

Acid Unit: Brønsted Lowry

1. Which reaction favours the **reactants**?

a	$\text{H}_3\text{O}^+(\text{aq}) + \text{OH}^-(\text{aq}) \leftrightarrow 2\text{H}_2\text{O}(\text{l})$
b	$\text{HCN}(\text{aq}) + \text{OH}^-(\text{aq}) \leftrightarrow \text{CN}^-(\text{aq}) + \text{H}_2\text{O}(\text{l})$
c	$\text{SO}_4^{2-}(\text{aq}) + \text{H}_2\text{S}(\text{aq}) \leftrightarrow \text{HSO}_4^-(\text{aq}) + \text{HS}^-(\text{aq})$
d	$\text{H}_2\text{CO}_3(\text{aq}) + \text{NH}_3(\text{aq}) \leftrightarrow \text{HCO}_3^-(\text{aq}) + \text{NH}_4^+(\text{aq})$

2. Which reaction favours the **products**?

a	$\text{HCO}_3^-(\text{aq}) + \text{SO}_3^{2-}(\text{aq}) \leftrightarrow \text{CO}_3^{2-}(\text{aq}) + \text{HSO}_3^-(\text{aq})$
b	$\text{C}_2\text{H}_5\text{COOH}(\text{aq}) + \text{HCO}_3^- \leftrightarrow \text{C}_2\text{H}_5\text{COO}^-(\text{aq}) + \text{H}_2\text{CO}_3(\text{aq})$
c	$\text{HNO}_2(\text{aq}) + \text{F}^-(\text{aq}) \leftrightarrow \text{NO}_2^-(\text{aq}) + \text{HF}(\text{aq})$
d	$\text{C}_3\text{H}_7\text{COO}^-(\text{aq}) + \text{H}_2\text{PO}_4^-(\text{aq}) \leftrightarrow \text{C}_3\text{H}_7\text{COOH}(\text{aq}) + \text{HPO}_4^{2-}(\text{aq})$

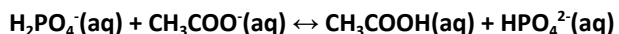
3. The reaction $\text{HB}(\text{aq}) + \text{X}^-(\text{aq}) \leftrightarrow \text{HX}(\text{aq}) + \text{B}^-(\text{aq})$ will favour products if _____

a	HB(aq) is a stronger acid than HX(aq)
b	HB(aq) is a weaker acid than HX(aq)
c	B ⁻ (aq) is a stronger base than X ⁻ (aq)
d	HB(aq) is an amphoteric acid.

4. When added to $\text{H}_3\text{PO}_4(\text{aq})$, which base would cause a reaction that favours the **reactants**?

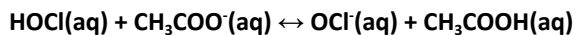
a	$\text{OH}^-(\text{aq})$
b	$\text{SO}_4^{2-}(\text{aq})$
c	$\text{HCO}_3^-(\text{aq})$
d	$\text{HSO}_3^-(\text{aq})$

5. Choose the **correct statement** for the following reaction.



a	Equilibrium favours the products.
b	$\text{H}_2\text{PO}_4^-(\text{aq})$ acts as a base.
c	$\text{CH}_3\text{COO}^-(\text{aq})$ acts as an acid.
d	$\text{HPO}_4^{2-}(\text{aq})$ acts as a base.

6. If 0.10 mol/L solutions of $\text{HOCl}(\text{aq})$ and $\text{KCH}_3\text{COO}(\text{aq})$ are mixed together, the following equilibrium is established:



This reaction _____

a	Favours reactants because $\text{HOCl}(\text{aq})$ is a weaker base than the acid $\text{CH}_3\text{COO}^-(\text{aq})$
b	Favours reactants because $\text{HOCl}(\text{aq})$ is a stronger acid than the base $\text{CH}_3\text{COO}^-(\text{aq})$
c	Favours products because $\text{HOCl}(\text{aq})$ is a stronger base than the acid $\text{CH}_3\text{COO}^-(\text{aq})$
d	Favours products because $\text{OCl}^-(\text{aq})$ is a weaker base than $\text{CH}_3\text{COO}^-(\text{aq})$

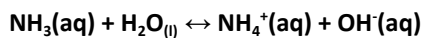
7. A Brønsted Lowry acid will _____ a _____ during a neutralization reaction.

a	Donate	Neutron
b	Accept	Proton
c	Donate	Proton
d	Accept	Neutron

8. A Brønsted Lowry base will _____ a _____ during a neutralization reaction.

a	Donate	Neutron
b	Accept	Proton
c	Donate	Proton
d	Accept	Neutron

9. Consider the Brønsted Lowry reaction below:



A Brønsted Lowry conjugate acid-base pair is ____ and ____.

a	$\text{H}_2\text{O}_{(\text{l})}$	$\text{OH}^-(\text{aq})$
b	$\text{NH}_3(\text{aq})$	$\text{H}_2\text{O}_{(\text{l})}$
c	$\text{NH}_4^+(\text{aq})$	$\text{OH}^-(\text{aq})$
d	$\text{NH}_4^+(\text{aq})$	$\text{H}_2\text{O}_{(\text{l})}$

10. Numerical response question

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Left justify your answer in the boxes provided.

Choose all entities in the list below that can act as Brønsted Lowry Acids. Record the answer(s) in ascending order.

1. $\text{HSO}_4^-(\text{aq})$
2. $\text{SO}_4^{2-}(\text{aq})$
3. $\text{HCOOH}_{(\text{aq})}$
4. $\text{HCOO}^-(\text{aq})$
5. $\text{NH}_3(\text{aq})$
6. $\text{NH}_4^+(\text{aq})$
7. $\text{PO}_4^{3-}(\text{aq})$
8. $\text{HPO}_4^{2-}(\text{aq})$

Solutions:

1. C
2. B
3. A
4. B
5. D
6. B
7. C
8. B
9. A
10. 1368