Unit 13 - Week 11

Assignment 11

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

Due on 2019-10-16, 23:59 IST.

1) For flow of aqueous polymer suspension through porous media, the expression for apparent viscosity would be *1 point*

a. $\eta = \frac{k_{initial} \Delta P_{observed} A}{Q\,L}$

b. $\eta = \frac{k_{initial} \Delta P_{observed} A}{Q^n\,L}$

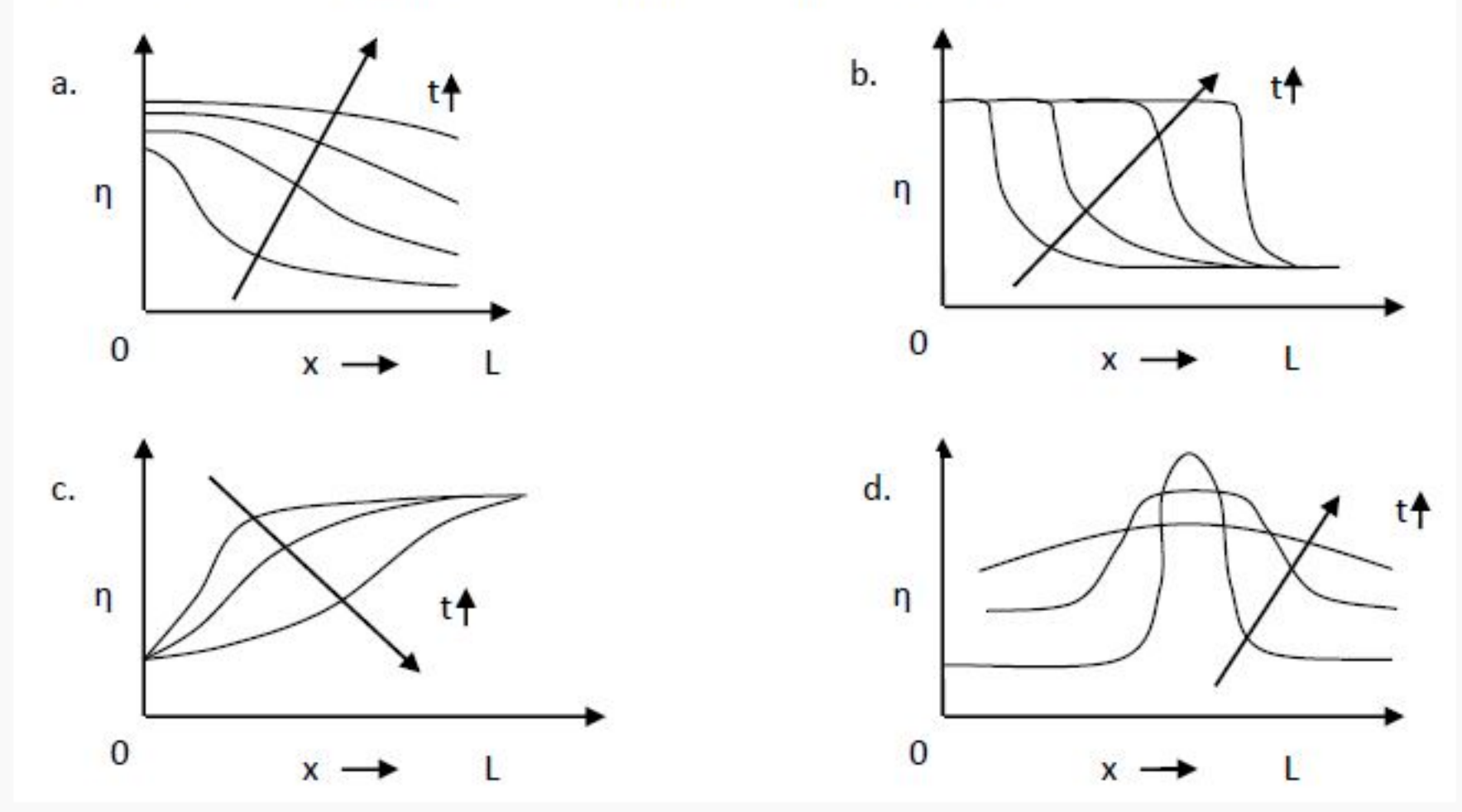
c. $\eta = \frac{k_{initial}^{(n-1)} \Delta P_{observed} A}{Q\,L}$

d. None of the above

- a.
- b.
- c.
- d.

