Ammonia Gas Absorption Experiment

ECH 6905L

Date: __________________________  Student Name: __________________________

Grader: __________________________  Group: __________________________

1. What are the assumptions used in deriving Colburn’s equation for calculating the number of transfer units?

   Answer:

2. What set of values of the absorption factor \( A \) make Colburn’s equation fail (other than trivial answers of \( A = 0, 1 \))? What does that constraint on \( A \) physically mean?

   Answer:


   Answer:

4. Calculate the rotameter reading (float position on the scale) for feed gas containing 99% \( N_2 \) and 1% \( NH_3 \) required to obtain an absorption factor \( A \) of 80 when the water flow rate is 10 GPH. Consider the following operating conditions - the pressure of feed air is 15 psig, the operating pressure of the column is 1 atm and temperature is 25°C. Once the rotameter reading for the feed gas is obtained, round the reading to the nearest integer and calculate the absorption factor for the rounded rotameter reading. Also report the density of feed gas in lb/ft\(^3\), the density of water in lb/gal, the equilibrium constant \( m \), and the molar flowrates of feed gas and water in lb – mole/min. (Hint: Refer to Sections 15 and 16 to calculate the flowrates of feed gas and water)

   Answer: