions.	**07**

Q.5	**(a)**	Name different types of solid media used for growth.	**03**
	(b)	Define crystallization and state its application in biochemical industry.	**04**
	(c)	Explain growth of a typical microbial culture in a batch conditions.	**07**

OR

Q.5	**(a)**	Discuss the limitation of bio-catalyzed reaction.	**03**
	(b)	Discuss various developments that took place in history for biochemical engineering and its products.	**04**
	(c)	Explain the types of protein with a suitable example? Discuss the factor affecting protein denaturation.	**07**

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