

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2018

**Subject Code:2160508**

**Date:30/11/2018**

**Subject Name:Biochemical Engineering**

**Time: 02:30 PM TO 05:00 PM**

**Total Marks: 70**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) Discuss any two techniques used to extract intracellular product via Cell Disruption.	03
	(b) Explain different methods for the determination of $k_{LA}$	04
	(c) Discuss the material of construction used in the design of bioreactors with example	07
Q.2	(a) Define Precipitation and Filtration techniques used in downstream processing.	03
	(b) Discuss various developments that took place in history for biochemical engineering and its products.	04
	(c) Explain the methods for the maintenance of Aseptic condition and containment	07
	<b>OR</b>	
	(c) Explain the Lock and Key model with diagram for enzymatic reactions	07
Q.3	(a) List various types of valves used in biochemical process industry	03
	(b) Discuss the role of impellers used for agitation in fermentor in brief.	04
	(c) Discuss in detail the difference between batch culture and Fed-batch culture.	07
	<b>OR</b>	
Q.3	(a) Define Monod growth kinetics and its application	03
	(b) Write a short note on OTR and OUR	04
	(c) Discuss in brief the variants of fermentation vessels	07
Q.4	(a) Explain in brief what happens during Lag phase and exponential phases of microbial growth	03
	(b) Explain the importance of pH in fermentation or enzymatic process for product formation	04
	(c) Write short note on antibiotics and its application	07
	<b>OR</b>	
Q.4	(a) Discuss the challenges faced during Scale-Up of fermentation process.	03
	(b) Define crystallization and state its application in biochemical industry	04
	(c) Discuss the methods to enhance aeration in a fermentor for an aerobic process.	07
Q.5	(a) Define Enzyme inhibition and role of cofactors	03
	(b) Write a brief note on various sterilization techniques of a fermentation process	04
	(c) Discuss various types of steam traps used in fermentation vessel	07

**OR**

- Q.5 (a) Explain the effect of Temperature, Substrate concentration and Enzyme concentration for any biochemical reaction **03**
- (b) Discuss the importance of Fluid rheology in design of any fermentation process equipment **04**
- (c) Discuss the basic functions of a fermenter for microbial or animal cell culture **07**

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