Cambridge AS & A Level

CHEMISTRY

Paper 1

Topical Past Paper Questions

+ Answer Scheme

2015 - 2021

PapaCambridge

Chapter 19

Nitrogen compounds

19.1 Primary amines

1166. 9701_m21_qp_12 Q: 19

Methylamine, CH_3NH_2, has similar chemical properties to ammonia, NH_3. Methylamine reacts with hydrogen chloride to form a white crystalline salt, methylammonium chloride.

$$CH_3NH_2 + HCl \rightarrow CH_3NH_3^+Cl^-$$

A sample of methylammonium chloride is heated with aqueous sodium hydroxide.

What are the products?

A ammonia, sodium chloride and water

B ammonia, sodium hydrogencarbonate and sodium chloride

C methylamine, hydrogen chloride and water

D methylamine, sodium chloride and water

19.2 Nitriles and hydroxynitriles

1167. 9701_m22_qp_12 Q: 38

Compound Y is heated with a mild oxidising agent. One of the products of the reaction reacts with hydrogen cyanide forming 2-hydroxybutanenitrile.

What is compound Y?

A butan-1-ol

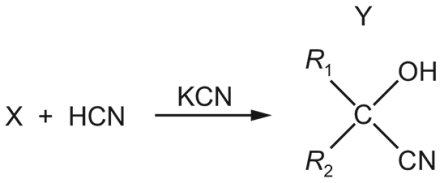
B butan-2-ol

C propan-1-ol

D propan-2-ol

1168. 9701_m21_qp_12 Q: 26

The diagram shows the formation of compound Y from compound X in a chemical reaction. R_1 and R_2 are alkyl groups.



Which row about this reaction is correct?

	mechanism	compound X
A	electrophilic addition	aldehyde
B	electrophilic addition	ketone
C	nucleophilic addition	ketone
D	nucleophilic addition	aldehyde

1169. 9701_s21_qp_11 Q: 20

Bromoethane reacts with cyanide ions, producing propanenitrile.

Which statement about the S_N2 mechanism of this reaction is correct?

A The lone pair of electrons on C of CN^- attacks the carbon atom of the C–Br bond.

B The lone pair of electrons on C of CN^- attacks the carbocation formed when the C–Br bond breaks.

C The lone pair of electrons on N of CN^- attacks the carbon atom of the C–Br bond.

D The lone pair of electrons on N of CN^- attacks the carbocation formed when the C–Br bond breaks.

1170. 9701_s21_qp_11 Q: 30

Butanoic acid is prepared from 1-bromopropane.

This synthesis requires a sequence of two reactions.

Which compound is prepared in the first stage of the synthesis?

A 1-aminopropane

B propan-1-ol

C butanal

D butanenitrile

1171. 9701_m18_qp_12 Q: 29

Alcohols, aldehydes and nitriles can each be converted into carboxylic acids.

Which descriptions of their conversions into carboxylic acids are correct?

	alcohols	aldehydes	nitriles
A	hydrolysis	hydrolysis	hydrolysis
B	hydrolysis	hydrolysis	oxidation
C	oxidation	oxidation	hydrolysis
D	oxidation	oxidation	oxidation