

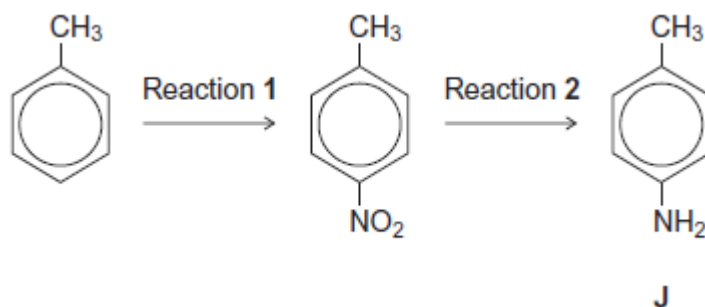
Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Q1.

Consider the following reaction sequence starting from methylbenzene.



- (a) Name the type of mechanism for reaction 1.

(1)

- (b) Compound J is formed by reduction in reaction 2.

- (i) Give a reducing agent for this reaction.

(1)

- (ii) Write an equation for this reaction. Use [H] to represent the reducing agent.

(1)

- (iii) Give a use for J.

(1)

- (c) Outline a mechanism for the reaction of bromomethane with an excess of compound J. You should represent J as RNH₂ in the mechanism.

(4)

- (d) Compound **K** ($\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$) is a structural isomer of **J**.

Explain why **J** is a weaker base than **K**.

(3)

(Total 11 marks)

Q2.

Trifluoromethane (CHF_3) can be used to make the refrigerant chlorotrifluoromethane(CClF_3).

- (a) Chlorotrifluoromethane is formed when trifluoromethane reacts with chlorine.



The reaction is a free-radical substitution reaction similar to the reaction of methane with chlorine.

- (i) Write an equation for each of the following steps in the mechanism for the reaction of CHF_3 with Cl_2

Initiation step

First propagation step

Second propagation step

Termination step to form hexafluoroethane

(4)

- (ii) Give **one** essential condition for this reaction.

(1)

- (b) In some refrigeration systems, CHF_3 has replaced CClF_3 because of concerns about ozone depletion.

- (i) Identify the species formed from CClF_3 that is responsible for the catalytic decomposition of ozone in the upper atmosphere.

(1)

- (ii) Write an overall equation to represent the decomposition of ozone into oxygen.

(1)

(Total 7 marks)