

19 NITROGEN COMPOUNDS

19.1 Primary amines

Learning outcomes

Candidates should be able to:

1. Recall the reactions by which amines can be produced:

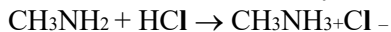
(a) reaction of a halogenoalkane with NH_3 in ethanol heated under pressure

Classification of amines will not be tested at AS Level.

Introduction

Preparation of amines by reaction of a halogenoalkane with NH_3 in ethanol heated under pressure (studied in halogenoalkanes)

1. Methylamine, CH_3NH_2 , has similar chemical properties to ammonia, NH_3 . Methylamine reacts with hydrogen chloride to form a white crystalline salt, methylammonium chloride.



A sample of methylammonium chloride is heated with aqueous sodium hydroxide.

What are the products?

- A** ammonia, sodium chloride and water
- B** ammonia, sodium hydrogencarbonate and sodium chloride
- C** methylamine, hydrogen chloride and water
- D** methylamine, sodium chloride and water

2. Butylamine can be produced by the reaction of butanenitrile with hydrogen in the presence of a suitable catalyst. Which volume of hydrogen, measured at room conditions, is required to react completely with 0.500 g of butanenitrile?
- A 145 cm³ B 174 cm³ C 289 cm³ D 348 cm³

19.2 Nitriles and hydroxynitriles

Learning outcomes

Candidates should be able to:

1. Recall the reactions by which nitriles can be produced:
(a) reaction of a halogenoalkane with KCN in ethanol and heat
2. recall the reactions by which hydroxynitriles can be produced:
(a) the reaction of aldehydes and ketones with HCN, KCN as catalyst, and heat
3. describe the hydrolysis of nitriles with dilute acid or dilute alkali followed by acidification to produce a carboxylic acid

Introduction

Production of nitriles by reaction of a halogenoalkane with KCN in ethanol and heat (studied in properties of halogenoalkanes)

Production of hydroxynitriles by the reaction of aldehydes and ketones with HCN, KCN as catalyst, and heat (studied in the properties of carbonyl compounds)

Hydrolysis of nitriles with dilute acid or dilute alkali followed by acidification to produce a carboxylic acid (studied in preparation of carboxylic acids)

***This is not a complete note. It is just to guide you. It is recommended to study prescribed textbooks along with this material. ***