Code No: 07A62302 **R07** **Set No. 2**

III B.Tech II Semester Examinations,APRIL 2011
BIOCHEMICAL REACTION ENGINEERING-II
Bio-Technology

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. What are the sailent features that you consider as important in the design of a bioreactor. [16]
2. What is solid state fermentation? When solid state fermentation is preferred and explain in detail about the solid state fermentation? [16]
3. Derive the substrate mass balance in the chemostat with neat schematic representation and explain all the terms in it? [16]
4. Explain the Application of tubular reactor concept in fluidized bed reactors. [16]
5. Draw the RTD curve for the fluid flowing throw a vessel and explain in detail about the RTD with proper mathematical equations? [16]
6. Why would fermentations for the production of the following be performed in fed batch manner ?Explain in detail.
   (a) Yeast biomass.
   (b) Antibiotics. [8+8]
7. With neat schematic diagram derive the equation for maximum amount of biomass concentration to be obtained from batch bioreactor? [16]
8. Explain about different energy sources involved in the media for industrial purposes and factors influencing them? [16]

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Code No: 07A62302 **R07** **Set No. 4**

III B.Tech II Semester Examinations,APRIL 2011
BIOCHEMICAL REACTION ENGINEERING-II
Bio-Technology

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are the various types of fermentation reactions? Explain with examples.
   (b) Explain in detail what are the effects of temperature ,pressure, pH on fermentation reactions. [8+8]
2. Explain different types of chemical reactors. [16]
3. Explain in detail about the operation of Continuously Stirred Tank reactor with suitable diagram? [16]
4. Write about industrial applications of packed bed reactor, also mention its advantages and disadvantages. [16]
5. Show that for a CSTR, space time is equal to the average residence time? [16]
6. For a chemostat at steady state condition
   $\mu = D + k_d$
   k_d = first order death rate
   μ = specific growth rate
   D= dilution rate . [16]
7. Write short notes on:
   (a) The aeration system.
   (b) The agitator.
   (c) Baffles.
   (d) Foam control. [16]
8. How total volume and total through flow of a real reactor are differentiated in a reactor and explain in detail the effect with neat diagrams on E curve F curve for a mixed flow reactor? [16]

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Code No: 07A62302 **R07** **Set No. 1**

III B.Tech II Semester Examinations,APRIL 2011
BIOCHEMICAL REACTION ENGINEERING-II
Bio-Technology

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain the Continuous Operation of a Plug-Flow Reactor. [16]
2. (a) Why fed batch reactors are used so widely in industry ? Give the applications in various bioprocessing industries?
   (b) Derive the mathematical expressions for conversion in a fed batch reactor. [8+8]
3. Write short note on:
   (a) Types of material balances.
   (b) Simplification of general mass balance equation. [6+10]
4. Discuss about Ideal Plug-flow tubular reactor ? What are the differences between an Ideal Plug flow and Ideal CSTR? [16]
5. Explain about incipient fluidization,particulate fluidization,aggrigate fluidization. [16]
6. What are the advantages of unsteady state bioreactors with respect to steady state reactors explain in detail? [16]
7.

Time t min	0	5	10	15	20	25	30	35
Tracer output gm/1tr	0	3	5	5	4	2	1	0

   The above table represents the response to pulse input to a closed vessel. For a liquid decomposing with rate $r_A = kC_A$,k=0.07 min^{-1}. Find the fraction of reactant unconverted in the plug flow reactor? [16]
8. Discuss product formation kinetics in a chemostat? [16]

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Code No: 07A62302 **R07** **Set No. 3**

III B.Tech II Semester Examinations,APRIL 2011
BIOCHEMICAL REACTION ENGINEERING-II
Bio-Technology

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. If the system obeys monod model for a chemostat at steady state show that $X_{SS} = Y_{X/S}(S_O - DK_S/[\mu_{\max}\ D])$ x_{ss}= steady state cell mass concentration
   $Y_{x/s}$= yield coefficient
   S_0 = initial substrate concentration
   D=dilution rate
   K_s= monod constant
   μ = maximum growth rate. [16]

2. Explain briefly about packed bed reactor. [16]

3. For an elementary second order reaction 2A 2R the conversion is 66.67% ,when operating in an isothermal plug flow reactor with a recycle ratio of unity.Determine the conversion if the recycle stream is shut off. [16]

4. What are the advantages of steady state reactors over the unsteady state reactors?Explain in deatail? [16]

5. Derive the equation for maximum time required for the maximum time for the paticular amount of cell mass concentration in a batch bio reactor? [16]

6. Derive the relation between the F and E curves and explain in detail with the graphical representation and mathematical equation?Explain in detail the properties of E and F curves for the plug flow,mixed flow and arbitrary flow with neat graphical representations? [16]

7. Explain in detail about the unsteady material balance equations with the material expressions. [16]

8. Why scale - up is a challenge in bioreactors? Explain with advantages and dis advantages of different bioreactors. [16]

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