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NPTEL

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Courses » Multiphase Microfluidics Announcements Course Ask a Question Progress Mentor

## Unit 5 - Module 3

### Course outline

New Unit

assignment zero

Module 1

Module 2

Module 3

[Week 03 Lec 01] Computational Techniques

[Week 03 Lec 02] Bubble and Droplet Generation

[Week 03 Lec 03] Interface and Surface tension 2

Quiz : assignment 3

Module 4

Module 5

Module 6

Module 7

Module 8

### assignment 3

The due date for submitting this assignment has passed. **Due on 2018-03-01, 13:29 IST.**

#### Submitted assignment

1) Different type of droplet breakup regimes in T-junction is/are 1 point

- Squeezing regime
- Dripping regime
- Jetting regime
- All of the above

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*All of the above*

2) Squeezing regime occurs when 1 point

- Interfacial forces dominate Shear stress
- Shear stress dominate Interfacial forces
- Viscous force dominate inertial effects
- None of the above

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Interfacial forces dominate Shear stress*

3) Dripping regime occurs for Capillary number greater than 1 point

- $10^{-1}$
- $10^{-2}$
- $10^0$
- $10^1$

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*$10^{-2}$*

4) Volume of bubble formed in flow focusing device is 1 point

- Proportional to the pressure applied to the gas stream
- Proportional to the gas viscosity
- Proportional to the liquid viscosity
- Inversely proportional to the pressure applied to the gas stream

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Proportional to the pressure applied to the gas stream*

5) In the squeezing regime, the flow rate of dispersed phase is increased. The length of the droplet would 1 point

- Increase
- Decrease
- Remain same
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Increase*

6) Work of adhesion (in Joule) for a superhydrophobic contact is 1 point

- 2
- 1
- 1
- 0

No, the answer is incorrect.

Score: 0

Accepted Answers:

*0*

7) Work of cohesion is 1 point

- Equal to viscous force
- 
- Work required to remove a droplet from a solid surface
- Work done per unit area produced in dividing a homogeneous liquid
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Work done per unit area produced in dividing a homogeneous liquid*

8) Find the capillary rise in a tube (in mm) for fluid at contact angle of 0 degrees and surface tension of 0.072 N/m and liquid density of 1000 kg/m<sup>3</sup> for radius of 72 mm in metres.  $g=10 \text{ m/s}^2$  1 point

- 0.2
- 0.4
- 0.6
- 0.8

No, the answer is incorrect.

Score: 0

Accepted Answers:

*0.2*

9) How will your answer change if the tube radius is 720 microns? 1 point

- 0.2 mm
- 2 mm
- 20 mm
- 200 mm

No, the answer is incorrect.

Score: 0

Accepted Answers:

20 mm

10) What if the channel size is 7.2 microns?

1 point

- 2 microns
- 20 mm
- 2 m
- 2 cm

No, the answer is incorrect.

Score: 0

Accepted Answers:

2 m

11) The contact angle is affected by

1 point

- Roughness of the surface
- Dirt on the surface
- Chemical inhomogeneity of the surface
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

All of the above

12) Receding and advancing contact angles for a droplet being sucked and deposited on a surface are

1 point

- Are same as static contact angle
- Are not equal to each other
- Receding contact angle is same as static contact angle
- Advancing contact angle is same as static contact angle

No, the answer is incorrect.

Score: 0

Accepted Answers:

Are not equal to each other

13) Work of cohesion is equal to

1 point

- 4 times the surface tension
- 3 times the surface tension
- 2 times the surface tension
- 1 times the surface tension

No, the answer is incorrect.

Score: 0

Accepted Answers:

2 times the surface tension

14) The contact angle hysteresis for a droplet depositing on a surface is \_\_\_ if advancing and receding contact angles are 60 and 30 degrees respectively

1 point

- 45°
- 30°
- 90°
- 60°

No, the answer is incorrect.

Score: 0

Accepted Answers:

$30^\circ$

15) What is the force per unit area required to separate two solid plates having a liquid film of thickness 1 mm between them. The contact angle is 60 degrees. 1 point

- 72 Pa
- 0 Pa
- 144 Pa
- 36 Pa

No, the answer is incorrect.

Score: 0

Accepted Answers:

$72 \text{ Pa}$

16) The necessary assumption in the derivation of mass and momentum conservation equation is 1 point

- Incompressible flow
- Newtonian fluid
- Continuum description of fluid
- Constant viscosity

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Continuum description of fluid*

17) During the discretisation, the partial differential equations are converted to 1 point

- Ordinary differential equations
- Linear ordinary differential equations
- Algebraic equations
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Algebraic equations*

18) Material derivative of a marker function is 1 point

- Infinity
- 1
- Zero
- 1

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Zero*

19) Which of the following is incorrect statement regarding colour function used in volume of fluid method 1 point

- It is volume fraction of one of the phase
- It is mass conservation equation for a phase
- Colour function can take a negative value
- It is 0 or 1 except at the interface

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Colour function can take a negative value*

20) **The boundary condition that is often valid on the walls is** *1 point*

- No slip
- Free slip
- Navier slip
- None of the above

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*No slip*

Previous Page

End

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