

Unit Test 单元测验

A-Level Chemistry · Unit 12 Nitrogen and sulfur

20 marks · 20 minutes

Score 得分:	1 Vocabulary ____ / 10	2 Questions ____ / 10	Total ____ / 20
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Part 1 · Vocabulary 词汇 (10 marks). Spelling must be exact in Sections A and C. A、C 部分拼写必须完全正确。

Section A · Chinese to English 中译英

Write the English word.

1. 三键

[1]
2. 碱性

[1]
3. 置换

[1]
4. 内燃机

[1]
5. 卤素

[1]
6. 氨

[1]
7. 热稳定性

[1]
8. 动态平衡

[1]

Section B · English to Chinese 英译中

Write the Chinese meaning.

9. exhaust gases

[1]
10. strong acid

[1]

Part 2 · Exam questions 考试题 (10 marks, 10 questions) begins on the next page. Answer in the spaces provided. 第二部分从下页开始。

22 Which statement describes a property of an ammonium ion?

- A** An aqueous ammonium ion is a weak Brønsted–Lowry base.
- B** Aqueous ammonium sulfate reacts with dilute hydrochloric acid to make ammonia gas.
- C** An ammonium ion has a pyramidal shape with an H–N–H bond angle of 107° .
- D** The four N–H covalent bonds in an ammonium ion are identical to each other.

23 Catalytic converters are fitted in the exhaust systems of many cars.

Gas X:

- causes acid rain if it is released into the air
- is removed from car exhaust fumes by a catalytic converter.

What is gas X?

- A** carbon dioxide
- B** carbon monoxide
- C** hydrocarbon vapour
- D** nitrogen dioxide

22 J dissolves in water to give an aqueous solution K.

K gives a dense white precipitate when aqueous silver nitrate is added.

When heated with aqueous potassium hydroxide, K gives off a gas that turns moist universal indicator paper blue.

What is J?

- A** ammonium chloride
- B** ammonium sulfate
- C** sodium chloride
- D** sodium hydroxide

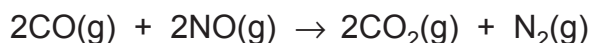
23 Ammonium sulfate, $(\text{NH}_4)_2\text{SO}_4$, and ammonium nitrate, NH_4NO_3 , are used as fertilisers.

These salts have different percentages by mass of nitrogen. They have the same effect as each other on the pH of wet neutral soil.

Which row is correct?

	higher percentage of nitrogen by mass	effect on pH of soil
A	ammonium nitrate	decrease
B	ammonium nitrate	increase
C	ammonium sulfate	decrease
D	ammonium sulfate	increase

24 The equation shows a reaction that occurs between carbon monoxide and nitrogen monoxide in a catalytic converter.



Which statement is correct?

- A** The catalyst used is finely divided iron.
- B** The reaction prevents greenhouse gas emissions into the atmosphere.
- C** The reaction reduces the possibility of the formation of photochemical smog.
- D** The reaction results in increased ozone depletion.

24 A catalytic converter reduces the amount of pollutants in the fumes from a car exhaust.

Which row identifies a pollutant and shows how it is removed by the action of the catalyst?

	pollutant	chemical removal
A	carbon dioxide	reduced to carbon
B	carbon monoxide	oxidised to carbon dioxide
C	oxides of nitrogen	oxidised to nitric acid
D	unburnt hydrocarbons	oxidised to carbon dioxide and hydrogen

- 25** Solid R is added to a solution of ammonium nitrate and the mixture is heated. A gas is given off which turns red litmus to blue.

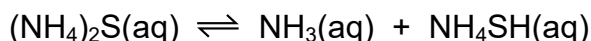
What could be R?

- A** aluminium chloride
- B** magnesium chloride
- C** sodium oxide
- D** phosphorus oxide

- 18** What is an environmental consequence of the uncontrolled use of nitrate fertilisers?

- A** acid rain
- B** low oxygen levels in streams
- C** ozone depletion
- D** the greenhouse effect

- 19** Ammonia gas, NH_3 , and hydrogen sulfide gas, H_2S , react together to form the salt ammonium sulfide, $(\text{NH}_4)_2\text{S}$. Ammonium sulfide dissolves in water to produce an orange alkaline solution.



The addition of $\text{NaOH}(\text{aq})$ to this solution produces a gas, X.

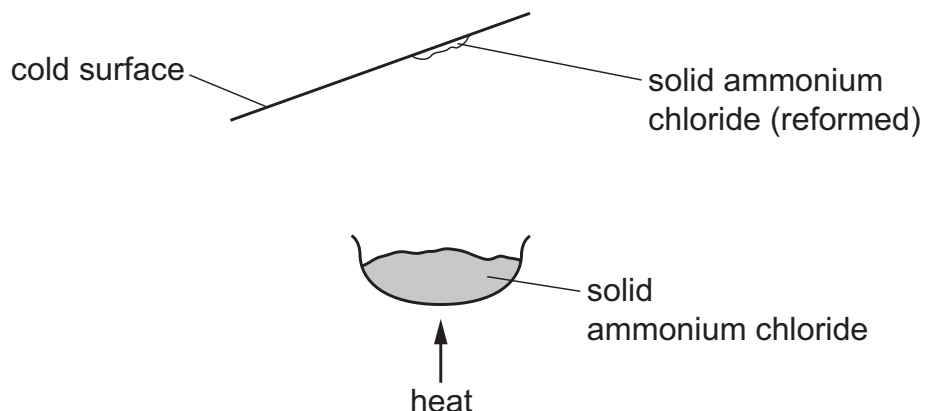
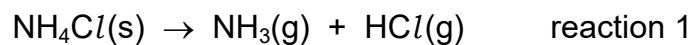
The addition of $\text{HCl}(\text{aq})$ to a separate portion of this solution produces a gas, Y.

X and Y could represent different gases or identical gases.

What are the identities of X and Y?

	X	Y
A	H_2S	H_2S
B	H_2S	NH_3
C	NH_3	H_2S
D	NH_3	NH_3

- 33** When a sample of ammonium chloride is warmed it decomposes into ammonia and hydrogen chloride gas.



When the mixture of hot ammonia and hydrogen chloride gases hit a cold surface, a white solid of ammonium chloride reforms.

Which statements are correct?

- 1 Reaction 1 is in dynamic equilibrium.
- 2 Reaction 1 is reversible.
- 3 Reaction 1 is an endothermic reaction.

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Working space 草稿区 — rough work here is not marked.