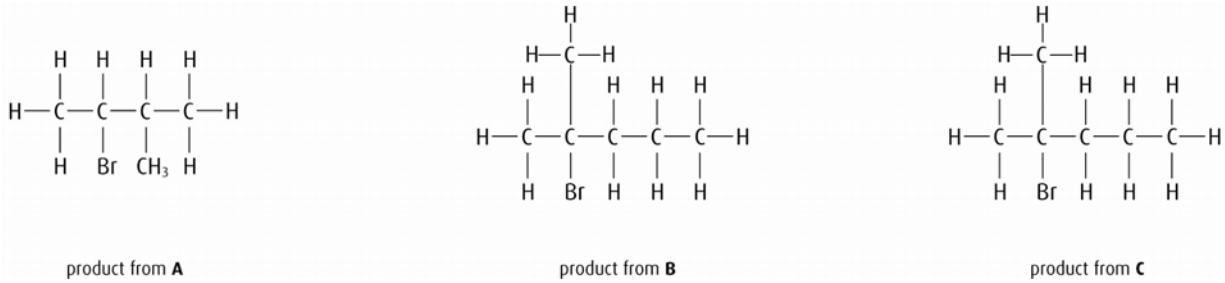
Marking scheme for Core Worksheet – Option G

1 a



[3]

b

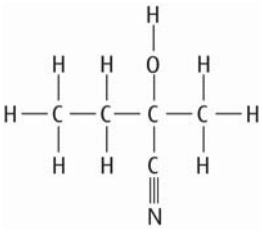
[2]

tertiary carbocation (on right) identified as more stable [1]

tertiary carbocation more stable than primary due to more alkyl groups around C^+ [1]

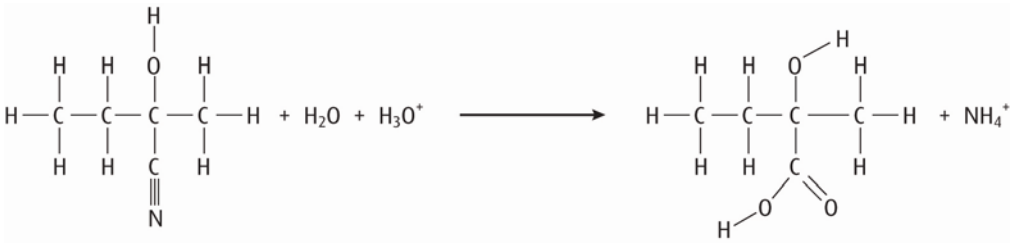
alkyl groups electron-releasing/positive inductive effect [1]

2 a



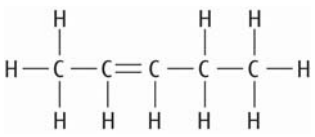
[1]

b



[2]

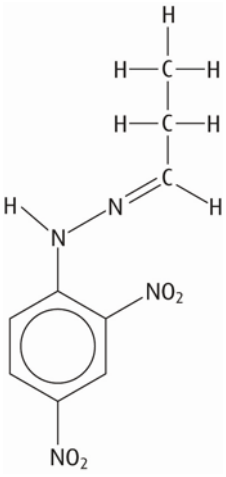
3 a



[1]

b dehydration/elimination [1]

4

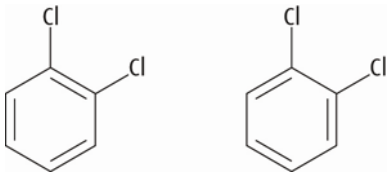


[2]

1 mark for C=N, 1 mark for rest of molecule

5 If benzene has a delocalised structure, only one 1,2-substituted isomer is possible. [1]

If benzene has the Kekulé structure, there would be two different 1,2-substituted isomers. [1]



[1]

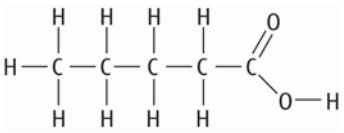
Only one 1,2-substituted isomer has been found. [1]

6 **a** magnesium [1]

dry ether/ethoxyethane [1]

$CH_3CH_2CH_2CH_2MgBr$ [1]

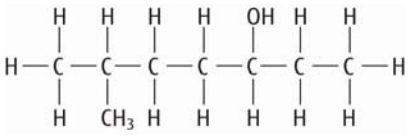
b



[1]

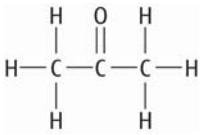
pentanoic acid [1]

c



[1]

7

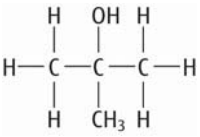


[1]

CH_3MgBr [1]

dry ether [1]

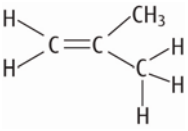
H^+/H_2O [1]



[1]

concentrated phosphoric acid [1]

heat [1]



[1]

8 **a** chloroethanoic acid is stronger [1]

Cl is electron-withdrawing/very electronegative [1]

electron density withdrawn from COO^- in conjugate base [1]

H^+ attracted less strongly/conjugate base more stable [1]

b 4-nitrophenol is stronger [1]

nitro group is electron-withdrawing [1]

electron density withdrawn from O^- in conjugate base [1]

H^+ attracted less strongly/conjugate base more stable [1]