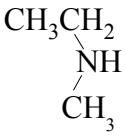
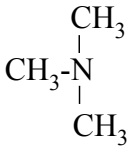
HALOGENOALKANES: REACTIONS WITH AMMONIA

1. a) CH_3NH_2

   b) 

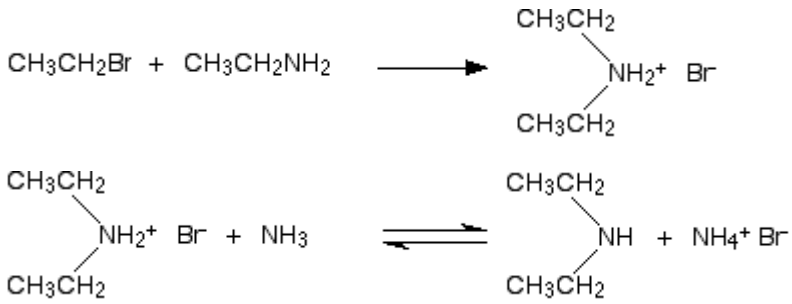
   c) 

2. Heat the bromoethane with a concentrated solution of ammonia in ethanol in a sealed tube.

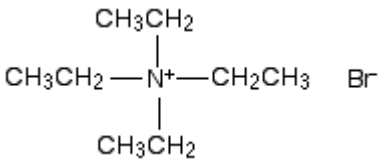
3. a) A salt. Ethylammonium bromide

   b) The ammonia is acting as a base, removing a hydrogen ion from the ethylammonium ion to leave the free ethylamine. But this reaction is reversible, because ethylamine is also a base, and can remove a hydrogen ion from the ammonium ion in ammonium bromide. You would end up with an equilibrium mixture of all four substances.

   c) (Taking the equations from the Chemguide page:)



   (The negative charge on the bromide ion doesn't show very clearly, but it is there!)

   d) 

   (Again, there should be a negative charge on the bromide ion – it just gets muddled up with the horizontal stroke of the r.)

e) Use a large excess of ammonia. That way, there is always a better chance of a bromoethane molecule hitting an ammonia molecule (to make ethylamine) rather than hitting one of the amine molecules formed during the reaction (to make a secondary amine, etc).

It also helps tip the position of equilibrium in equation 2 to the right.