Assignment 12: Multiphase Flow Phenomena and Its Application

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment.

Module 12: Multiphase Flow Phenomena and It's Application

Assignment 12

Important notes:
(i) All questions are mandatory
(ii) No negative marking for the wrong answer
(iii) All questions have only one correct answer

1) The multiphase flow behaviours are affected by
   - Interfacial tension forces
   - Contact angle and wetting characteristics of the liquid on the channel wall
   - The exchange of mass, momentum, and energy between the phases
   - All the above
   
   No, the answer is incorrect.
   Score: 0
   Accepted Answers: All the above

2) At stratified wavy flow, the amplitude of the wave depends on
   - The relative velocity of the two phases
   - The average velocity of the two phases
   - Both (a) and (b)
   - None of the above
   
   No, the answer is incorrect.
   Score: 0
   Accepted Answers: The relative velocity of the two phases

3) In case of bubbly flow, uniform dispersion of bubbles occurs when
   - The shear forces are dominant
   - The buoyancy forces are dominant
   - The shear and buoyancy forces are dominant
   - None of the above
   
   No, the answer is incorrect.
   Score: 0
   Accepted Answers: The shear forces are dominant

4) In slug flow condition
   - Smaller in dimension to the tube diameter
   - Similar in dimension to the tube diameter
   - Both (a) and (b)
   - None of the above
   
   No, the answer is incorrect.
   Score: 0
   Accepted Answers: Similar in dimension to the tube diameter

5) Churn flow is a highly disordered flow regime in which
   - The gas plugs become narrower and more irregular
   - The continuity of the liquid in the slug is repeatedly destroyed by regions of high gas concentration
   - The thin film film of liquid surrounding the gas plug can no longer be observed
   
   No, the answer is incorrect.
   Score: 0
   Accepted Answers: The thin film film of liquid surrounding the gas plug can no longer be observed.
6) The main dynamic variables on which the flow patterns depend
   - Shape and inclination of the conduit
   - Flowrate of the phases
   - Adiabatic or diabatic conditions of the phases
   - All the above
   **No, the answer is incorrect.**
   **Score: 0**
   **Accepted Answers:**
   - Flowrate of the phases

7) Holdup is often referred to as
   - The volume fraction of the dispersed phase
   - The volume fraction of the continuous phase
   - The mass fraction of the dispersed phase
   - All the above
   **No, the answer is incorrect.**
   **Score: 0**
   **Accepted Answers:**
   - The volume fraction of the dispersed phase

8) At no-slip condition, according to the homogeneous model the density of the gas-liquid two-phase mixture ($\rho_p$) is represented as ($\alpha$ is the gas hold up)
   - $\rho_p = \rho \left(1 - \alpha_g\right) - \rho \alpha_g \rho_{fg}$
   - $\rho_p = \rho \left(1 + \alpha_g\right) - \rho \alpha_g \rho_{fg}$
   - $\rho_p = \rho \left(1 - \alpha_g\right) + \rho \alpha_g \rho_{fg}$
   - None of these
   **No, the answer is incorrect.**
   **Score: 0**
   **Accepted Answers:**
   - $\rho_p = \rho \left(1 - \alpha_g\right) + \rho \alpha_g \rho_{fg}$

9) In case of gas-liquid bubbly flow, when the gas velocity is low
   - Gas phase is the dispersed phase
   - Liquid phase is the dispersed phase
   - Gas phase is the continuous phase
   - All the above
   **No, the answer is incorrect.**
   **Score: 0**
   **Accepted Answers:**
   - Gas phase is the dispersed phase

10) Multiphase flow is the simultaneous flow of
    - Materials with different states or phases
    - Materials with different chemical properties but in the same state or phase
    - Both (a) and (b)
    - None of the above
    **No, the answer is incorrect.**
    **Score: 0**
    **Accepted Answers:**
    - Both (a) and (b)

11) Stratified flow is mostly affected by the
    - Gravitational force
    - Surface tension force
    - Interfacial tension force
    - None of the above
    **No, the answer is incorrect.**
    **Score: 0**
    **Accepted Answers:**
    - Gravitational force

12) Mist flow occurs in case of horizontal co-current gas-liquid flow when the
    - Mass fluxes are very high
    - Mass fluxes are moderate
    - Mass fluxes are low
    - All the above
    **No, the answer is incorrect.**
    **Score: 0**
    **Accepted Answers:**
    - Mass fluxes are very high

13) The length of the Taylor bubble is typically
    2 point
14) In a gas-liquid flotation column (bubbly flow), the complete mixing or homogenization occurs when

- P_e → 1
- P_e → 0
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
One to two times the tube diameter

15) Flow condition
(p) Laminar flow
(q) Transitional flow
(r) Turbulent flow

Reynolds number (Re)
(a) 2300 < Re < 4000
(b) Re > 4500
(c) Re = 2300
(d) Re > 4000

- p – e; q – f; r – g
- p – g; q – e; r – f
- p – h; q – e; r – g

No, the answer is incorrect.
Score: 0

Accepted Answers:
p → f; q → e; r → g