Multi-Stage Synthesis Map

OCR A Level Chemistry A · 6.2.5 Organic synthesis

1 Purifying a solid

6.2.5(a)

- **Minimum** hot solvent
- Filter hot, cool slowly
- Reduced pressure
- Wash cold, dry



2 Melting point

6.2.5(a)

- Slow heating
- Compare with data
- Pure: sharp, at the value
- Impure: **low and broad**

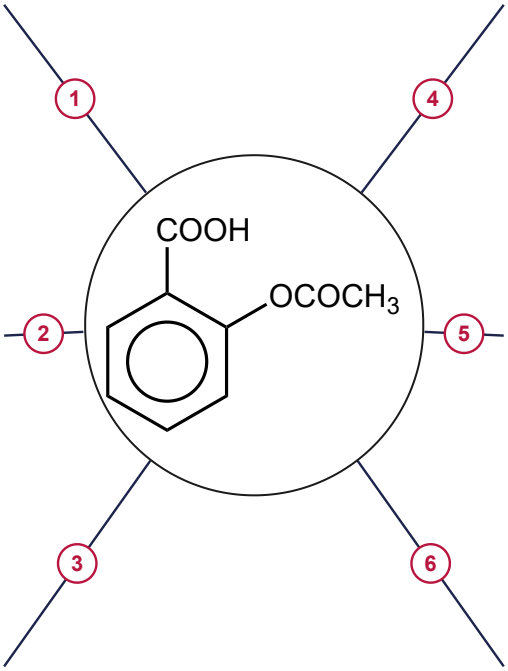


3 Tests

6.2.5(b)

- 2,4-DNP: C=O
- Tollens': aldehyde
- Na_2CO_3: COOH
- Br_2 water: C=C

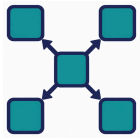




4 Several groups

6.2.5(b)

- Each group still reacts
- Read every group
- $NaBH_4$ spares C=C
- Copy the rest



5 Aromatic routes

6.2.5(c)

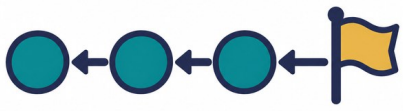
- Nitrate, then reduce
- Acylate with $AlCl_3$
- A ketone on the ring
- Ring stays intact



6 Working backwards

6.2.5(c)

- Start at the **target**
- Which bond was last?
- Conditions at each stage
- Yields **multiply**



Tests for functional groups

reagent and result

Group	Reagent	Result
C=C	Bromine water	Orange to colourless
C=O	2,4-DNP	Orange precipitate
Aldehyde	Tollens' reagent	Silver mirror
COOH	Na_2CO_3	Fizzing
Primary or secondary OH	$K_2Cr_2O_7/H^+$	Orange to green

Worked examples

Overall yield

- 90%, 70% and 50%
- 0.90 × 0.70 × 0.50
- **31.5%**

Percentage recovery

- 2.40 g from 3.00 g
- 2.40 ÷ 3.00 × 100
- **80.0%**

Aldehyde or ketone

- 2,4-DNP: both orange
- Tollens': aldehyde only
- **No mirror**: a ketone

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