Unit 14 - Week 12

Course outline

- How to access the portal?
- Week 0 Assignment 0
- week 1
- Week 2
- Week 3
- Week 4
- Week 5
- Week 6
- Week 7
- Week 8
- Week 9
- Week 10
- Week 11
- Week 12
  - Lecture 56 : Colloids and nanoparticles
  - Lecture 57 : Colloids and nanoparticles (Contd.)
  - Lecture 58 : Colloids and nanoparticles (Contd.)
  - Lecture 59 : Colloids and nanoparticles (Contd.)
  - Lecture 60 : Colloids and nanoparticles (Contd.)
  - Lecture Material
  - Quiz : Assignment 12
  - Feedback for Week 12
- DOWNLOAD VIDEOS
- Details Solution
- Live Session

Assignment 12

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

Due on 2019-10-23, 23:59 IST.

1) One dimensional random walk model to estimate the average distance (L) that a Brownian particle moves in terms of diffusion coefficient (α) and time (t), given by Einstein is: *1 point*

a. $L = \sqrt{2\alpha t}$
b. $L = \sqrt{\frac{2\alpha}{t}}$
c. $L = 2\sqrt{\alpha t}$
d. $L = 2\sqrt{\frac{\alpha}{t}}$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

2) Overall van der Waals force between two spherical particles of the same size (x) separated by a distance (D) can be estimated by _____, where A = Hamaker constant. *1 point*

a. $F_{vdW} = -\frac{Ax}{24D}$
b. $F_{vdW} = -\frac{Ax}{24D^2}$
c. $F_{vdW} = -\frac{Ax^2}{24D^2}$
d. $F_{vdW} = -\frac{Ax^2}{24D}$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

3) Debye screening parameter (κ) for monovalent salts having molar concentration of $[c]$ can be estimated by: *1 point*

a. $\kappa = \sqrt{3.29[c]}$
b. $\kappa = 3.29/\sqrt{[c]}$
c. $\kappa = 3.29\sqrt{[c]^{-1}}$
d. $\kappa = 3.29\sqrt{[c]}$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

4) When sufficient amount of salt is added, the range of the electrical double layer (EDL) repulsion *1 point*

a. increases reasonably
b. decreases reasonably
c. remains unaffected

a.
b.
c.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

5) Best bridging flocculation is usually found when *1 point*

a. soluble polymers of low molecular weight added to the solution
b. insoluble polymers are added to the solution
c. soluble polymer quantity is sufficient to fully cover the particle surface
d. soluble polymer quantity is just enough to cover half of the total particle surface

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

6) For a Newtonian liquid, addition of spherical particles will _____ its viscosity. *1 point*

a. increase
b. decrease
c. not influence

a.
b.
c.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

7) Attractive particles and aggregates form sediments *1 point*

a. of compact structure
b. of high levels of residual moisture
c. after extended periods

a.
b.
c.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

8) Which of the following is not considered in hard sphere modeling approach? *1 point*

a. Brownian motion
b. Hydrodynamic forces
c. Surface forces

a.
b.
c.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

9) At the isoelectric point, net charge on the particle surface is ___ *1 point*

a. maximum
b. zero
c. minimum

a.
b.
c.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

10) With the addition of salt to a suspension, the magnitude of the zeta potential ___ *1 point*

a. enhances
b. remains unaffected
c. reduces

a.
b.
c.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

11) For a Newtonian liquid, addition of spherical particles will _____ its viscosity. *1 point*

a. increase
b. decrease
c. not influence

a.
b.
c.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

12) The time frame of stability of a colloidal suspension can be estimated by _____________. *1 point*

a. $t = \frac{216kT}{\pi g^2(\rho_p - \rho_f)\mu x^5}$
b. $t = \frac{21.6kT\mu}{\pi g^2(\rho_p - \rho_f)x^5}$
c. $t = \frac{216kT\mu}{\pi g^2(\rho_f - \rho_p)x^5}$
d. $t = \frac{216kT\mu}{\pi g^2(\rho_p - \rho_f)^2 x^5}$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

13) Fine particles are difficult to fluidize because of *1 point*

a. strong adhesion
b. poor van der Waals and capillary attraction
c. strong cohesion

a.
b.
c.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

14) Greater interparticle attraction results in *1 point*

a. increased viscosities at all shear rates
b. decreased viscosities at all shear rates
c. increased viscosities at low shear rates
d. decreased viscosities at high shear rates

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

15) Which of the following types of rheological behavior can be characteristic of suspensions of attractive particles? *1 point*

a. Shear thinning
b. Yield stress
c. Viscoelasticity
d. All of the above

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

16) Which of the following forces is not important for colloidal particles? *1 point*

a. Hydrodynamic
b. Body
c. Surface
d. Brownian

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

17) Which of the following statement is correct? *1 point*

a. The shear thinning of an attractive particle network is less pronounced than for hard sphere suspensions of the same particles and volume fraction.
b. The mechanism of shear thinning of an attractive particle network is similar to that of hard sphere suspensions of the same particles and volume fraction.
c. The low shear rate viscosity of the attractive particle network is lower than for hard sphere suspension.
d. The low shear rate viscosity of the attractive particle network is higher than for hard sphere suspension.

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

18) What is the effective volume fraction for a suspension of 150 nm silica particles at 40 vol % solids in a solution of 0.01 M $NaCl$? *3 points*

a. 0.95
b. 0.85
c. 0.65
d. 0.45

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.