

Unit Test 单元测验

A-Level Chemistry · Unit 19 Nitrogen compounds

23 marks · 25 minutes

Score 得分:	1 Vocabulary ____ / 10	2 Questions ____ / 13	Total ____ / 23
-----------	------------------------	-----------------------	-----------------

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. 一氧化碳

[1]
2. 聚合物

[1]
3. 骨架式

[1]
4. 环状

[1]
5. 平衡常数

[1]
6. 弱酸

[1]
7. 能量循环

[1]
8. 开尔文

[1]

Section B · English to Chinese 英译中

Write the Chinese meaning.

9. bacteria

[1]
10. graphite

[1]

Part 2 · Exam questions 考试题 (13 marks, 6 questions) begins on the next page. Answer in the spaces provided. 第二部分从下页开始。

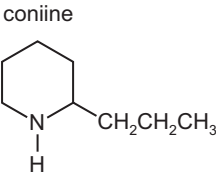
32 Halogenoalkanes react with hot ethanolic potassium cyanide.

The reaction mechanism is either S_N1 or S_N2.

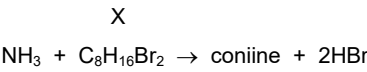
Which statement is correct?

- A All secondary halogenoalkanes react by the S_N2 mechanism only.
- B Both the halogenoalkane and the cyanide ion are involved in the initial step of the S_N1 mechanism.
- C Chloroethane reacts with cyanide ions by the S_N1 mechanism only.
- D The S_N2 mechanism involves a short-lived negatively charged transition state.

32 The structure of coniine is shown.



Coniine can be synthesised by reacting ammonia with a dibromo compound, X.



What is compound X?

- A 1,1-dibromo-2-propylcyclopentane
- B 1,2-dibromo-2-propylcyclopentane
- C Br(CH₂)₃CHBr(CH₂)₃CH₃
- D Br(CH₂)₄CHBr(CH₂)₂CH₃

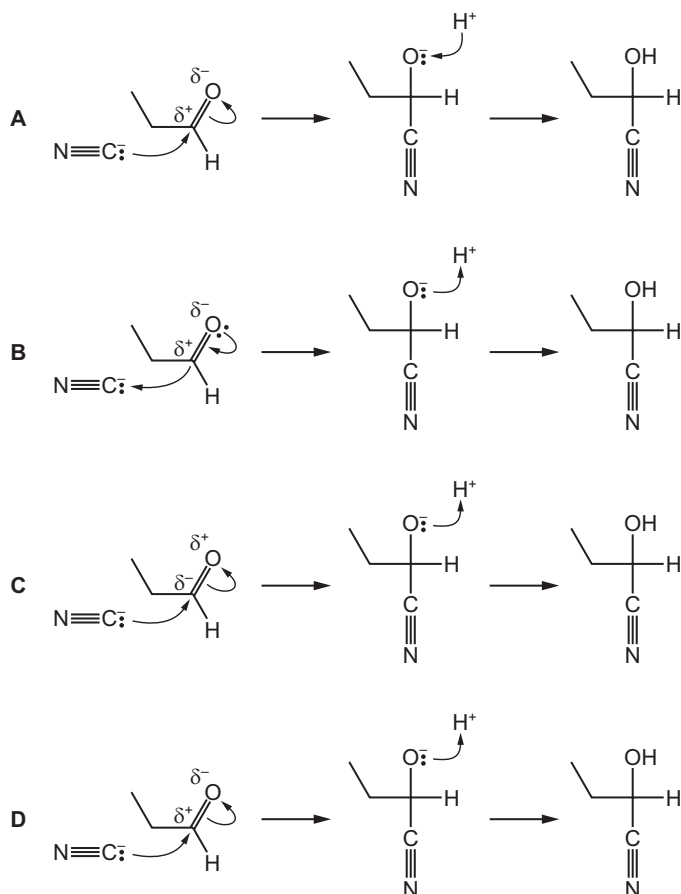
37 Which reaction is a redox reaction?

- A ethanenitrile heated under reflux with dilute hydrochloric acid
- B ethanoic acid reacted with aqueous sodium hydroxide
- C ethanoic acid reacted with sodium
- D ethyl ethanoate heated under reflux with dilute hydrochloric acid

27 Which reaction will form a strong organic base?

- A** ethanol and acidified sodium dichromate
B ethanol and hot aluminium oxide
C ethanol and sodium
D ethanol and hydrogen chloride

28 Which reaction mechanism for the formation of $\text{C}_2\text{H}_5\text{CH}(\text{OH})(\text{CN})$ is correct?

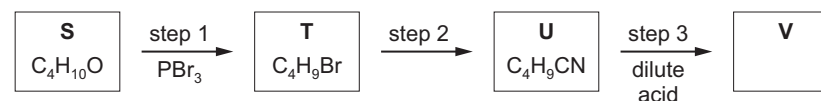


5 **S** is a secondary alcohol with molecular formula $\text{C}_4\text{H}_{10}\text{O}$.

(a) Draw the displayed formula of **S**.

[1]

(b) **S** is converted to **V** in a three-step reaction sequence.



In step 1, the secondary alcohol **S** reacts with PBr_3 to produce **T**, which has molecular formula $\text{C}_4\text{H}_9\text{Br}$.

(i) Give the systematic name of **T**.

..... [1]

(ii) Name the type of reaction that occurs in step 1.

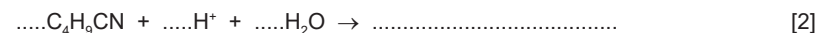
..... [1]

(iii) State the reagent(s) and conditions for step 2.

.....
 [2]

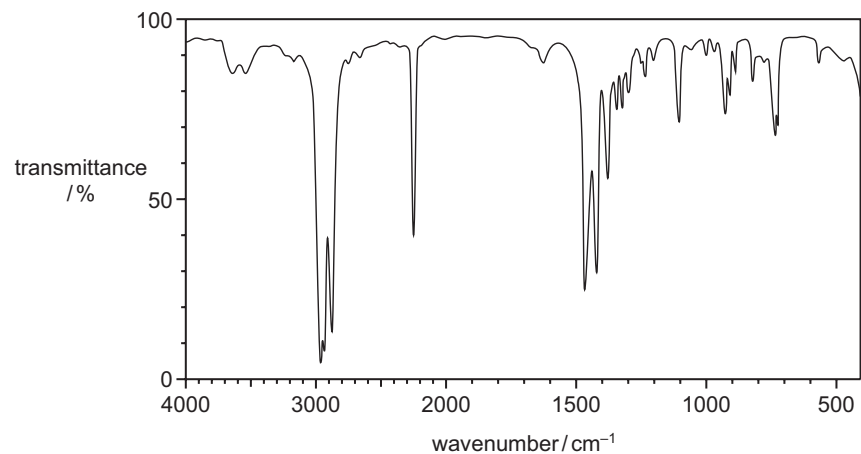
(iv) Step 3 involves heating $\text{C}_4\text{H}_9\text{CN}$ with dilute acid to form **V**.

Complete the equation for this reaction.



(v) An unlabelled sample contains either **S**, **T** or **U**.

The sample produces the infrared spectrum shown.



Explain how this spectrum confirms that the unknown sample contains **U**.

In your answer identify **one** relevant absorption in the infrared spectrum and the bond that corresponds to this absorption in the region above 1500 cm^{-1} .

.....
..... [1]

[Total: 8]

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