

Complete the following in your notebook with  
the heading: **Bronsted–Lowry theory of acids and bases**

# Key

1) What is name is given a hydrogen ion in the Bronsted–Lowry theory?

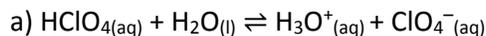
Proton

2) Define an acid and base according to the Bronsted–Lowry theory.

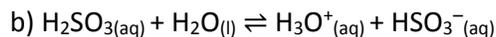
A Bronsted-Lowry acid is a proton ( $H^+$ ) donor.

A Bronsted-Lowry base is a proton ( $H^+$ ) acceptor.

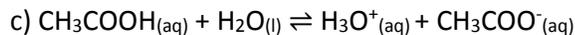
3) Identify the conjugate acid-base pairs in the following reactions:



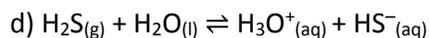
$HClO_{4(aq)}$	$H_2O_{(l)}$	$H_3O^+_{(aq)}$	$ClO_4^-_{(aq)}$
acid	base	conjugate acid	conjugate base



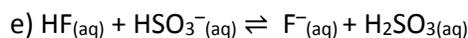
$H_2SO_{3(aq)}$	$H_2O_{(l)}$	$H_3O^+_{(aq)}$	$HSO_3^-_{(aq)}$
acid	base	conjugate acid	conjugate base



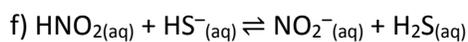
$CH_3COOH_{(aq)}$	$H_2O_{(l)}$	$H_3O^+_{(aq)}$	$CH_3COO^-_{(aq)}$
acid	base	conjugate acid	conjugate base



$H_2S_{(g)}$	$H_2O_{(l)}$	$H_3O^+_{(aq)}$	$HS^-_{(aq)}$
acid	base	conjugate acid	conjugate base



$HF_{(aq)}$	$HSO_3^-_{(aq)}$	$F^-_{(aq)}$	$H_2SO_3_{(aq)}$
acid	base	conjugate base	conjugate acid



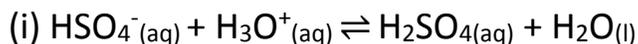
$HNO_2_{(aq)}$	$HS^-_{(aq)}$	$NO_2^-_{(aq)}$	$H_2S_{(aq)}$
acid	base	conjugate base	conjugate acid

4) Using H<sub>2</sub>O as an example, explain and show what is meant by an amphiprotic species.

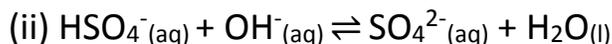
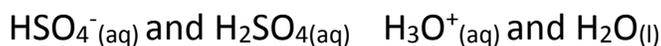
An amphiprotic species is able to donate or accept a proton therefore acting as a Bronsted-Lowry acid or a Bronsted-Lowry base. H<sub>2</sub>O is able to donate a proton to form OH<sup>-</sup>(aq) or accept a proton to form H<sub>3</sub>O<sup>+</sup>(aq), therefore acting as a Bronsted Lowry acid or a Bronsted-Lowry base.

5) Write equations for the following amphiprotic species reacting with the hydronium ion (H<sub>3</sub>O<sup>+</sup>) or the hydroxide ion (OH<sup>-</sup>).

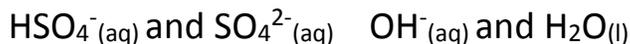
a) Hydrogen sulfate ion HSO<sub>4</sub><sup>-</sup>(aq)



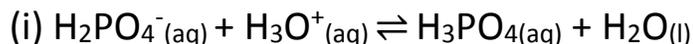
Conjugate acid-base pairs (differ by a H<sup>+</sup>):



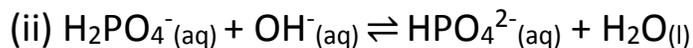
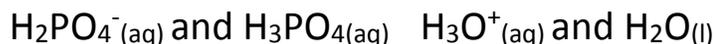
Conjugate acid-base pairs:



b) Dihydrogen phosphate ion H<sub>2</sub>PO<sub>4</sub><sup>-</sup>(aq)



Conjugate acid-base pairs:



Conjugate acid-base pairs:

