

A-Level Chemistry

Name: _____ Score: _____

1. Oxidising methylbenzene with hot alkaline KMnO_4 gives:
 - ☐ benzoic acid (the side-chain becomes $-\text{COOH}$)
 - ☐ nitrobenzene
 - ☐ cyclohexane
 - ☐ phenol
2. An ester can be made at room temperature by reacting an acyl chloride with:
 - ☐ an alcohol or a phenol
 - ☐ an alkane
 - ☐ water only
 - ☐ an amine
3. An acyl chloride reacting with ammonia gives:
 - ☐ an amide (plus HCl)
 - ☐ an ester
 - ☐ a carboxylic acid
 - ☐ an alkene
4. Which carboxylic acid can be oxidised further?
 - ☐ methanoic acid (HCOOH)
 - ☐ ethanoic acid
 - ☐ propanoic acid
 - ☐ benzoic acid
5. Reacting phenol with benzoyl chloride gives:
 - ☐ phenyl benzoate
 - ☐ ethyl ethanoate
 - ☐ benzoic acid
 - ☐ phenol again
6. Making an ester from an acyl chloride happens at room temperature.
 - ☐ True ☐ False

7. An ester is hydrolysed by hot aqueous alkali in a reaction called _____.

8. Carboxylic acids react with carbonates to release carbon dioxide.
☐ True ☐ False
9. Esters often have sweet, fruity smells.
☐ True ☐ False
10. Acyl chlorides react vigorously with water to give a carboxylic acid and _____ chloride gas.

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1. **benzoic acid (the side-chain becomes –COOH)**

The whole side-chain is oxidised to a –COOH group, giving benzoic acid.

2. **an alcohol or a phenol**

Both alcohols and phenols react with acyl chlorides to give esters (+ HCl).

3. **an amide (plus HCl)**

Ammonia (or a 1°/2° amine) reacts with an acyl chloride to give an amide.

4. **methanoic acid (HCOOH)**

Methanoic and ethanedioic acids can be oxidised further (e.g. to CO₂); most carboxylic acids cannot.

5. **phenyl benzoate**

A phenol + an acyl (benzoyl) chloride forms the ester phenyl benzoate.

6. **True**

Acyl chlorides are very reactive, so the reaction proceeds quickly at room temperature.

7. **saponification**

It gives a carboxylate salt and an alcohol.

8. **True**

A test for the acid group.

9. **True**

They are used as flavourings and perfumes.

10. **hydrogen**

Misty fumes of HCl form.