**Questions**

**Q1.**

What type of species forms when a bond breaks homolytically?

   **A**     Nucleophile

   **B**     Electron

   **C**     Electrophile

   **D**     Free radical

**(Total for question = 1 mark)**

**Q2.**C2H5Br + NaOH → C2H4 + NaBr + H2O

This reaction is an example of

   **A**    addition.

   **B**    elimination.

   **C**    hydrolysis.

   **D**    oxidation.

**(Total for Question = 1 mark)**

**Q3.**

Unsaturated vegetable oils are hardened to make margarine by reaction with hydrogen and a nickel catalyst. Which terms could both be used to describe this type of reaction?

   **A**    Substitution and oxidation

   **B**    Substitution and reduction

   **C**    Addition and oxidation

   **D**    Addition and reduction

**(Total for Question = 1 mark)**

**Q4.**

Chloroethane reacts with **aqueous** potassium hydroxide solution, producing ethanol as
 the organic product.

(a)  The hydroxide ion is acting as

**(1)**

   **A**     an electrophile.

   **B**     a nucleophile.

   **C**     an oxidizing agent.

   **D**     a reducing agent.

(b)  Which of the following shows the correct electron-pair movements in this reaction?

**(1)**



**(Total for question = 2 marks)**

**Q5.**

      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)**

**Q6.**

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)**

**Q7.**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)**

**Q8.**The meaning of homolytic fission is

   **A**    bond-breaking to form two free radicals.

   **B**    bond-making to form two free radicals.

   **C**    bond-breaking to form a cation and an anion.

   **D**    bond-making to form a cation and an anion.

**(Total for Question = 1 mark)**

**Q9.**

A reaction mechanism is shown below.



The hydroxide ion is acting as

   **A**    an electrophile.

   **B**    a catalyst.

   **C**    a free radical.

   **D**    a nucleophile.

**(Total for question = 1 mark)**

**Q10.**

When iodomethane, CH3I, is heated in a sealed tube with an excess of alcoholic ammonia, which of the following **cannot** be formed?

   **A**    Methylamine, CH3NH2

   **B**    Ethylamine, CH3CH2NH2

   **C**    Dimethylamine, (CH3)2NH

   **D**    Ammonium iodide, NH4I

**(Total for Question = 1 mark)**

**Q11.**

Four organic reactions are given below:



(a) Which reaction is a substitution reaction?

**(1)**

   **A**

   **B**

   **C**

   **D**

(b) Which reaction is an electrophilic addition reaction?

**(1)**

   **A**

   **B**

   **C**

   **D**

(c) Which reaction involves initial attack by a nucleophile?

**(1)**

   **A**

   **B**

   **C**

   **D**

(d) Which reaction requires an initiator?

**(1)**

   **A**

   **B**

   **C**

   **D**

**(Total for question = 4 marks)**

**Mark Scheme**

**Q1.**



**Q2.**



**Q3.**



**Q4.**



**Q5.**



**Q6.**



**Q7.**



**Q8.**



**Q9.**



**Q10.**



**Q11.**

