R09

Code No: C5103

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I - Semester Examinations March/April-2011
ADVANCED CHEMICAL REACTION ENGINEERING
(CHEMICAL ENGINEERING)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks
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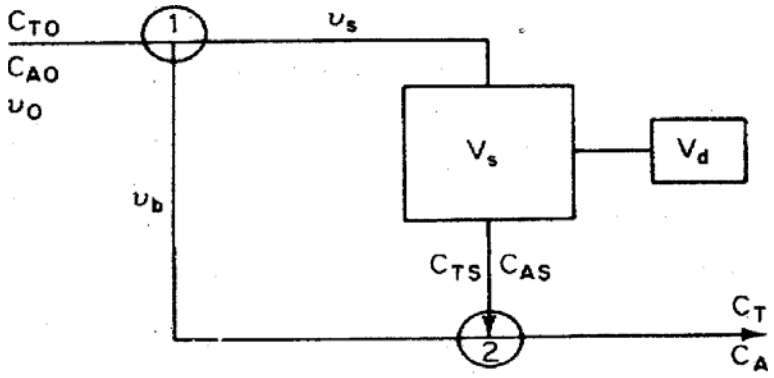
1. Discuss about the series – parallel and series reactions. [12]

2. Evaluate the model parameters for tracer in CSTR in dead space and bypass model. [12]

3. The elementary reaction **A + B → C + D** is to be carried out in the CSTR shown in the figure. There is both bypassing and a stagnant region in this reactor. The tracer output for this reactor is shown in Table, the measured reactor volume is $1.0m^3$ and the flow rate to the reactor is $0.1m^3$/min. The reaction rate constant is 0.28 m^3/kmol min. The feed is equimolar in **A** and **B** with an entering concentration of **A** equal to 2.0 kmol/m^3. Calculate the conversion that can be expected in this reactor [12]

Table:

C, (mg/dm^3):	l000	1333	1500	1666	1750	1800
t (min) :	4	8	10	14	16	18



figure

4. Illustrate the design procedure for straight mass transfer in countercurrent towers. [12]

5. A feed consisting 30% of 50-cm-radius particles, 40% of 100-cm-radius particles and 30% of 200-cm-radius particles is to be reacted in a fluidized-bed steady-state flow reactor constructed from a vertical 2-m long 20-cm ID pipe. The fluidizing gas is the gas-phase reactant, and at the planned operating conditions the time required for complete conversion is 5, 10 and 20 min for the three sizes of feed. Find the conversion of solids in the reactor for a feed rate of 1 kg solids min if the bed contains 10 kg solids. Make necessary assumptions. [12]

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6. Discuss about mixed flow of particles of a single unchanging size, uniform gas composition. [12]

7. Discuss in detail about porous catalytic particles. [12]

8. Write in brief about the following:
   a. Reactive distillation
   b. Semi continuous reactor model
   c. Catalyst deactivation. [12]

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