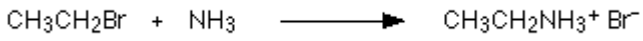
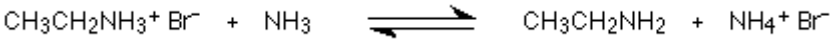
AMINES: PREPARATION

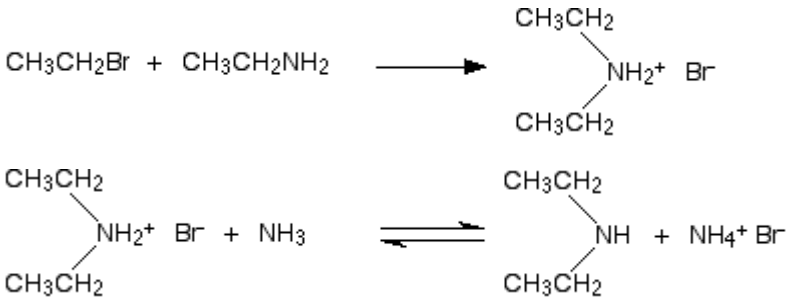
1. a) Heat a mixture of bromoethane and a concentrated solution of ammonia in ethanol in a sealed tube.

b) 

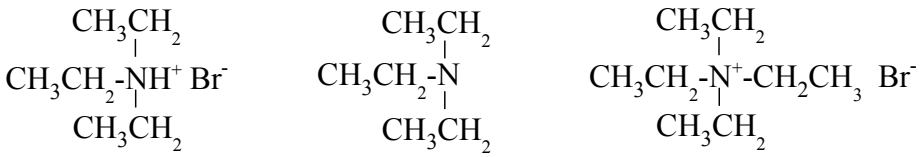
In the first equation the ammonia reacts with the bromoethane, breaking the bond between the ethyl group and the bromine atom. The product is the ionic salt, ethylammonium bromide.



In the second reaction another ammonia molecule removes a hydrogen ion from the nitrogen in the salt to leave the free amine and produce the ammonium ions which form ammonium bromide. This reaction is reversible, and so you end up with a mixture of everything in the equation.

c) 

(I have taken these from the Chemguide page to save time. The negative charge on the bromide ions doesn't show very well in either the amine salt or the ammonium bromide, but must be there.)

d) 

These are probably easier to see if you write them in a more condensed form:

$(CH_3CH_2)_3NH^+ Br^-$ $(CH_3CH_2)_3N$ $(CH_3CH_2)_4N^+ Br^-$

It is certainly easier to see their relationship with ammonia and ammonium salts if you write them like this.

e) $(CH_3CH_2)_4N^+ Br^-$

f) $CH_3CH_2NH_2$

2. a) The nitrile reacts with the lithium tetrahydridoaluminate in solution in ethoxyethane (diethyl ether, or just "ether") followed by treatment of the product of that reaction with a dilute acid.

b) $CH_3CH_2CN + 4[H] \longrightarrow CH_3CH_2CH_2NH_2$

c) Palladium, platinum or nickel. There are undoubtedly other similar catalysts, but stick with one of the commonly quoted ones.

d) $CH_3CH_2CN + 2H_2 \longrightarrow CH_3CH_2CH_2NH_2$

You must write the hydrogen in its proper form. You could write the catalyst over the arrow if you wanted to.