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A Level Chemistry

Examiners' Edition

Securing A*s

FREE SAMPLE

Pearson Edexcel 8CH0, 9CH0

19 Topic Booklets, One For Every Topic

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This Sample Shows A Few Pages From One Of The Topics.



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YOUR GOALS. OUR EXPERTISE.

A Level Chemistry · Topic 12

Acid-Base Equilibria

*Examiners' Edition: Securing A*s*

14 common mistakes · 28 practice questions · full mark schemes

Written for Pearson Edexcel AS and A Level Chemistry (8CHO, 9CHO).

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12.1 Bronsted-Lowry acids and bases

MEMORISE THIS

Acid: proton donor; base: proton acceptor

not electron pairs

Conjugate pair differs by one H^+

label the pairs

1 Acid and base definitions

A Level only

✗ Common mistake

Calling a base a proton donor, giving the Lewis definition ("electron pair acceptor" or "electron donor"), or writing a definition when the question asks something else.

✓ Do this instead

- Brønsted-Lowry acid: a proton (H^+) donor.
- Brønsted-Lowry base: a proton (H^+) acceptor.
- Lewis definitions (electron pairs) are not credited when a Brønsted-Lowry answer is asked for.
- In a given reaction, decide which species gains H^+ (the base) and which loses H^+ (the acid).
- Strong acid: fully dissociates in water. Weak acid: only partially dissociates (use $\rightleftharpoons$).

IN THE
EXAM

A few defined a base as a proton donor, which is the definition of an acid. (Jun 2022, AL P1)

Exam tip: Read the question: "identify the base and explain" wants the species and the proton transfer, not the textbook definition.

Examiners flagged this in: Jun 2019 AL P3, Jun 2022 AL P1, Jun 2022 AL P2, Jun 2024 AL P1

Question 1.1 Check it

[Mark scheme](#)

State what is meant by a Brønsted-Lowry acid and by a Brønsted-Lowry base.

(2)

Question 1.2 Apply it

[Mark scheme](#)

In a nitrating mixture: $HNO_3 + H_2SO_4 \rightleftharpoons H_2NO_3^+ + HSO_4^-$

Identify the species acting as a Brønsted-Lowry base in the forward reaction. Explain your answer.

(2)

Mark schemes

1 Acid and base definitions

Question 1.1 Check it

[Back to question](#)

Part	Answer	Marks
	Acid: proton (H^+) donor.	1
	Base: proton (H^+) acceptor.	1
Total		2

Question 1.2 Apply it

[Back to question](#)

Part	Answer	Marks
	HNO_3	1
	It accepts a proton (H^+) from H_2SO_4 to form H_2NO_3^+ .	1
Total		2

Common wrong answers: "A base is a proton donor"; "electron pair acceptor"; choosing H_2SO_4 because "it is the stronger acid so it must be the base".

2 Conjugate acid-base pairs

Question 2.1 Check it

[Back to question](#)

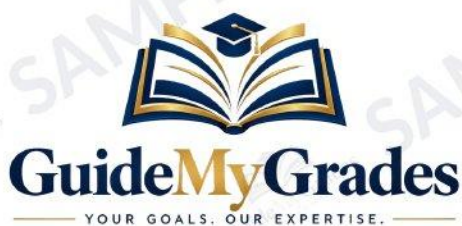
Part	Answer	Marks
	CH_3COOH (acid) and CH_3COO^- (base)	1
	H_3O^+ (acid) and H_2O (base)	1
Total		2

Question 2.2 Apply it

[Back to question](#)

Part	Answer	Marks
(a)	$\text{HCl} + \text{CH}_3\text{COOH} \rightarrow \text{Cl}^- + \text{CH}_3\text{COOH}_2^+$ (allow $\rightleftharpoons$)	1
(b)	HCl (acid) and Cl^- (base)	1
(b)	$\text{CH}_3\text{COOH}_2^+$ (acid) and CH_3COOH (base)	1
Total		3

Common wrong answers: Making ethanoic acid donate the proton (giving H_2Cl^+ and CH_3COO^-); writing CH_4COOH^+ ; pairing H_2O with NH_4^+ .



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- Topic 3** Redox I
- Topic 4** Inorganic Chemistry And The Periodic Table
- Topic 5** Formulae, Equations And Amounts Of Substance
- Topic 6** Organic Chemistry I
- Topic 7** Modern Analytical Techniques I
- Topic 8** Energetics I
- Topic 9** Kinetics I
- Topic 10** Equilibrium I
- Topic 11** Equilibrium II
- Topic 12** Acid-Base Equilibria
- Topic 13** Energetics II
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