Organic Synthesis Map

Cambridge International AS & A Level Chemistry · Topic 21 Organic synthesis

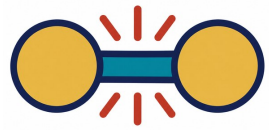
1 Carbonyl tests
21.1.1(a)

- 2,4-DNPH: C=O
- Tollens': silver mirror
- Fehling's: red precipitate
- Alkaline I_2(aq): CH_3CO



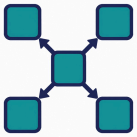
2 Several groups
21.1.1(b)

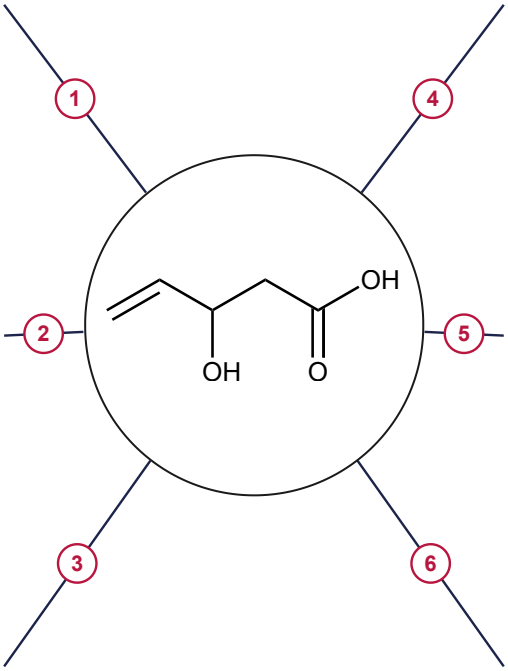
- **Ring** each group
- Each still reacts
- Change one group
- Copy the rest



3 AS junctions
21.1.2

- Halogenoalkanes
- Alcohols
- Reagent and **conditions**
- Distil or reflux





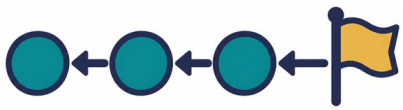
4 One more carbon
21.1.2

- KCN in ethanol, heat
- HCN, KCN catalyst
- Then dilute acid
- Acid, then ester



5 Reading a step
21.1.3-a

- Compare the two ends
- Name the **type**
- Then the reagent
- Then the conditions



6 By-products
21.1.3-b

- Minor **isomer**
- Competing elimination
- One stage too far
- H_2O, HBr, NaBr



Tests for functional groups
reagent and result

Group	Reagent	Result
C=C	Bromine water	Orange to colourless
C=O	2,4-DNPH	Orange precipitate
Aldehyde	Tollens' or Fehling's	Silver mirror or red solid
CH_3CO	Alkaline I_2(aq)	Yellow CHI_3
COOH	Na_2CO_3	Fizzing

Worked examples

Add one carbon
- Bromoethane to propanoic acid
- KCN in ethanol, heat
- **Dilute acid**, reflux

Name the types
- Propene to propan-2-ol, via RBr
- Electrophilic addition
- **Nucleophilic substitution**

Find the by-product
- Propene with HBr
- Main: 2-bromopropane
- By-product: **1-bromopropane**

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