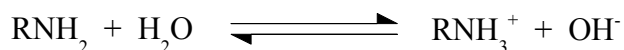


Chemguide – answers

AMIDES: OTHER REACTIONS

1. a) The nitrogen on the NH₂ group in both ammonia and ethylamine has an active lone pair which can pick up a hydrogen ion. For example in water:



where R is hydrogen or an ethyl group.

The reaction is reversible, and both of these are weak bases because the position of equilibrium lies well to the left.

- b) Although amides contain an NH₂ group, the lone pair isn't available to pick up a hydrogen ion. Instead, the lone pair gets involved in the pi bond between the carbon and oxygen atom, and becomes delocalised over the whole CONH₂ group. As well as making it less attractive to a hydrogen ion, the delocalisation also increases the stability of the molecule. If you add a hydrogen ion now, it means that you have to add energy to disrupt that stability.
2. a) Heat the CH₃CH₂CONH₂ with a mixture of bromine and sodium hydroxide solution (the Hofmann Degradation).
- b) React the CH₃CH₂CONH₂ with LiAlH₄ in solution in dry ether at room temperature, and then treat the product with a dilute acid such as dilute sulphuric acid or hydrochloric acid.
- c) Heat the CH₃CH₂CONH₂ with solid phosphorus(V) oxide, distilling off the CH₃CH₂CN.

(Some things you just have to learn!)