

CHBE 344 Homework Assignment 2

Answers to problems

Problem 1:

Overall effectiveness of this screen: 51%

Problem 2a:

- i. Plot: 2.5 points
- ii. settling velocity for the particle in vegetable oil = 0.000232 m/s , 2.5 points

Problem 2b:

- i. plot: 2.5 points
- ii. the terminal settling velocity for a 1 mm particle: 0.1004 m/s 2.5 points

Problem 2c:

- i. Vegetable oil: displacement ($1.18\text{e-}8\text{m}$), time ($8.40\text{-}5\text{s}$) , 2
- ii. West Texas oil: displacement ($1.67\text{e-}3\text{m}$), time ($2.81\text{e-}2\text{s}$) , 2 points
- iii. Yes, it is reasonable to ignore (1 points).

Veg oil: Time: 0.000158 s

Distance: $2.8\text{e-}8 \text{ m}$

Problem 3:

- i. Plot: 7.5 points
- ii. Mass fraction in bed: 100%, overflow mass fraction: 0%

Problem 4:

- a) Elutriation velocity: 0.0433 m/s , 4 points
I have also accepted following answers:
 $1.21\text{e-}2 \text{ m/s}$, 4 points
If $1.56\text{e-}2$ 4 points
- b) No 2 points
- c) the maximum size of galena particle carried over with the silica 147 micron
(or 153 microns), 4 points.