

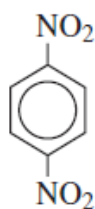
F324 Synoptic HW3

- (a) Give reagents and conditions and write equations to show the formation of nitrobenzene from benzene.

Name and outline a mechanism for this reaction of benzene.

(8 marks)

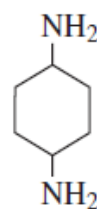
- (b) Compounds X, Y and Z are shown below.



X



Y



Z

Name X and give reagents for the conversion of X into Y. Write an equation for this reaction using [H] to represent the reductant.

Explain why Y is a weaker base than Z.

(6 marks)

- (c) Draw the repeating unit of the polymer formed by the reaction of Y with hexanedioic acid.

(2 marks)

Part 2

- (a) Amide R, CH₃CH₂CONHCH₃, can be formed by the reaction of CH₃CH₂COCl with CH₃NH₂

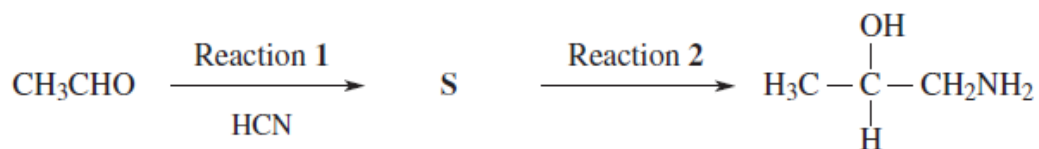
- (i) R can also be formed by the reaction of an acid anhydride with CH₃NH₂

Draw the structure of this acid anhydride.

- (ii) In the mass spectrometer, fragmentation of the molecular ion of CH₃CH₂CONHCH₃ produces a peak with $m/z = 57$. Write an equation for this fragmentation.

(4 marks)

- (b) Consider the following reaction sequence.



Name the mechanism for Reaction 1 and deduce the structure of compound S.

Give the reagents and name the type of reaction occurring in Reaction 2.

(4 marks)