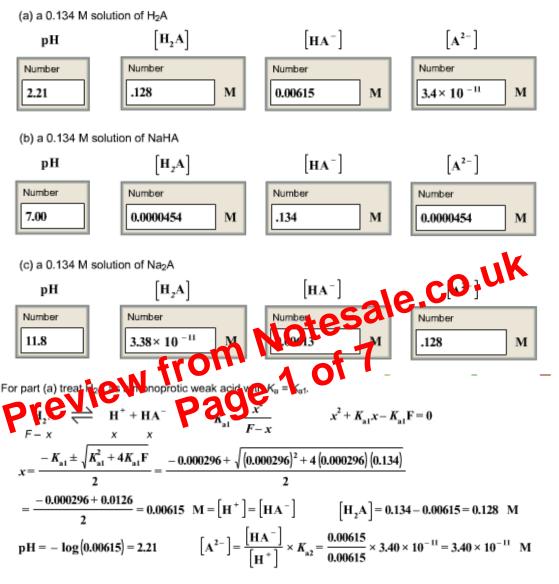
Chapter 9 Sapling

1.

Given a diprotic acid, H_2A , with two ionization constants of $K_{e1} = 2.96 \times 10^{-4}$ and $K_{e2} = 3.40 \times 10^{-11}$, calculate the pH and molar concentrations of H_2A , HA^- , and A^{2-} for each of the solutions below.



For part (b) note that HA $^-$ is the intermediate form of a diprotic acid. It is an amphiprotic species that can both accept and donate a proton. The following equation is for calculating the H $^+$ concentration, where you assume [HA $^-$] $\approx F$, the formal concentration.

$$\left[\mathbf{H}^{+}\right] = \sqrt{\frac{K_{a1}K_{a2}\left[\mathbf{H}\mathbf{A}^{-}\right] + K_{a1}K_{w}}{K_{a1} + \left[\mathbf{H}\mathbf{A}^{-}\right]}}$$