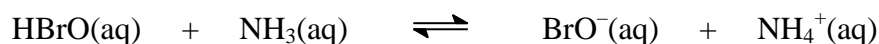


Marks
5

- Consider the following equation.



Name all of the species in this equation.

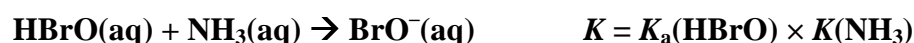
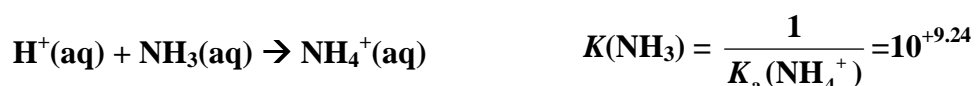
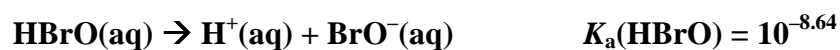
HBrO	hypobromous acid
BrO ⁻	hypobromite ion
NH ₃	ammonia
NH ₄ ⁺	ammonium ion

Complete the following table by giving the correct p*K*_a or p*K*_b value where it can be calculated. Mark with a cross (✗) those cells for which insufficient data have been given to calculate a value.

Species	HBrO	NH ₃	BrO ⁻	NH ₄ ⁺
p <i>K</i> _a of acid	8.64	✗	✗	9.24
p <i>K</i> _b of base	✗	4.76	5.36	✗

Determine on which side (left or right hand side) the equilibrium for the reaction above will lie. Provide a brief rationale for your answer.

The reaction is the sum of the acid-base equilibria for HBrO and NH₃:



Hence, $K = (10^{-8.64}) \times (10^{+9.24}) = 10^{+0.64} = 4.4$. As $K > 1$, the reaction favours products.