

Unit 12 - Week 10

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Assignment 10

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

Due on 2019-10-09, 23:59 IST.

1) For flow of slightly compressible fluid through porous media, following term is linearized ignoring higher order expansion terms

1 point

- $e^{C_f(P-P_0)}$
- $\ln\{C_f(P-P_0)\}$
- $\sinh\{C_f(P-P_0)\}$
- None of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

2) The compressibility factor Z for real gases is defined as

1 point

- $\frac{PV}{nRT}$
- $\frac{PM}{RT}$
- $\frac{P}{RT}$
- $-\frac{1}{V} \left(\frac{\partial V}{\partial P} \right)_T$

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

3) The sum of saturations of all phases at any point in porous media is

1 point

- zero
- one
- a fraction within 0 to 1
- none of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

b.

4) Difference between deep filtration and cake filtration is

1 point

- in the first case, the interception happens at the pore mouth over a length of porous section
- in the first case, the depth of the fluid and the corresponding hydrostatic head contributes to the pressure gradient for filtration
- in the second case, the fluid cannot penetrate deep into the pores, unlike the first case
- none of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

5) Debye thickness signifies

1 point

- the distance from the wall over which there is a charge concentration due to electric double layer formation
- minimum distance of separation between ions of similar charge
- thickness over which voltage around and electrode drops to zero
- none of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

6) For electro-osmotic flow between two parallel plates, calculate the velocity (in mm/s) applicable to most part of the cross-section except very near the wall. Given the electric field of 10 kV/cm, ξ potential of 20 mV, viscosity of 10^{-3} Pa.s, and permittivity of $80 \times 8.854 \times 10^{-12}$ F/m. where F = coulomb/volt = Joule/volt²

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 14,14.5

1 point

7) Which of the following forms completely define the electro-osmotic velocity between two parallel plates

1 point

- $v_x(z) = \left[1 - \frac{\cosh\left(\frac{z}{\lambda_D}\right)}{\cosh\left(\frac{h/2}{\lambda_D}\right)} \right] \frac{\epsilon \xi}{\eta} E$
- $v_x(z) = \left[1 - \left(\frac{z}{\lambda_D} \right)^2 \right] \frac{\epsilon \xi}{\eta} E$
- $v_x(z) = \left[1 - \left(\frac{z}{h/2} \right)^2 \right] \frac{\epsilon \xi}{\eta} E$
- None of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

8) Which of the following functional form defines the streaming potential for flow of electrolyte through a porous medium?

1 point

- $E_s = \frac{\epsilon \xi \Delta P}{\eta}$
- $E_s = \frac{\epsilon \xi \Delta P}{\eta [k_B - 2^{k_s/R}]}$
- $E_s = \frac{\epsilon \xi \Delta P}{\eta [k_B + 2^{k_s/R}]}$
- None of these

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

b.

9) Surface charge affects the particle dislodging process by

1 point

- causing repulsion wherever electric double layer between the fine particle and the surface of larger particle overlaps
- promoting Van der Waal's interaction between particles
- ballistic movement of opposite charge due to coulombic attraction
- none of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

10) During flow of a suspension through porous medium, the porosity is held constant whereas permeability decreases significantly based on the justification as

1 point

- the suspended particles get lodged only at the constriction (pore mouth) which creates flow restriction, and thus reduced permeability, whereas, the major part of the pore remains unfilled with particle leaving the initial porosity unchanged.
- during flow of suspension, the abrasion of pore surface causes increase in porosity that compensates the decrease from deposition of suspended solids
- due to the injection pressure, the porous media gets compressed whereby the permeability decreases
- none of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

11) Permeability reduction in plugging pathways follows

1 point

- $k = k_0 \left[1 - \frac{6}{\phi} \right]^n$
- $k = k_0 e^{-\alpha \epsilon^n}$
- $k = k_0 \sin(\alpha \epsilon)$
- none of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

b.

12) Apart from formation volume factor, what other way the phase equilibria can be considered in reservoir model

1 point

- by using activity coefficient models
- by using Henry's law
- by using Raoult's law
- none of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

13) Unit of volumetric deposition rate in the volumetric continuity equation for suspended solid in porous media would be

1 point

- $m^3 kg^{-1} s^{-1}$
- $kg m^{-3} s^{-1}$
- s^{-1}
- none of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

c.

14) The average velocity of the solid-fluid suspension in porous media can be expressed as

1 point

- $\phi u_p c_p + (1 - \phi) u_f c_f$
- $(1 - \phi) u_p c_p + \phi u_f c_f$
- $u_p c_p + u_f c_f$
- None of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

c.

15) What is the significance of diffusive flux j in the continuity equation for solid-fluid suspension in porous media?

1 point

- Relative velocity of particle or fluid with reference to average suspension velocity
- Diffusion of solid particles in plugging pathways
- Diffusion of solid particles in non-plugging pathways
- None of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.