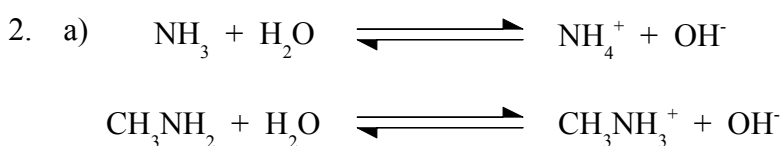


Chemguide – answers

AMINES: AS BASES

1. a) (i) A Bronsted-Lowry base is a substance which combines with hydrogen ions.
(ii) A Lewis base is an electron pair donor
- b) The lone pair on the nitrogen atom in methylamine can combine with a hydrogen ion from, for example, a water molecule or an acid, and so is a Bronsted-Lowry base. That is also, of course, an example of electron pair donation from the nitrogen atom to the hydrogen ion, and so is also an example of it acting as a Lewis base. (See also Q2(i).)

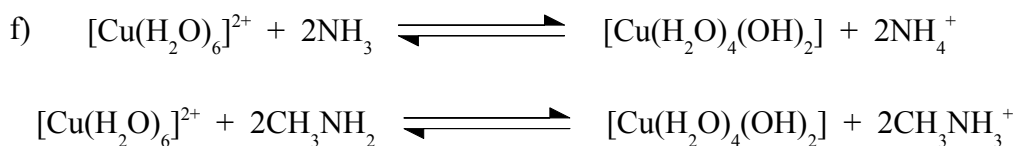


(If you include state symbols, everything will be (aq) except the water which is, of course, (l).)

- b) They are removing a hydrogen ion from a water molecule and combining with it.
- c) In both cases, you will get a cloud of white smoke produced from two colourless gases. (In the presence of moist air, the HCl will be seen as steamy fumes.)
- d) $\text{NH}_4^+ \text{Cl}^-$ and $\text{CH}_3\text{NH}_3^+ \text{Cl}^-$

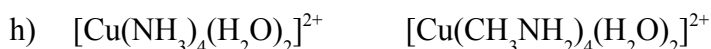
The essential detail is to show the ionic nature of the products. Make sure that you have got the right number of hydrogens on the nitrogen in the methylammonium chloride.

e) In both cases, adding a few drops of a colourless solution to a pale blue solution gives a pale blue precipitate.



(If you add state symbols, everything is (aq) except for the copper complexes formed which are (s).)

g) In both cases, you first get a pale blue precipitate which redissolves to give a deep blue solution.



i) They are acting as Lewis bases (electron pair donors), donating their lone pairs to form bonds with empty orbitals on the copper(II) ion.

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