Solutions

Each answer shows the steps, then the **result**.

2.1

- ammonia (NH_3) in ethanol; heated under pressure

2.2

- nucleophilic substitution

3.1 B

- Excess ammonia stops the amine reacting further with the halogenoalkane

3.2 A

- The lone pair on the nitrogen of ammonia is the nucleophile

3.3

(a)

- $C_2H_5Br + NH_3 \rightarrow C_2H_5NH_2 + HBr$

(b)

- ammonia (a nucleophile) uses its lone pair to attack the $\delta+$ carbon and replaces the halogen — a substitution