1. Define : Buffer solution

A solution that has the ability to resist changes in pH upon the addition of _small_ amounts of either acid or base.

2. How will the pH of a buffer solution change if we add a _small_ amount of water? (increase, decrease, or (remain the same))

3. Consider the table given below, write a **balanced** chemical equation for any reaction taking place between solute particles. Then write the formulas of the **major** particles present (just as you would for a net-ionic equation) in each of the following solutions below. Decide on which of the solutions below would show a buffer action.

	Particles present	Is it a buffer? (Ye or No)
Na_2SO_3	Na^+, SO_3^{2-}	NO
$KHSO_4$	K^+, HSO_4^-	NO
NaF	Na^+, F^-	NO
Equal volumes of **0.10 M** HCN and **0.05** M NaOH Equation: $HCN + NaOH \rightarrow Na^+CN^- + H_2O$ initial .10 .05 0 change −.05 −.05 +.05 final .05 0 .05	HCN Na^+, CN^-	yes
Equal volumes of **0.10 M** NaOH and **0.05 M** H_2CO_3 Equation: $2NaOH + H_2CO_2 \rightarrow Na_2CO_3 + H_2O$ initial .10 .05 2 change −.10 −.05 +.05 final 0 0 .05	Na^+, CO_3^{2-}	NO
$NaHS$	Na^+, HS^-	yes
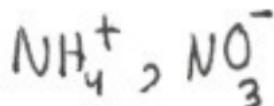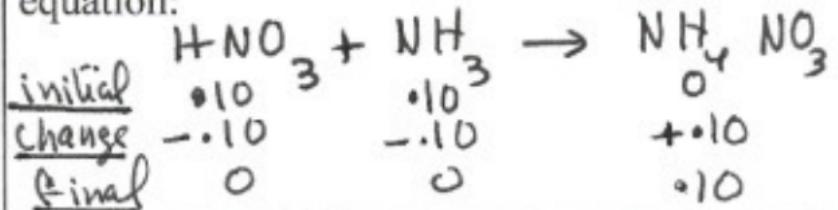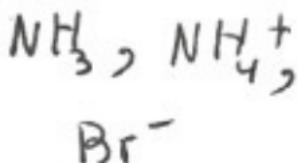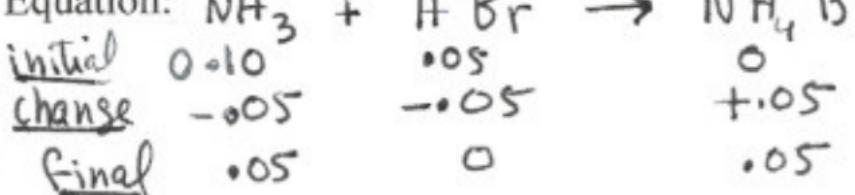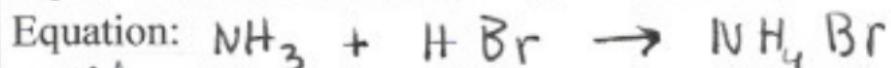
Equal volumes of **0.10 M** HNO3 and **0.10 M** NH3 (aq) equation: $HNO_3 + NH_3 \rightarrow NH_4NO_3$ initial $\quad .10 \quad\quad .10 \quad\quad 0$ change $-.10 \quad\quad -.10 \quad\quad +.10$ final $\quad 0 \quad\quad\quad 0 \quad\quad\quad .10$	NH_4^+, NO_3^-	NO
Equal volumes of **0.10 M** NH3 and **0.05 M** HBr Equation: $NH_3 + HBr \rightarrow NH_4Br$ initial $\quad 0.10 \quad\quad .05 \quad\quad 0$ change $\quad -.05 \quad\quad -.05 \quad\quad +.05$ final $\quad .05 \quad\quad\quad 0 \quad\quad\quad .05$	$NH_3, NH_4^+,$ Br^-	ye
Equal volumes of **0.10 M** H2C2O4 and **0.10 M** KOH Equation: $H_2C_2O_4 + KOH \rightarrow KHC_2O_4 + H_2O$ initial $\quad .10 \quad\quad .10 \quad\quad 0$ change $\quad -.10 \quad\quad -.10 \quad\quad +.10$ final $\quad 0 \quad\quad\quad 0 \quad\quad\quad .10$	$K^+, HC_2O_4^-$	yes