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

2) Which of the following apparent viscosity profile applies to Q (1) above *1 point*



- a.
- b.
- c.
- d.

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

3) Formation damage factor is expressed as *1 point*

a. $\frac{1}{1+{}^{k}/_{k_0}\sigma_s}$

b. $\frac{1}{1-{}^{k}/_{k_0}\sigma_s}$

c. $\frac{k_0 - k}{k\,\sigma_s}$

d. None of the above

- a.
- b.
- c.
- d.

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

4) Which one of the following is a valid expression for total no. of particles that cross unit area at a given location in the time t *1 point*

a. $\int_0^t \frac{uc}{v_p^*} d\tilde{t}$

b. $\int_0^t ucv_p^*\, d\tilde{t}$

c. $\int_0^t \frac{uv_p^*}{c} d\tilde{t}$

d. None of the above

- a.
- b.
- c.
- d.

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

5) In a porous medium (cross-sectional area 0.5 m^2, length 1 m, porosity 0.3), an aqueous polymer suspension is injected at a rate of 0.0001 m^3/s for unidirectional flow. If the viscosity of the suspension is 20×10^{-3} Pa-s, and the permeability is related to cumulative flow invaded through the medium as *k* (in darcy) = (1 − 10 Q) where Q is in m^3, what is the average permeability of the invaded zone when the fluid-suspension front is exactly halfway (i.e., 0.5 m from the inlet).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.62,0.63

