

## Unit 4 - Week 3

### Course outline

How does an NPTEL online course work?

#### Week 1

#### Week 2

#### Week 3

Lecture 11: Introduction to Stimulus Response Techniques

Lecture 12: Characterization of Flow

Lecture 13: Characterization of Flow in Actual Systems

Lecture 14: Analysis of RTD Curves

Lecture 15: Plug, Mixed and Dead Regions in Tundish

Quiz : Assignment 3

Solution for Assignment 3

#### Week 4

#### Week 5

#### Week 6

#### Week 7

#### Week 8

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## Assignment 3

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

**Due on 2020-02-19, 23:59 IST.**

1) The volume of a reactor is  $2.78m^3$  and the flow rate in the reactor is  $0.00556m^3/s$ . The average time spent by the fluid in the reactor (in seconds) is **1 point**

- 500  
 826  
 1500  
 900

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
500

2) Dimensionless concentration for the step input of tracer, F, is given by **1 point**  
(Where c is any concentration of tracer in the fluid at exit of vessel and  $c_i$  is tracer concentration in incoming fluid)

- $F = \frac{c}{c_i}$   
  
 $F = c * c_i$   
  
 $F = \frac{c_i}{c}$   
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $F = \frac{c}{c_i}$

3) longitudinal mixing is non-existent in **1 point**

- Plug flow  
 Mixed flow  
 Both a & b  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Plug flow

4) F curve for well-mixed flow system is represented by **1 point**  
(Where  $\theta$  is dimensionless time)

- $F = e^{-\theta}$   
  
 $F = \frac{1}{e^{-\theta}}$   
  
 $F = 1 - e^{-\theta}$   
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $F = 1 - e^{-\theta}$

5) Dead volume indicates the..... zone in the tundish **1 point**

- Active Zone  
 Mixed Zone  
 Inactive Zone  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Inactive Zone

6) Peclet number is inverse of **1 point**

- Dispersion number  
 Schmidt number  
 Reynold number  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Dispersion number

7) Dispersion number in case of plug flow should be **1 point**

- 1  
 0  
  $\infty$   
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
0

8) ..... are very sensitive to changes in the dispersion number **1 point**

- C-Curves  
 F-Curves  
 Both a & b  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
C-Curves

9) The dimensionless mean of the residence time distribution can be calculated directly by (Where  $\theta$  is dimensionless time and c is dimensionless concentration) **1 point**

- $\frac{\int_0^{\infty} \theta cd\theta}{\int_0^{\infty} d\theta}$   
  
 $\frac{\int_0^{\infty} cd\theta}{\int_0^{\infty} c\theta d\theta}$   
  
 $\frac{\int_0^{\infty} c\theta d\theta}{\int_0^{\infty} cd\theta}$   
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $\frac{\int_0^{\infty} c\theta d\theta}{\int_0^{\infty} cd\theta}$

10) In a tundish, if plug volume fraction is 0.2 and mixed volume fraction is 0.6, dead volume fraction will be **1 point**

- 0.3  
 0.2  
 0.4  
 0.5

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
0.2