Transport Processes – Homework

1. A molecule has a sedimentation coefficient of 4.2e-13 S and a diffusion coefficient of 7.5e-7 cm^2/sec, and a partial specific volume of 0.72 ml/g. Find the molar mass and the frictional ratio (anisotropy), and the Stokes radius. Assume a buffer density of 1 g/ml, and a viscosity of 0.01 poise. The gas constant is 8.314e7 erg/(mol*K). Show all work and all units.

2. What is the value of the molar mass and the value of the f/f_0 if the partial specific volume is 0.55?

3. Explain for each of these cases:
a) a molecule changes conformation and unfolds from globular to extended.
b) the density of the solvent increases
c) the viscosity of the solvent decreases

Does the sedimentation coefficient increase, decrease or stay the same? Does the diffusion coefficient increase, decrease or stay the same? Does the frictional coefficient increase, decrease or stay the same? Does the molar mass increase, decrease or stay the same? Explain your answer.