

### Chem201 Self Quiz - 6 (Spectroscopy / Extraction)

1. Molar absorptivities ( $\epsilon$ ,  $M^{-1}cm^{-1}$ ) of compounds X and Y were measured in pure samples at two different  $\lambda$  and are given below:

$\lambda$ , nm	X	Y
250	14,350	2,505
310	2,708	6,502

A mixture of these two compounds was tested in a 1.0 cm cell. The following absorbances (A) were obtained:

$\lambda$ , nm	A
250	0.910
310	0.575

Find concentrations of X and Y in the mixture.

2. Solute S has a partition coefficient of 4 between water and chloroform.
- Calculate the concentration of S in chloroform if  $S_{aq}$  is 0.02 M.
  - If volume of water is 80 mL and the volume of chloroform is 10 mL, find the quotient  $(\text{moles } S)_{org} / (\text{moles } S)_{aq}$ .
  - Assume that solute S is a weak acid ( $pK_a = 4.5$ ). What would be its concentration in each phase if an aqueous solution buffered at pH 5.5? Volume of each phase is 25 mL and concentration of  $S_{aq}$  is 0.02 M.