ENVE 301
2011-2012
PS # 3 – Gas Transfer

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Question 1 :

Calculate the solubility of CO_2 (in air) in water at 25^0C and 1atm pressure.
(CO_2 in air =0,03% H= $6.11.10^{-4} atm^{-1}$)

Question 2 :

Calculate the solubility of nitrogen (in air) in water at 0^0C and 1 atm pressure.
(N_2 in air =79% H=$5.29.10^4 \frac{atm}{\text{mole fraction}}$

Question 3 :

Calculate the solubility of O_2 (in air) in water at 20^0C , 1atm pressure.
(O_2 in air 21% H=43,3mg/L/atm)

Question 4 :

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Dechlorinated secondary effluent is placed in a storage basin until needed for reuse. If the initial DO conc. is 1,5mg/L estimate the time required for the DO conc. to increase to 8,5mg/L due to surface re-aeration assuming the water in storage basin is circulated and not stagnant. Assume the K_L value for oxygen is equal to 0,03m/h. The surface area of the storage basin is $400m^2$ and the depth is 0,025m.T=20^oC

Question 5 :

A quantity of benzene was spilled accidently into a treated wastewater storage basin having depth of 2m. Estimate the time required for the concentration of benzene to drop out 50% from the initial concentration due to volatilization.
K_L for benzene = 0,144 m/hr