Q Calculate S^{-2} ion Conc. in a saturated 0.1M soln H_2S whose pH was adjusted to 2 by add^n of HCl [$Ka = 1.1 \times 10^{-21}$]

$$H_2S \rightleftharpoons 2H^+ + S^{-2}$$

$$Ka = \frac{[H^+]^2[S^{-2}]}{[H_2S]} \Rightarrow [S^{-2}] = \frac{Ka[H_2S]}{[H^+]^2}$$

$pH = 2$ so $[H^+] = 10^{-2}$

H_2S is a weak electrolyte so, $[H_2S] = 0.1\ M$

$$[S^{-2}] = \frac{1.1 \times 10^{-21}}{1 \times 10^{-2} \times 10^{-2}} = \boxed{1.1 \times 10^{-18}\ M}$$