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Courses » Principles of Polymer Synthesis Announcements Course Ask a Question Progress Mentor

Unit 6 - Week 5

Week 5 Assignment 5

The due date for submitting this assignment has passed. **Due on 2018-03-14, 23:59 IST.**

Submitted assignment

1) For identical feed composition and flow rate, M plug flow reactors in series with a total volume V give the same conversion as a single. ***0 points***

- a. Plug flow reactor of volume V.
- b. Plug flow reactor of Volume MV.
- c. Plug flow reactor of volume V/M.
- d. CSTR of volume V.

No, the answer is incorrect.
Score: 0

Accepted Answers:
b. Plug flow reactor of Volume MV.

2)

For the following reaction data, where X_A: conversion, F_{A0}: molar flow rate in for A ($molS^{-1}$) and r_A: rate of reaction ($molm^{-3}S^{-1}$), find the volume of CSTR necessary (in m^3) to achieve 70% conversion.

X_A	0	0.1	0.2	0.4	0.6	0.7	0.8
$F_{A0}/-r_A$	0.89	1.08	1.33	2.05	3.56	5.06	8

Hint

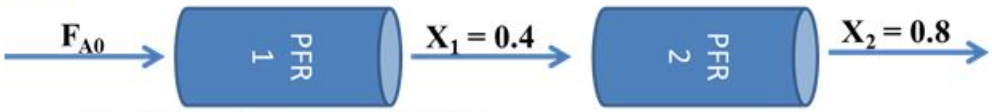
No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 3.5,3.6

1 point

3)

Exact same reaction date as question 2. Two PFR's in series are employed as shown below:



Derive the volume of second PFR (in m^3).

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 1.6,1.7

1 point

4) Which of the following is the ideal steady state mole balance equation for a CSTR? ***1 point***

a. $t = \int_0^{X_A} \frac{N_{A0}}{-r_A} \frac{dX_A}{V}$

b. $V = \int_0^{X_A} -\frac{F_{A0}}{r_A} dX_A$

c. $V = \frac{F_{A0} X_A}{-r_A}$

d. $W = \int_0^{X_A} -\frac{F_{A0}}{r_A} dX_A$

No, the answer is incorrect.
Score: 0

Accepted Answers:

c. $V = \frac{F_{A0} X_A}{-r_A}$

5) The reaction-

aA + bB ⟶ cC + dD

follows elementary rate law. Which of the following is true?

No, the answer is incorrect.
Score: 0

Accepted Answers:

(Type: Range) 0.69,0.7

1 point

6) The reaction- ***1 point***

aA + bB ⟶ cC + dD

follows elementary rate law. Which of the following is true?

a. $-r_A = kC_A^a C_B^b$

b. $-r_A = kC_A^{a/2} C_B^b$

c. $-r_A = kC_A$

d. $-r_A = kC_A C_B$

No, the answer is incorrect.
Score: 0

Accepted Answers:

a. $-r_A = kC_A^a C_B^b$

7) ***1 point***

For the reaction

aA + bB ⟶ Product

The rate law, $-r_A = k_A[A]^m[B]^n$ also given are the following data:

Experiment Number.	[A] in molL-1	[B] in molL-1	Rate (M/S)
1	0.100	0.100	2×10^{-3}
2	0.200	0.100	4×10^{-3}
3	0.200	0.200	16×10^{-3}

Which of the following is true?

a. m=1, n=1

b. m=1, n=2

c. m=2, n=1

d. m=2, n=2

No, the answer is incorrect.
Score: 0

Accepted Answers:
b. m=1, n=2

8) For a CSTR operating at steady state, which of the following statement is/are true? ***1 point***

- a. concentration of product in the reactor changes with time.
- b. Concentration of product in the reactor does not change with time
- c. Concentration of reactants and products both vary spatially inside the reactor
- d. Concentration of product in the reactor increases continuously with time

No, the answer is incorrect.
Score: 0

Accepted Answers:
b. Concentration of product in the reactor does not change with time

9) For a CSTR operating at steady state ***1 point***

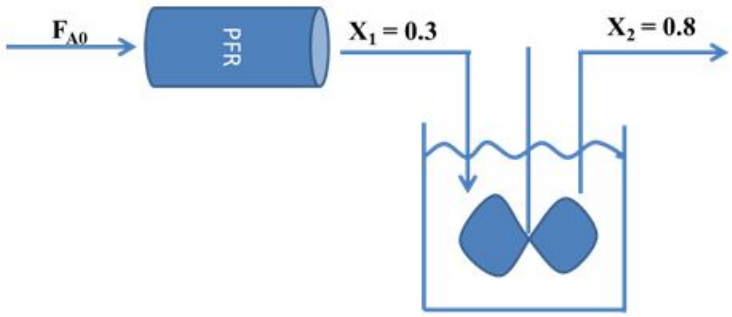
- a. Exit stream composition of reaction mixture is different from the reaction mixture composition inside the reactor.
- b. Exit stream composition of reaction mixture is the same as the reaction mixture composition inside the reactor.
- c. Exit stream composition of reaction mixture is the same as the reaction mixture composition of the inlet stream.
- d. None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
b. Exit stream composition of reaction mixture is the same as the reaction mixture composition inside the reactor.

10)

Calculate the PFR volume (in dm^3) for the configuration shown below for the reaction data in th table. F_{A0} is in $molS^{-1}$ and r_A is in $moldm^{-3}S^{-1}$



X_A	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
$F_{A0}/-r_A$	164	167	173	193	217	263	347	482	694

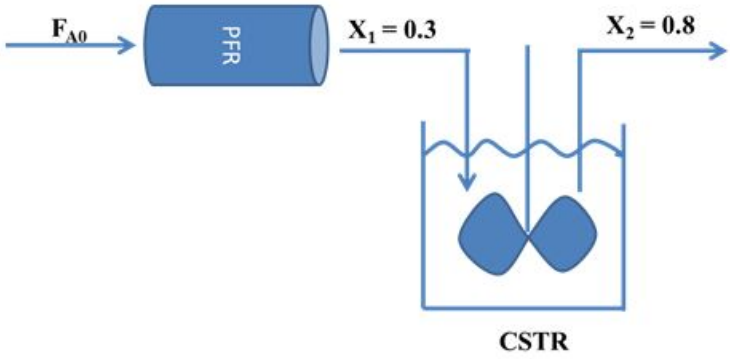
No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 51,52

1 point

11)

Calculate the CSTR volume (in dm^3) for the configuration shown below for the reaction data in the table. F_{A0} is in $molS^{-1}$ and r_A is in $moldm^{-3}S^{-1}$



X_A	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
$F_{A0}/-r_A$	164	167	173	193	217	263	347	482	694

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 346,348

1 point

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