ACYL CHLORIDES: REACTION WITH BENZENE

1. a) This reaction is known as *Friedel-Crafts acylation*. What do you understand by the term *acylation*?

b) Describe how you would convert benzene into phenylethanone, C₆H₅COCH₃. Give the conditions for the reaction, but no description of the purification of the product is necessary.

c) Name the other product of the reaction you described in part (b).

2. Friedel-Crafts acylation is a useful way of attaching carbon-containing groups to a benzene ring. The -COCH₃ group (or other acyl group if you start with a different acyl chloride) can be modified to give other groups.

   a) One modification is known as the Clemmensen reduction, and covert the carbon-oxygen double bond into a CH₂ group. Give the conditions for the Clemmensen reduction.

   b) In this case, the overall effect of doing a Friedel-Crafts acylation followed by the Clemmensen reduction would be an ethyl group attached to a benzene ring.

   It is perfectly possible to attach an ethyl group to a benzene ring by treating benzene with chloroethane in the presence of an aluminium chloride catalyst. So why do we normally use this more roundabout (and time-consuming) acylation-followed-by-reduction route instead?