Buffer calculations

Calculate the pH of a buffer solution where [H2S] = 0.0515 mol L-1, [HS-] = 0.105 mol L-1 ,pKa (H2S) = 6.98

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| **Using Ka**  **OR**  Ka = [A-][H3O+]  [HA]  H2S + H2O ⇄ HS-  + H3O+  pKa = - log Ka  6.98 = - log Ka  inverse log – 6.98 = Ka  1.047 x 10-7 = Ka  Ka = [HS-][H3O+]  [H2S]  1.047 x 10-7 = [0.105][H3O+]  [0.0515]  (1.047 x 10-7) ( 0.0515) = [H3O+]  0.105  5.135 x 10-8 =[H3O+]  pH = - log [H3O+]  pH = - log 5.135 x 10-8  pH = 7.289  ***Answer: 7.29***  Round up at the very end only!  Answer to 3 sig figs  UNITS where relevant | **Using Kb**  Kb = [BH+][OH-]  [HB]  HS-  + H2O ⇄ H2S + OH-  pKa = - log Ka  6.98 = - log Ka  inverse/shift log – 6.98 = Ka  1.047 x 10-7 = Ka  Kb = Kw  Ka  Kb = 1 x 10-14  1.047 x 10-7  Kb = 9.551 x 10-8  Kb = [H2S][OH-]  [HS-]  9.551 x 10-8 = (0.0515) [OH-]  0.105  1.947 x 10-21 =[OH-]  Kw = [H3O+] [OH-]  1 x 10-14 = [H3O+] (1.947 x 10-7 )  5.135 x 10-8 =H3O+]  pH = - log [H3O+]  pH = - log 5.135 x 10-8  pH = 7.289  ***Answer: 7.29***  Round up at the very end only!  Answer to 3 sig figs  UNITS where relevant | **Using Henderson-Hasselbalch equation**  **OR**  pH = pKa + log [conjugate base]  [acid]  H2S + H2O ⇄ HS-  + H3O+  ­pH = 6.98 + log 0.105  0.0515  pH = 6.98 + log 2.038  pH = 6.98 + 0.3093  pH = 7.289  ***Answer: 7.29***  Round up at the very end only!  Answer to 3 sig figs  UNITS where relevant  <https://www.chemical-minds.com> |

Which method above would you choose?