SL Paper 3

Ethylamine, $C_2H_5NH_2$, is a weak base.

a. State the equation for the reaction of ethylamine with water. [1]

b. Explain why ethylamine has basic properties. [1]

d. State the formula and deduce the shape of the positive ion (cation) formed when triethylamine, $(C_2H_5)_3N$, reacts with hydrochloric acid. [2]

Markscheme

a. $C_2H_5NH_2 + H_2O \rightleftharpoons C_2H_5NH_3^+ + OH^-$;

Accept $\rightarrow$ *in place of* $\rightleftharpoons$.

b. non-bonding/lone pair of electrons on the N atom (enables proton/H^+ acceptance) / *OWTTE*;

d. $(C_2H_5)_3NH^+ / [(C_2H_5)_3NH]^+$;

tetrahedral;

Examiners report

a. Majority of the candidates scored the mark for part (a). Lack of reference to N and lone pairs in part (b) penalized many candidates in scoring the mark. Most candidates were unable to explain the stronger basic properties diethylamine in part (c). Responses indicated weak understanding of the inductive effect of the alkyl groups. Many candidates did not address it the increased inductive effect due to two alkyl groups.

b. Majority of the candidates scored the mark for part (a). Lack of reference to N and lone pairs in part (b) penalized many candidates in scoring the mark. Most candidates were unable to explain the stronger basic properties diethylamine in part (c). Responses indicated weak understanding of the inductive effect of the alkyl groups. Many candidates did not address it the increased inductive effect due to two alkyl groups.

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