This is BCE#19.

I recommend you print out this page and bring it to class. Click here to show a set of five BCE19 student responses randomly selected from all of the student responses thus far in a new window.

John , here are your responses to the BCE and the Expert's response.

1. H_2S(aq) is a diprotic acid. Given a 0.100 M H_2S solution, complete the ICE table below. NOTE: For the reaction the equation is for the first dissociation.

Reaction	$H_2S \rightleftharpoons$	H^+	$+ HS^-$
Initial	0.100 M 0.100 M	0 M ~0 M	0 M 0 M
Change	-x M - x	+x M + x	+x M + x
Equilibrium	0.100 - x M 0.100 - x	0+x M 0 + x	0+x M 0 + x

94%

2. K_{a1} for H_2S is 5.7×10^{-8}. Calculate $[H^+]$ produced from H_2S.

$[H^+]$ = 7.55e-5 M 67% math error: 17%

$K_{a1} = [H^+][HS^-]/[H_2S]$

$5.7 \times 10^{-8} = (x)(x)/(0.100 - x)$ assume x <<<<0.100 M

$5.7 \times 10^{-8} = (x)(x)/(0.100)$

$x^2 = 5.7 \times 10^{-8} * (0.100) = 5.7 \times 10^{-9}$ M

$x = 7.5 \times 10^{-5}$ M = $[H^+]$

3. What is the $[HS^-]$ (at equilibrium) in the solution?

$[HS^-] = 7.55e\text{-}5$ M 67%

$[HS^-] = 7.5 \times 10^{-5}$ M

4. Complete the table below for the second dissociation HS^-.

Reaction	$HS^- \rightleftharpoons$	H^+	$+ S^{2-}$
Initial	7.55e-5 M 7.5×10^{-5} M	7.55e-5 M 7.5×10^{-5} M	0 M 0 M
Change	-x M - x	+x M + x	+x M + x
Equilibrium	7.55e-5 - x M 7.5×10^{-5} - x	7.55e-5 + x M 7.5×10^{-5} + x	0+x M 0 + x

33%

5. K_{a2} for H_2S is 1.3×10^{-13}. Calculate $[H^+]$ produced from Question 4.

$[H^+] = 1.3e\text{-}13$ M 27%

$K_{a2} = [H^+][S^{2-}]/[HS^-]$

$1.3 \times 10^{-13} = (7.5 \times 10^{-5} + x)(x)/(7.5 \times 10^{-5} - x)$ assume $x <<<< 7.5 \times 10^{-5}$ M

$1.3 \times 10^{-13} = (7.5 \times 10^{-5})(x)/(7.5 \times 10^{-5})$

$1.3 \times 10^{-13} = x$

$x = 1.3 \times 10^{-13}$ M $= [H^+]$

6. What is the $[H^+]$ in a 0.100 M H_2S solution?

$[H^+] = 7.55e\text{-}5$ M 33%

$[H^+] = [H^+]_{1st\ dissociation} + [H^+]_{2nd\ dissociation} = 7.5 \times 10^{-5}$ M $+ 1.3 \times 10^{-13}$ M

$[H^+] = 7.5 \times 10^{-5}$ M

7. Is there anything about the questions that you feel you do not understand? List your concerns/questions.

nothing

8. If there is one question you would like to have answered in lecture, what would that question be?

nothing

1. does $[\ ]_{eq}$ in the 1st table move to the initial $[\ ]$?
2. What is K_{a_1} & K_{a_2}
3. What makes H_2S a diprotic acid? Didn't I already calculate the $[H^+]$ in the 1st ICE table?