To 150.0 mL of a buffer soln that is 0.334 M Ammonium bromide and 0.342 M Ammonia, add 0.0369 mol HBr. Give pH.

\[ 150 \text{ mL} \begin{array}{c}
0.334 \text{ M } \text{NH}_4\text{Br} \\
0.342 \text{ M } \text{NH}_3
\end{array} \]

\text{NH}_3 = \text{Weak base} \quad \text{NH}_4\text{Br} = \text{Conj Weak Acid Salt}

\text{HBr} = \text{Strong Acid}, \text{ reacts with } \text{NH}_3 \text{ Weak base}

\text{HBr} + \text{NH}_3 \rightarrow \text{NH}_4\text{Br}

\begin{array}{c|c|c}
\text{I} & 0.0369 \text{ mol} & (0.150 \text{ L})(0.342 \text{ M}) \\
\text{A} & -0.0369 & (0.334 \text{ M})(0.150 \text{ L}) \\
\hline
\text{F} & 0.0144 \text{ mol} & 0.0870 \text{ mol}
\end{array}

\text{Buffer is left (Weak base & Conj Acidic Salt)}

Use basic form of Henderson (Weak base)

\[ \text{pOH} = \text{pK}_b + \log \frac{\text{Salt ion}}{\text{Weak base}} \]

\[ = -\log 1.8e^{-5} + \log \frac{0.0870 \text{ mol}}{0.0144 \text{ mol}} \]

\[ = 4.744 + \log \left( \frac{0.58}{0.9}\right) \]

\[ = 4.744 + 0.78156 \]

\[ \text{pOH} = 5.526 \quad (3 \text{ sfgs Figs}) \]

\[ \text{pH} = 14 - 5.526 = 8.474 = \text{pH} \]