

### Example 5.1

Algal cells are being cultivated in 2 ft. deep ponds. These cells have a density of  $1.12 \text{ g/cm}^3$  and a diameter of  $5 \text{ }\mu\text{m}$ . The cell-free fluid has a density of  $1.00 \text{ g/cm}^3$  and a viscosity of  $1.1 \text{ cP}$ .

- a) What is the settling velocity ( $v_g$ ) of these particles?
- b) If the terminal settling velocity is reached quickly, estimate the total settling time.
- c) If the algal cells are placed in 15 cm tubes and then in a lab centrifuge having a distance of 6 cm from the top of the tube to the center of rotation, what rotation rate is necessary to sediment all the cells within 10 minutes?
- d) If you wish to process 1000 L/min of algal cells, what Sigma value must you specify for a centrifuge?
- e) What is the Equivalent Time for these algal cells?