

Solutions

Original marking guidance: M1 method, A1 accuracy, B1 explanation.

2.1 Primary, secondary and tertiary respectively. Count carbon groups attached to the carbon bearing Br, not the total carbons or the name locant.

2.2 Ethanol with warm aqueous KOH; ethene with hot ethanolic KOH.

2.3 Propanenitrile, $\text{CH}_3\text{CH}_2\text{CN}$. The cyanide carbon joins the original two-carbon chain, giving three carbons.

3.1 One arrow starts at an oxygen lone pair and ends at the C bearing Br; the other starts at C–Br and ends at Br. Ethanol and Br^- form. Ammonia first gives $\text{CH}_3\text{CH}_2\text{NH}_3^+$; a second NH_3 removes H^+ to give ethylamine and NH_4^+ .

3.2 Iodo > bromo > chloro, because C–I is weakest and C–Cl strongest of these bonds. Match temperature and concentrations/volumes. Different detection thresholds/precipitate solubilities mean visible appearance is not a direct identical-conversion measurement in all cases.