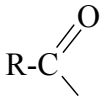
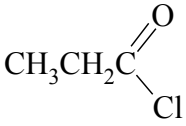
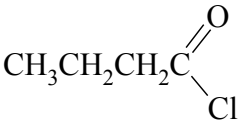
ACYL CHLORIDES: INTRODUCTION

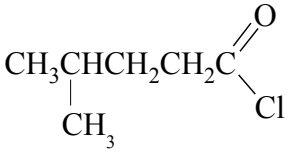
1. An acid derivative is a compound which can be made from a carboxylic acid (such as ethanoic acid) by replacing the OH group by something else. In ethanoyl chloride the OH in ethanoic acid has been replaced by a chlorine.

   An acyl group has the formula 

   where R is a hydrocarbon group – in this case, CH_3-.

2. a) (i) 

   (ii) 

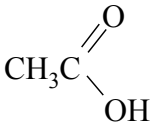
   (iii) 

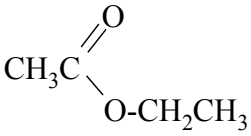
   b) 2-methylbutanoyl chloride

3. a) Ethanoyl chloride reacts violently with water rather than just dissolving in it.

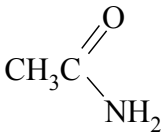
   b) It fumes because of its reaction with water vapour in the air, producing steamy fumes of hydrogen chloride (as well as ethanoic acid which you wouldn't see as fumes).

   c) van der Waals dispersion forces and dipole-dipole attractions.

4. a)  and HCl (You could equally write CH_3COOH since you are just asked for a formula.)

   b)  and HCl (or $CH_3COOCH_2CH_3$)

c) In the first instance:



and HCl (or write the organic product as CH_3CONH_2)

But the HCl will react with ammonia in the reaction mixture to form ammonium chloride, NH_4Cl. Well done if you spotted this.