

6. This question is about the synthesis of Fexofenadine.

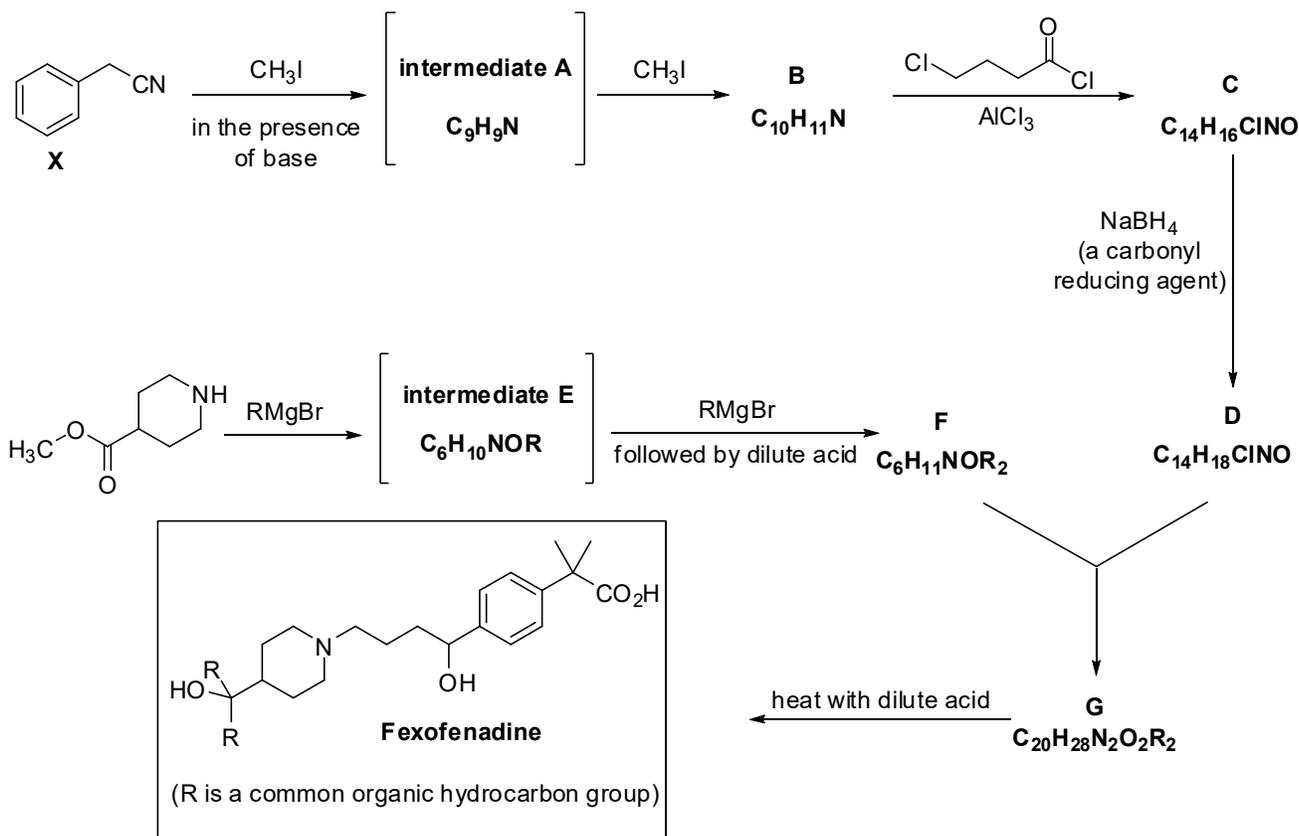
Antihistamines are taken to reduce the effects of allergic reactions in the body. The drug fexofenadine is used to treat sneezing, runny nose and itchy eyes experienced by hay fever sufferers, without causing drowsiness.



Fexofenadine, structure shown below, is sold as the hydrochloride salt with each tablet containing 112 mg of fexofenadine as 120 mg of the salt with HCl.

- (a) i) On the structure in your answer booklet, circle the atom which will be protonated in the salt.
- ii) Given that 112.00 mg of fexofenadine is actually contained in 120.14 mg of the salt, calculate the relative molecular mass of fexofenadine.
- iii) Given your answer to part (ii), suggest what common organic group R is in the structure of fexofenadine below.

A synthesis of Fexofenadine is shown below.



- (b) Draw out the structure of starting material X and indicate which hydrogen atoms are removed by the base in the first step of the synthesis.
- (c) Draw the structures of compounds / intermediates A to G.