



### Topic 17 Exercise 3 – amines

1.
  - a) Write an equation for the reaction of chloroethane with excess ammonia to form aminoethane and give a mechanism for the reaction.
  - b) If excess ammonia is not used, a variety of other organic products are formed. Write equations to show the formation of three other organic products.
  - c) Aminoethane can also be prepared by a reduction reaction. Identify a starting compound that can be used to prepare aminoethane by reduction, give the necessary reagent and write an equation for the reaction.
  - d) Suggest, with a reason, which of the methods used in a) and c) is likely to result in a higher yield of aminoethane.
  
2. Write equations for the following reactions, showing clearly the structure of the organic product:
  - a) bromomethane with excess ammonia
  - b) chloroethane with ammonia (1:1 ratio)
  - c) bromomethane with aminoethane (1:1 ratio)
  - d) 2-chloropropane with N-methylaminoethane (1:1 ratio)
  - e) bromoethane with N,N-diethylaminoethane (1:1 ratio)
  - f) chloromethane with ammonia (3:1 ratio)
  - g) propanenitrile with  $\text{LiAlH}_4$
  
3.
  - a) Draw the structure of tetradecylammonium chloride.
  - b) What type of compound is this this?
  - c) Suggest a use for this compound.
  
4.
  - a) Write equations for the following reactions:
    - i) ammonia with water
    - ii) aminoethane with water
  - b) Suggest, with a reason, which of the solutions in a) will have a higher pH.
  - c) Write equations for the following reactions:
    - i) aminoethane with HCl
    - ii) N-methylaminomethane with sulphuric acid
    - iii) N,N-dimethylaminoethane with HCl