Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Carboxylic Acids & Derivatives

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Name of the Student:_____
Max. Marks : 25 Marks **Time : 25 Minutes**

Q1.

(a) Name the compound $(CH_3)_2NH$

_____

(1)

(b) $(CH_3)_2NH$ can be formed by the reaction of an excess of CH_3NH_2 with CH_3Br. Name and outline a mechanism for this reaction.

Name of mechanism _____

Mechanism

(5)

(c) Name the type of compound produced when a large excess of CH_3Br reacts with CH_3NH_2 Give a use for this type of compound.

Type of compound _____

Use _____

(2)

(d) Draw the structures of the two compounds formed in the reaction of CH_3NH_2 with ethanoic anhydride.

(2)
(Total 10 marks)

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Q2.

(a) Compound **A**, $HCOOCH_2CH_2CH_3$, is an ester. Name this ester and write an equation for its reaction with aqueous sodium hydroxide.

Name _____

Equation _____

(2)

(b) The initial rate of reaction between ester **A** and aqueous sodium hydroxide was measured in a series of experiments at a constant temperature. The data obtained are shown below.

Experiment	Initial concentration of NaOH / mol dm^{-3}	Initial concentration of **A** / mol dm^{-3}	Initial rate / mol dm^{-3} s^{-1}
1	0.040	0.030	4.0×10^{-4}
2	0.040	0.045	6.0×10^{-4}
3	0.060	0.045	9.0×10^{-4}
4	0.120	0.060	to be calculated

Use the data in the table to deduce the order of reaction with respect to **A** and the order of reaction with respect to NaOH. Hence calculate the initial rate of reaction in Experiment 4.

*Order with respect to **A*** _____

Order with respect to NaOH _____

Initial rate in Experiment 4 _____

_____

(3)

(c) In a further experiment at a different temperature, the initial rate of reaction was found to be 9.0×10^{-3} mol dm^{-3} s^{-1} when the initial concentration of **A** was 0.020 mol dm^{-3} and the initial concentration of NaOH was 2.00 mol dm^{-3}.
Under these new conditions with the much higher concentration of sodium hydroxide, the reaction is first order with respect to **A** and appears to be zero order with respect to sodium hydroxide.

(i) Write a rate equation for the reaction under these new conditions.

_____

(ii) Calculate a value for the rate constant under these new conditions and state its units.

Calculation _____

_____

_____

Units _____

(iii) Suggest why the order of reaction with respect to sodium hydroxide appears to be zero

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under these new conditions.

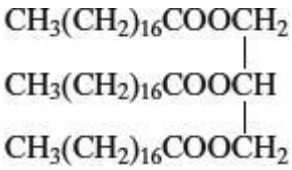
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_____

_____

(6)

(d) A naturally-occurring triester, shown below, was heated under reflux with an excess of aqueous sodium hydroxide and the mixture produced was then distilled. One of the products distilled off and the other was left in the distillation flask.



(i) Draw the structure of the product distilled off and give its name.

Structure

Name _____

(ii) Give the formula of the product left in the distillation flask and give a use for it.

Formula _____

Use _____

(4)

(Total 15 marks)

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