Code No: **RT41084** **R13** **Set No. 1**

IV B.Tech I Semester Supplementary Examinations, February/March - 2018

BIOCHEMICAL ENGINEERING

(Chemical Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B

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PART–A *(22 Marks)*

1.	a)	Give the classification of microorganisms belonging to the kingdom of Protists	[4]
	b)	What is activation energy? Explain the role of it in enzyme catalyzed reactions	[3]
	c)	Define immobilization. What are the advantages and disadvantages of it?	[4]
	d)	Explain about biosynthesis.	[4]
	e)	Describe the thermal death kinetics of cells.	[4]
	f)	Draw the different diagrams of CSTR designs for enzyme catalyzed reactions.	[3]

PART–B *(3x16 = 48 Marks)*

2. Compare Prokaryotic and Eukaryotic cells with neat sketches [16]

3. a) Explain in detail the classification of enzymes [8]
   b) Derive the M-M equation for enzymatic reaction with a single substrate. [8]

4. Explain different methods of enzyme immobilization with the help neat sketches [16]

5. a) Explain carbon catabolism with suitable examples [8]
   b) Discuss in detail how could the transport of ions and molecules takes place between cell and environment [8]

6. Consider a 1000 L CSTF in which biomass is being produced with glucose as the substrate. The microbial system follows a Monod relationship with μ_m = 0.45 h^{-1}, K_s = 2.0 g/L and yield factor $y_{x/s}$ = 1.0 g biomass / g substrate consumed. If normal operation is with a sterile feed containing 20g/L glucose at a rate of 100 L/h.
   a) What is the specific biomass production rate g/L-h at steady state?
   b) If recycle is used with a recycle stream of 20 L/h and a recycle biomass concentration is five times as large as that in the reactor exit, what would be the new specific biomass production rate? [16]

7. a) Explain the complete analysis of Ideal plug flow reactor [8]
   b) Define sterilization and distinguish it from pasteurization. Describe all the methods of air sterilization. [8]