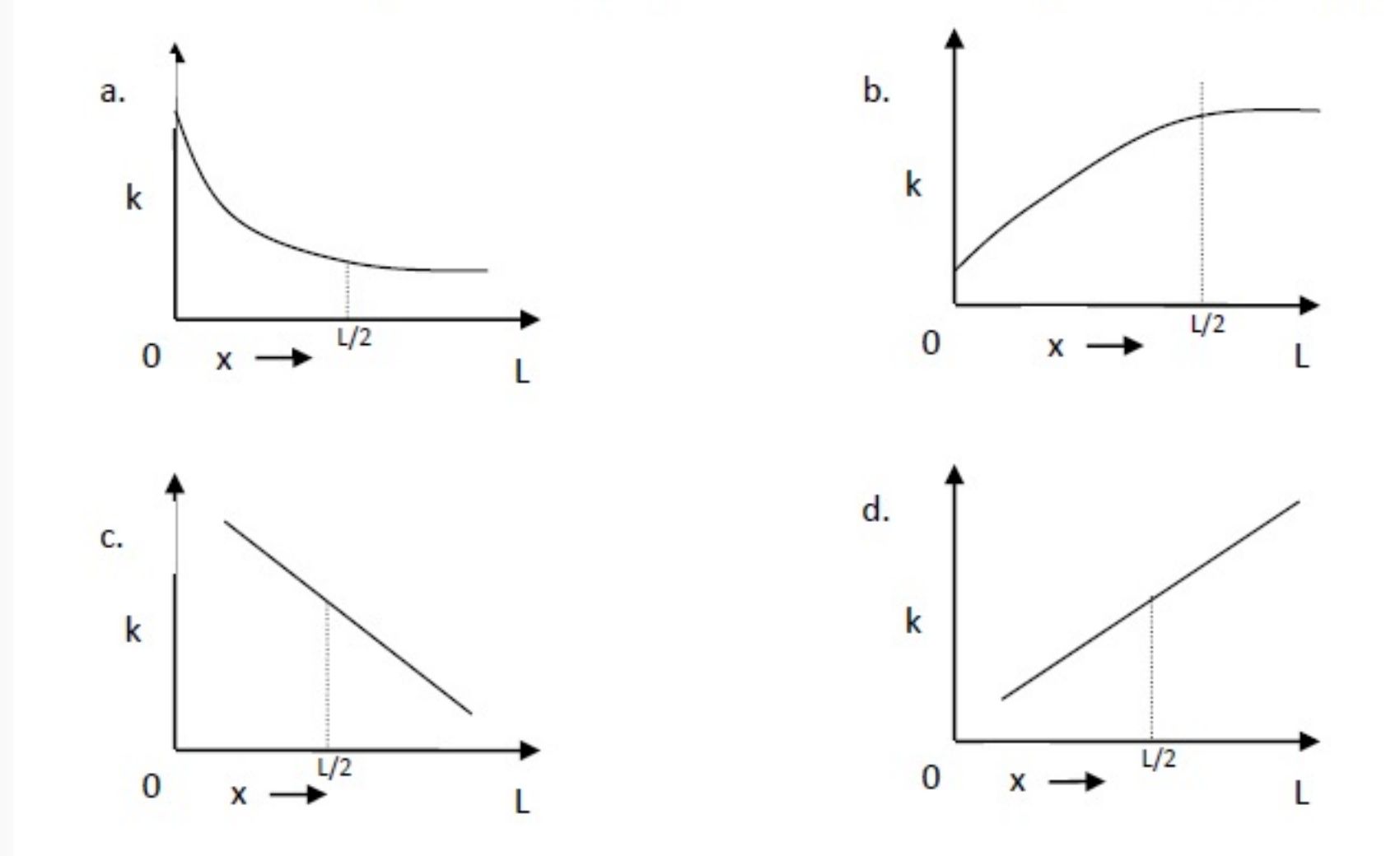
1 point

6) For the system in Q (5) above, what would be the overall permeability of the total length of porous medium?

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.75,0.78

1 point

7) Which of the following schematic rightly show the variation in permeability in Q (5) above *1 point*



- a.
- b.
- c.
- d.

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

8) Which of the following equations rightly express the relation between linear strain and porosity *1 point*

a. $e = \frac{\varphi - \varphi_0}{1-\varphi}$

b. $e = \frac{\varphi - \varphi_0}{1-\varphi_0}$

c. $e = \frac{1-\varphi_0}{\varphi - \varphi_0}$

d. None of the above

- a.
- b.
- c.
- d.

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

9) Which of the following equations rightly express the relation between solid volume fraction (u) and void ratio (e) *1 point*

a. $e = \frac{u}{1-u}$

b. $e = \frac{1-u}{1+u}$

c. $e = \frac{1-u}{u}$

d. None of the above

- a.
- b.
- c.
- d.

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

10) Which of the following equations rightly express the relation between deformation gradient and porosity *1 point*

a. $\frac{\partial x}{\partial X} = \frac{1-\varphi_0}{1-\varphi}$

b. $\frac{\partial x}{\partial X} = \frac{1-\varphi}{1-\varphi_0}$

c. $\frac{\partial x}{\partial X} = \frac{1-\varphi}{1+\varphi_0}$

d. None of the above

- a.
- b.
- c.
- d.

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

11) Which of the following equations rightly express the continuity equation for solid phase in deformable porous medium, where u is the solid volume fraction *1 point*

a. $\frac{\partial u}{\partial t} - \frac{\partial}{\partial x}[(1-u)v_s] = 0$

b. $\frac{\partial u}{\partial t} + \frac{\partial}{\partial x}[uv_s] = 0$

c. $\frac{\partial u}{\partial t} - \frac{\partial}{\partial x}[uv_s] = 0$

d. None of the above

- a.
- b.
- c.
- d.

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

12) Which of the following equations define overall continuity in terms of composite velocity for deformable porous medium *1 point*

a. $\frac{\partial v_c}{\partial x} = 0$

b. $\frac{\partial u}{\partial t} - \frac{\partial}{\partial x}[uv_c] = 0$

c. $\frac{\partial u}{\partial t} - \frac{\partial}{\partial x}[(1-u)v_c] = 0$

d. None of the above

- a.
- b.
- c.
- d.

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

13) To obtain fluid velocity in deformable porous medium using Darcy's law which of the following modifications is not required *1 point*

a. The fluid velocity is expressed relative to solid velocity
b. Fluid velocity is expressed as interstitial velocity
c. Permeability is variable, and is expressed as function of solid volume fraction
d. Buoyancy of solid phase is considered

- a.
- b.
- c.
- d.

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

14) Which of the following expressions defines composite velocity in deformable porous medium *1 point*

a. $\overrightarrow{v_c} = \overrightarrow{v_s} + \overrightarrow{v_l}$

b. $\overrightarrow{v_c} = \overrightarrow{v_s} - \overrightarrow{v_l}$

c. $\overrightarrow{v_c} = u\overrightarrow{v_s} + (1-u)\overrightarrow{v_l}$

d. None of the above

- a.
- b.
- c.
- d.

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

15) Which of the following expressions relate pressure and excess stress for flow through deformable porous medium *1 point*

a. $\frac{\partial \sigma}{\partial x} + \frac{\partial P}{\partial x} = 0$

b. $\sigma + P = 0$

c. $\frac{\partial \sigma}{\partial P} = 0$

d. None of the above

- a.
- b.
- c.
- d.

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