Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Organic Synthesis

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

This question is about amines.

(a) Give an equation for the preparation of 1,6-diaminohexane by the reaction of 1,6-dibromohexane with an excess of ammonia.

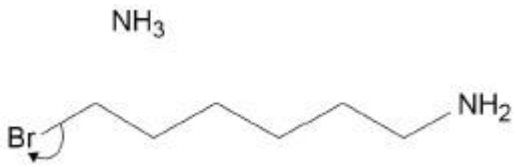
_____

(2)

(b) Complete the mechanism for the reaction of ammonia with 6-bromohexylamine to form 1,6-diaminohexane.

Suggest the structure of a cyclic secondary amine that can be formed as a by-product in this reaction.

Mechanism



Cyclic secondary amine

(4)

(c) 1,6-Diaminohexane can also be formed in a two-stage synthesis starting from 1,4-dibromobutane.
Suggest the reagent and a condition for each stage in this alternative synthesis.

Stage 1 reagent and condition

_____

Stage 2 reagent and condition

Downloaded from www.merit-minds.com

_____

(3)

(d) Explain why 3-aminopentane is a stronger base than ammonia.

_____

_____

_____

_____

_____

_____

(2)

(e) Justify the statement that there are no chiral centres in 3-aminopentane.

_____

_____

_____

(1)

(Total 12 marks)

Downloaded from www.merit-minds.com

Q2.

A two-step preparation of propylamine is shown.

bromoethane → **X** → propylamine

What is **X**?

A $CH_3CH_2CH_2NH_2$ ⬭

B CH_3CH_2CN ⬭

C $CH_3CH_2CH_2Br$ ⬭

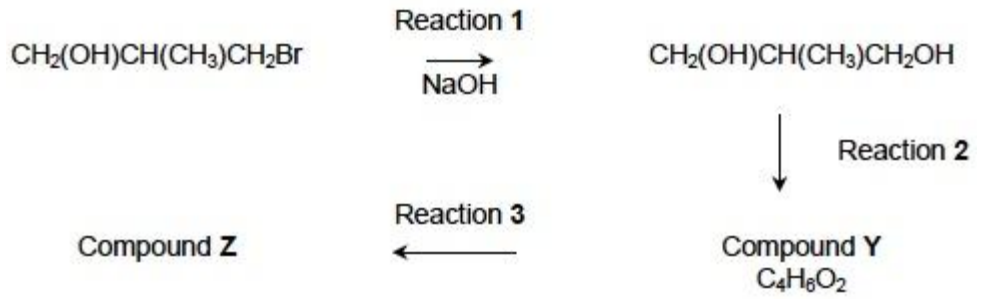
D $CH_3CH_2NH_2$ ⬭

(Total 1 mark)

Downloaded from www.merit-minds.com

Q3.

Halogenoalkanes are useful compounds in synthesis. A reaction pathway is shown.



(a) Give the IUPAC name for $CH_2(OH)CH(CH_3)CH_2Br$

_____

(1)

(b) Reaction **1** occurs via a nucleophilic substitution mechanism.

Explain why the halogenoalkane is attacked by the nucleophile in this reaction.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(3)

(c) The infrared spectrum of Compound **Y** shows a significant absorption in the range 1680–1750 cm^{-1}

Draw the displayed formula of Compound **Y**.

Downloaded from www.merit-minds.com

(1)

(d) Compound **Z** has the empirical formula C_3H_4NO

Give the structure of Compound **Z**.

Suggest the reagent for Reaction **3**.

Structure

Reagent for Reaction **3** _____

(2)

(Total 7 marks)

Downloaded from www.merit-minds.com