2001 HIGHER SCHOOL CERTIFICATE EXAMINATION

Chemistry

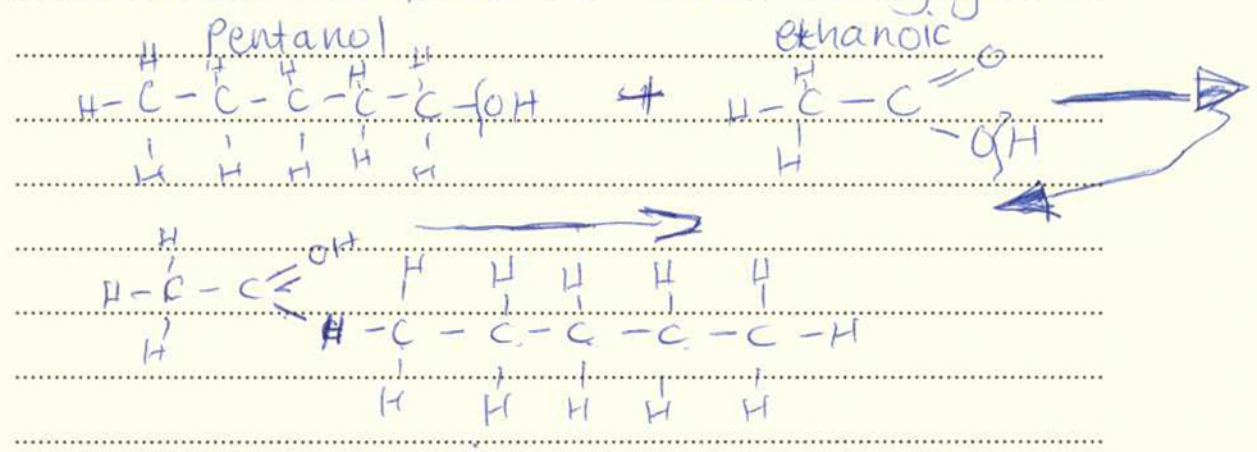
Section I – Part B (continued)

Marks

Question 22 (6 marks)

Justify the procedure you used to prepare an ester in a school laboratory. Include relevant chemical equations in your answer. **6**

Ester is made from carboxylic acid and alcohol. One example of how to make ester is the mixture of pentanol and ethanoic acid which will form a compound which will have the smell of like chewing gum.



ethyl penthanoic

Marks

Question 23 (4 marks)

A household cleaning agent contains a weak base of general formula NaX. 1.00 g of this compound was dissolved in 100.0 mL of water. A 20.0 mL sample of the solution was titrated with 0.1000 mol L^{-1} hydrochloric acid and required 24.4 mL of the acid for neutralisation.

(a) What is the Brönsted–Lowry definition of a base? **1**

base is weak on acid strong in water.

(b) What is the molar mass of this base? **3**

NaX 1.00g 100.0mL

$\frac{1.00g}{1000} = 0.01 \times 200 = 2$ mol/L

1000 − 20 = 80 mL

Marks

Question 24 (6 marks)

In the early twentieth century, Fritz Haber developed a method for producing ammonia, as shown by the equation:

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

(a) Ammonia is used as a cleaning agent. State ONE other use of ammonia. **1**

Solvent

(b) Explain the effect of liquefying the ammonia on the yield of the reaction. **2**

To make the reaction occur faster.

(c) Explain why it is essential to monitor the temperature and pressure inside the reaction vessel. **3**

It is essential to monitor temperature & pressure to ensure there are no powerful reactions Eg an explosion.