Q1. Reaction of 2-bromobutane with potassium hydroxide can produce two types of product depending on the solvent used. In aqueous solution, the formation of an alcohol, **E**, is more likely but in ethanolic solution the formation of alkenes is more likely.

(a) For each type of product, name the type of reaction occurring and state the role of the potassium hydroxide.

(4)

(b) Name alcohol **E** and draw its structural formula. By reference to the structure of the halogenoalkane, explain why the initial step in the mechanism of the reaction producing the alcohol occurs.

(5)

(c) When 2-bromobutane reacts with ethanolic potassium hydroxide, two structurally isomeric alkenes are produced, one of which shows stereoisomerism.

Outline the mechanism for the formation of one of the structurally isomeric alkenes. Explain why two structurally isomeric alkenes are formed and draw the structure of the second structural isomer. Draw the structural formulae of the two stereoisomers.

(8)

(Total 17 marks)

Q2. (a) The equation below shows the reaction of 2-bromopropane with an excess of ammonia.

$$CH_3CHBrCH_3 + 2NH_3 \rightarrow CH_3CH(NH_2)CH_3 + NH_4Br$$

Name and outline the mechanism involved.

Name of mechanism ….....

Mechanism

(5)

(b) When 2-bromopropane is heated with ethanolic potassium hydroxide, an elimination reaction occurs. State the role of potassium hydroxide and outline a mechanism for this reaction.

Role of potassium hydroxide .....

Mechanism

(5)
(Total 10 marks)