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Unit 8 - Module 6

Course outline

New Unit

assignment zero

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[Week 06 Lec 01] Taylor Flow: Mass transfer 1

[Week 06 lec 02] Taylor Flow: Mass transfer 2

[Week 06 lec 03] Flow boiling in Microchannels

Quiz : Assignment 6

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Assignment 6

The due date for submitting this assignment has passed. **Due on 2018-03-20, 23:59 IST.**

Submitted assignment

11) What is/are the advantages of mass transfer and reaction in micro channels 1 point

-
- a) Large interfacial area
-
- a) Avoid hot spot formation during exothermic reaction
- small diffusion length
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

All of the above

12) Scaling up of micro channels can be achieved by 1 point

-
- a) Increasing the diameter of the channels
- Numbering up the units or channels
-
- a) Decreasing the length of the channels
-
- a) Decreasing the diameter of the channels

No, the answer is incorrect.

Score: 0

Accepted Answers:

Numbering up the units or channels

3) Which of these processes does not involve mass transfer 1 point

- Evaporation
- Condensation
- Distillation
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

All of the above

4) Fourier number is the ratio of 1 point

- Convective transport rate and storage rate
- Diffusive rate and convective transport rate
- Diffusive transport rate and storage rate
- Storage rate and convective transport rate

No, the answer is incorrect.

Score: 0

Accepted Answers:

Diffusive transport rate and storage rate

5) Sherwood number in mass transfer is analogous to _____ in heat transfer **1 point**

- Prandtl number
- Nusselt Number
- Schmidt number
- Hatta number

No, the answer is incorrect.

Score: 0

Accepted Answers:

Nusselt Number

6) Hatta number is the ratio of **1 point**

- Characteristic diffusion time to reaction time
- Momentum diffusion to mass diffusion
- Convective mass diffusion to molecular diffusion
- Reaction time to characteristic diffusion time

No, the answer is incorrect.

Score: 0

Accepted Answers:

Characteristic diffusion time to reaction time

7) Schmidt number is the ratio of **1 point**

- Dynamic viscosity and mass diffusivity
- Kinematic viscosity and mass diffusivity
- Thermal and momentum diffusivity
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

Kinematic viscosity and mass diffusivity

8) According to stagnant film model, the mass transfer coefficient is _____ mass diffusivity **1 point**

- Directly proportional to
- Inversely proportional to
- Proportional to the square root of
- Proportional to the square of

No, the answer is incorrect.

Score: 0

Accepted Answers:

Directly proportional to

9) According to the penetration model, the mass transfer coefficient is _____ mass diffusivity **1 point**

- Directly proportional to
- Inversely proportional to

- Proportional to the square of
- Proportional to the square root of

No, the answer is incorrect.

Score: 0

Accepted Answers:

Proportional to the square root of

10) If the solute concentrations in the two phases at the gas-liquid interface are c_1^* and c_2^* at equilibrium, then **1 point**

- $c_1^* = c_2^*$
- $c_1^* = 1/(c_2^*)$
- $c_1^* = Hc_2^*$ where H is Henry's constant
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

$c_1^ = Hc_2^*$ where H is Henry's constant*

11) Which of these systems can be analogous to heat transfer in Taylor flow **1 point**

- Gas-liquid mass transfer in Taylor flow
- Gas transfer to the catalytic solid wall via liquid phase in Taylor flow
- Gas-liquid mass transfer with reaction in Taylor flow
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

Gas transfer to the catalytic solid wall via liquid phase in Taylor flow

12) The interfacial area density in the cylindrical film region in slug flow is (where d is the bubble diameter in the cylindrical region) **1 point**

- $1/d$
- $1/d*d$
- d
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

$1/d$

13) Liquid-solid mass transfer in Taylor flow depends on **1 point**

- Intensity of recirculation in the liquid slug
- Liquid film thickness surrounding the liquid slug
- Surface area between liquid and solid phases
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

All of the above

14) Sherwood number for developing flow in liquid solid region for gas liquid flow in microchannel is a function of **1 point**

- Schmidt number
- Grashoff number
- Nusselt number
- Graetz number

No, the answer is incorrect.

Score: 0

Accepted Answers:

Graetz number

15) Thickness of the liquid film (in mm) surrounding a gas bubble moving with a velocity of 0.1 m/s in water (dynamic viscosity = 0.001 Pa s and surface tension = 0.072 N/m). Channel radius is 1 mm. **1 point**

- 0.0014
- 0.016
- 0.16
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.0014

16) If the diffusivity of the gas is 10^{-6} m²/hr, calculate the mass transfer coefficient (in microns/s) in the liquid film. **1 point**

- 1.7×10^{-5}
- 1.7
- 17
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

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