CHE 362 **HW #2** **Due 6/1/23**

#1 a) Use Fuller's method to estimate the diffusivity of benzene in nitrogen at 311.3 K and 1 atm. Compare your estimate to the value reported in Table 3.2 in the text. Report the % difference (% difference = (estimated value – table value)/table value * 100%) between your estimated value and the reported value.

b) Use Fuller's method to estimate the diffusivity of cyclohexane in hydrogen at 288.6 and 1 atm. Compare your estimate to the value reported in Table 3.2 in the text. Report the % difference (% difference = (estimated value – table value)/table value * 100%) between your estimated value and the reported value. % difference.

c) Use the table value of the diffusivity of ammonia in hydrogen at 298K and 1 atm to estimate the diffusivity at 533K. Report the % difference (% difference = (estimated value – table value)/table value * 100%) between your estimated value and the reported value. % difference.

#2 a) Estimate the liquid diffusivity of acetic acid (solute) in a dilute solution of acetone at 288K using the Wilke-Chang method and the Tyn and Calus method. Compare your estimate to the value reported in Table 3.4 in the text. Report the % difference (% difference = (estimated value – table value)/table value * 100%) between your estimated value and the reported value.

b) Estimate the liquid diffusivity of water (solute) in a dilute solution of ethanol (solvent) at 298K using the Wilke-Chang method and the Tyn and Calus method. Compare your estimate to the value reported in Table 3.4 in the text. Report the % difference (% difference = (estimated value – table value)/table value * 100%) between your estimated value and the reported value.

The physical properties needed for problems #1 and #2 can be found in ***Yaw's Critical Property Data for Chemical Engineers and Chemists*** available in the Knovel e-Library through the AIChE.org website. Most of the properties can be found in the *Thermophysical Properties* and *Transport Properties* sections. Note that the molar volume as a function of temperature can be found under *Volume of Liquid*.