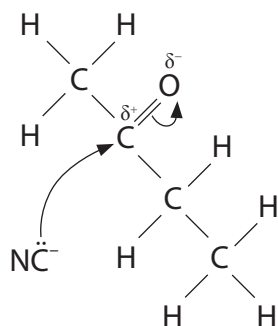
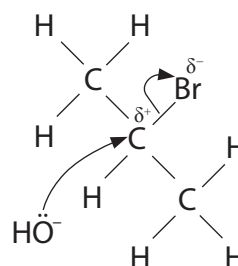


1 The first steps of two **different** reaction mechanisms are shown.

First
Reaction Mechanism



Second
Reaction Mechanism



(a) What do **both** reaction mechanism steps have in common?

(1)

- A They involve addition.
- B They involve substitution.
- C As one bond is made, one bond is broken.
- D The attack is on a planar group.

(b) Only **one** of the first steps above

(1)

- A leads to the formation of a racemic mixture.
- B involves initial attack by a nucleophile.
- C involves initial attack by an electrophile.
- D leads to an elimination.

(Total for Question = 2 marks)

2 The reaction of ammonia with propanoyl chloride, $\text{C}_2\text{H}_5\text{COCl}$, forms

- A $\text{C}_2\text{H}_5\text{NH}_2$
- B $\text{C}_2\text{H}_5\text{CONH}_2$
- C $\text{C}_2\text{H}_5\text{CH}(\text{OH})\text{NH}_2$
- D $\text{C}_2\text{H}_5\text{CONHC}_2\text{H}_5$

(Total for Question = 1 mark)

3 The reaction of 1-chloropropane with water containing dissolved silver nitrate in the presence of ethanol is

- A a redox reaction.
- B a nucleophilic substitution.
- C an electrophilic substitution.
- D a free radical substitution.

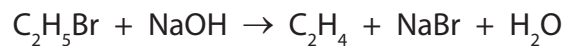
(Total for Question = 1 mark)

4 The compound with formula $\text{CH}_3\text{CH}(\text{NH}_2)\text{CH}_3$ can be made by reacting alcoholic ammonia with

- A propane.
- B propene.
- C 2-chloropropane.
- D propan-2-ol.

(Total for Question = 1 mark)

5



This reaction is an example of

- A addition.
- B elimination.
- C hydrolysis.
- D oxidation.

(Total for Question = 1 mark)

6 Nucleophiles are

- A electron pair donors that attack regions of high electron density.
- B electron pair donors that attack regions of low electron density.
- C electron pair acceptors that attack regions of high electron density.
- D electron pair acceptors that attack regions of low electron density.

(Total for Question 1 mark)

7 When iodomethane, CH_3I , is heated in a sealed tube with an excess of alcoholic ammonia, which of the following **cannot** be formed?

- A Methylamine, CH_3NH_2
- B Ethylamine, $\text{CH}_3\text{CH}_2\text{NH}_2$
- C Dimethylamine, $(\text{CH}_3)_2\text{NH}$
- D Ammonium iodide, NH_4I

(Total for Question 1 mark)

8 Which of the following is essential if a species is to act as a nucleophile?

- A A lone pair of electrons.
- B A negative charge.
- C An unpaired electron.
- D A strongly polar bond.

(Total for Question = 1 mark)

9 Which of these compounds is a secondary halogenoalkane?

- A $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$
- B $\text{CH}_3\text{CCl}(\text{CH}_3)\text{CH}_3$
- C $\text{CH}_3\text{CHClCH}_3$
- D $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$

(Total for Question = 1 mark)

10 The reaction of the halogenoalkane, $\text{C}_2\text{H}_5\text{Cl}$, with alcoholic ammonia is

- A nucleophilic substitution.
- B electrophilic substitution.
- C reduction.
- D elimination.

(Total for Question = 1 mark)

11 The formation of a carbocation from a halogenoalkane is an example of

- A homolytic fission.
- B heterolytic fission.
- C an initiation reaction.
- D a propagation reaction.

(Total for Question = 1 mark)

12 When a chloroalkane is heated with aqueous sodium hydroxide

- A no reaction occurs with primary, secondary or tertiary chloroalkanes.
- B a reaction occurs with primary and secondary chloroalkanes but not with tertiary chloroalkanes.
- C a reaction occurs with tertiary chloroalkanes but not with primary and secondary chloroalkanes.
- D a reaction occurs with primary, secondary and tertiary chloroalkanes.

(Total for Question 1 mark)

13 Consider the following organic liquids:

A ethanal

B ethanol

C tetrachloromethane

D trichloromethane

(a) Each liquid is run from a burette. Which liquid would **not** be deflected significantly by a charged rod?

(1)

A

B

C

D

(b) Which liquid would react with phosphorus(V) chloride to give a gas which fumes in moist air?

(1)

A

B

C

D

(c) Which liquid would you expect to have the peak at the greatest mass/charge ratio in its mass spectrum?

(1)

A

B

C

D

(d) Which liquid has an infrared spectrum with a broad absorption due to hydrogen bonding?

(1)

A

B

C

D

(Total for Question 4 marks)