

Solutions

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

2.1 Warm Tollens' reagent: propanal gives a silver mirror/grey silver, propanone gives no such change. Accept correct Fehling's/Benedict's alternative.

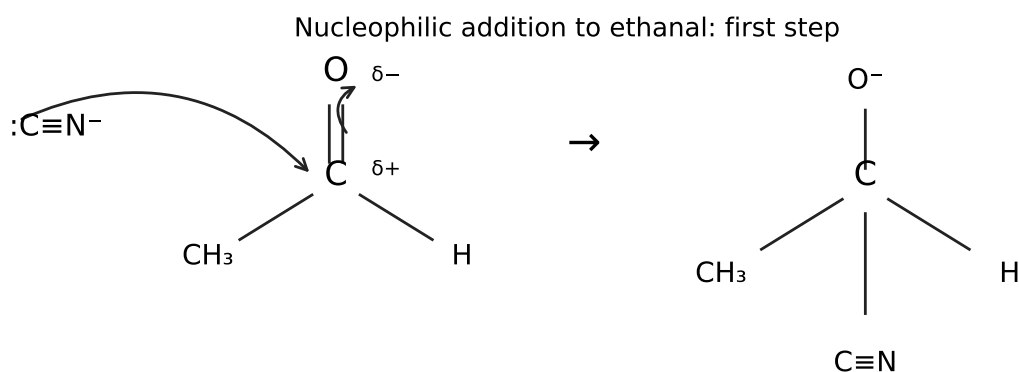
2.2 Propan-2-ol; LiAlH_4 in dry ether then appropriate work-up.

2.3 Yellow/orange precipitate; both aldehydes and ketones respond, so it is not a distinction between them.

3.1 Propanone CH_3COCH_3 . Carbonyl gives DNPH; $\text{CH}_3\text{CO}-$ gives iodoform and ketone gives no Tollens' silver. Two equivalent methyl carbons and one carbonyl environment give two signals. HCN product $(\text{CH}_3)_2\text{C}(\text{OH})\text{CN}$ has identical methyl groups, so is achiral.

3.2 CN^- carbon lone pair $\rightarrow$ carbonyl C; $\text{C}=\text{O}$ π pair $\rightarrow$ O. O^- gains H^+ from HCN, regenerating CN^- . Either face of planar carbonyl is attacked equally in the ideal achiral model, giving equal enantiomers of $\text{CH}_3\text{CH}(\text{OH})\text{CN}$.

3.3



B1 lone pair on CN carbon to carbonyl carbon; B1 $\text{C}=\text{O}$ π pair to oxygen; B1 correct intermediate connectivity; B1 negative oxygen.