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NPTEL

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Courses » Adiabatic Two-Phase Flow and Flow Boiling in Microchannel Announcements Course Ask a Question Progress



Unit 3 - Week 2:

Course outline

How to access the portal ?

Week 1:

Week 2:

- Lecture 06: Pertinent Dimensionless Numbers in Two Phase Flow
- Lecture 07: Flow Pattern Maps for Milli and Micro Systems
- Lecture 08: Pattern Transition from Energy Minimisation Principle
- Lecture 09: Experimental Identification of Flow Regimes
- Lecture 10: Experimental Identification of Flow Regimes (Contd.)
- Assignment 2 Solution:
- Quiz : Assignment -2

Week 3

Week 4

Assignment -2

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

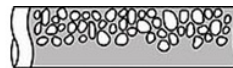
Due on 2016-10-05, 05:25 IST

1 point

1)

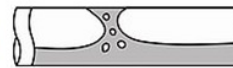
1) Annular flow

a)



2) Stratified flow

b)



3) Slug flow

c)



4) Bubbly flow

d)



- 1-d, 2-b, 3-a, 4-c
- 1-a, 2-c, 3-b, 4-d
- 1-a, 2-b, 3-c, 4-d
- 1-c, 2-d, 3-b, 4-a

No, the answer is incorrect.
Score: 0

Accepted Answers:
1-c, 2-d, 3-b, 4-a

2) 1) Capillary number

a) Surface tension forces / Momentum transport (dissipation)

1 point

2) Bond number

b) Viscous forces / Surface tension forces

3) Weber number

c) Inertial forces / Surface tension forces

4) Suratman number

d) Body forces / Surface tension forces

- 1-b, 2-d, 3-c, 4-a
- 1-b, 2-c, 3-a, 4-d
- 1-a, 2-b, 3-c, 4-d
- 1-b, 2-d, 3-a, 4-c

No, the answer is incorrect.
Score: 0

Accepted Answers:
1-b, 2-d, 3-c, 4-a

3) The inertia dominated flow patterns are

- Slug and annular
- Bubbly and annular
- Churn and slug
- Annular and churn

No, the answer is incorrect.
Score: 0

Accepted Answers:

1 point

Bubbly and annular

4) Miniaturization is associated with

1 point

- Extended range of bubbly flow
- Extended range of annular flow
- Extended range of slug flow
- Extended range of stratified flow

No, the answer is incorrect.**Score: 0****Accepted Answers:***Extended range of slug flow*

5) When different flow patterns occur along a microchannel,

1 point

- The flow pattern observed at the exit is designated as the prevailing flow pattern
- The flow pattern observed at the entry is designated as the prevailing flow pattern
- The flow pattern observed at the halfway of the conduit is designated as the prevailing flow pattern
- The most frequently observed flow pattern along the length is designated as the prevailing flow pattern

No, the answer is incorrect.**Score: 0****Accepted Answers:***The most frequently observed flow pattern along the length is designated as the prevailing flow pattern*

6)

1 point

Given, the Confinement number $[Co = \frac{1}{D} \sqrt{\frac{\sigma}{g(\rho_1 - \rho_2)}}]$ boundary between micro and macro

is 0.5. Find out the critical diameter (in mm) for (i) water-mercury (ii) air-toluene

$$\rho_{\text{water}} = 1000 \text{ kg/m}^3 \quad \rho_{\text{mercury}} = 13600 \text{ kg/m}^3 \quad \sigma_{\text{water-mercury}} = 0.415 \text{ N/m}$$

$$\rho_{\text{air}} = 1.225 \text{ kg/m}^3 \quad \rho_{\text{toluene}} = 867 \text{ kg/m}^3 \quad \sigma_{\text{air-toluene}} = 0.02852 \text{ N/m}$$

- (i) 10.15 (ii) 3.66
- (i) 10.15 (ii) 5.42
- (i) 3.66 (ii) 3.66
- (i) 5.42 (ii) 3.66

No, the answer is incorrect.**Score: 0****Accepted Answers:***(i) 3.66 (ii) 3.66*7) Which of the following statements are **TRUE** about Energy Minimization Approach?

1 point

1. Can predict the range of flow patterns in reduced dimensions
2. Can predict the range of existence of mesoscale
3. Principle: the total energy holdup of the system is minimum for the stable flow pattern

- 1
- 2
- 3
- 1,2,3

No, the answer is incorrect.**Score: 0****Accepted Answers:***1,2,3*

8) Knudsen number defines microchannel flow for

1 point

- Liquid (only) flow
- Gas (only) flow
- Liquid – gas flow
- Liquid – liquid flow

No, the answer is incorrect.**Score: 0****Accepted Answers:***Gas (only) flow*9) Which of the following is **NOT TRUE** about visualization and photographic techniques for identification of flow patterns?

1 point

- Difficulty in analysis and interpretation

- Intrusive, thus affect the flow patterns
- Complex interfacial structures give multiple reflection and refraction that obscure the view particularly of the central region of the channel
- Test section need to be transparent or transparent windows need to be provided for photography

No, the answer is incorrect.

Score: 0

Accepted Answers:

Intrusive, thus affect the flow patterns

10) Which of the following statements is **NOT TRUE**?

- Impedance probe techniques are all intrusive
- Gas and liquid superficial velocities are the commonly used axes in flow pattern maps
- Optical probe technique is non-intrusive
- Capacitance probe measures the difference in dielectric constant of the two phases

No, the answer is incorrect.

Score: 0

Accepted Answers:

Impedance probe techniques are all intrusive



1 point



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