Seat No.: _____ Enrolment No._____

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 Asceptic condition and containment	**07**
		OR	
	(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**
		OR	
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**
		OR	
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**

****