CARBOXYLIC ACIDS: ESTERIFICATION

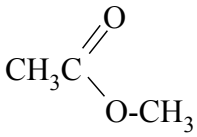
1. a) methyl methanoate

   b) propyl ethanoate

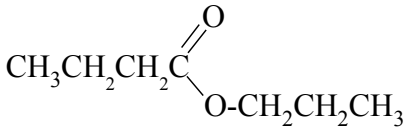
   c) methyl propanoate

   d) propyl methanoate

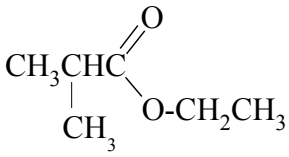
2. a)



   b)



   c)



3. a) Heat the mixture, distilling off the ethyl ethanoate as soon as it forms. Ethyl ethanoate has the lowest boiling point of everything present because it doesn't form hydrogen bonds as well as the various van der Waals forces – unlike the acid, the alcohol and water. Removing it from the mixture stops the back reaction.

   b) In this case, you would need to keep everything in the mixture until equilibrium was reached, and so you would heat it under reflux. Then fractionally distill the mixture, collecting the fraction at the correct boiling point of the ester.