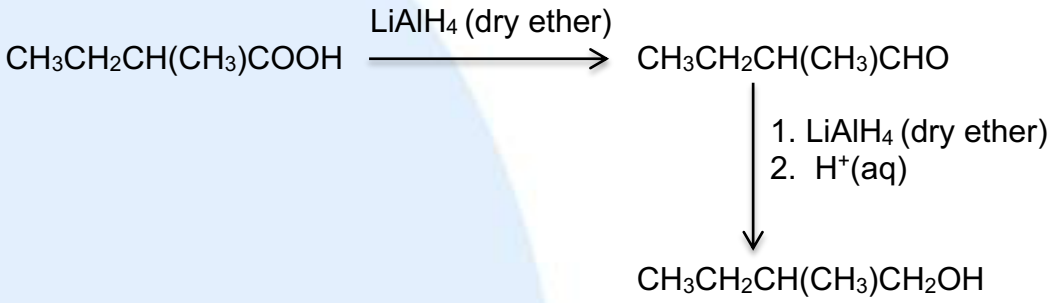
HL Answers to Reduction reactions questions

1. *Intermediate:* 2-methylbutanal
Final product: 2-methylbutan-1-ol



2. i. butan-1-ol, butan-2-ol, 2-methylpropan-1-ol, 2-methylpropan-2-ol

ii. butan-1-ol, $CH_3CH_2CH_2CH_2OH$ from butanal, $CH_3CH_2CH_2CHO$

butan-2-ol, $CH_3CH_2CH(OH)CH_3$ from butanone, $CH_3CH_2COCH_3$

2-methylpropan-1-ol, $CH_3CH(CH_3)CH_2OH$ from 2-methylpropanal, $CH_3CH(CH_3)CHO$

iii. The fourth alcohol, 2-methylpropan-2-ol, is a tertiary alcohol so there is no possibility of adding a hydrogen atom to the carbon atom bonded to the hydroxyl group.

3. i. It is a reducing agent.

ii. phenylammonium chloride (or the phenylammonium ion)

$C_6H_5NO_2 + 7H^+ + 6e^- \rightarrow C_6H_5NH_3^+ + 2H_2O$

iii. $C_6H_5NH_3^+ + OH^- \rightarrow C_6H_5NH_2 + H_2O$

or $C_6H_5NH_3Cl + NaOH \rightarrow C_6H_5NH_2 + H_2O + NaCl$

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