Subject: Organic chemistry 3 **Time: 1 Hr.**

Date: 6 /11 / 2023

الأسم الثلاثي:

Question 1: **Give structures and names of the main products for each of the following reactions[10 mark]**

1- Benzoyl chloride +phenol ⟶

2- Benzoic acid + $NaHCO_3$ ⟶

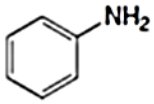
3- Succinic acid $\xrightarrow{\textbf{heat}}$

4- Acetic acid n + Cl_2 $\xrightarrow{\textbf{P}}$

5- succinic anhydride + $2NH_3$ ⟶ $\xrightarrow{\textbf{H+}}$

Question 2 :

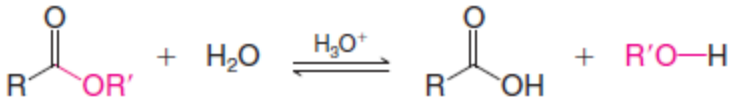
A- Outline all steps to synthesis the following compounds using any needed reagents

1- 

From toluene.

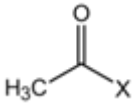
2- Benzoic acid from Bromobenzene

Question 3 Write possible mechanism for the following reactions: [10 marks]

1- 

Question 4: Circle the correct answer in each of the following [10 marks]

1) In the compound below, which of the following substituents replacing X would result in the most reactive compound?



a) NH(CH3)2 b) Cl c) OCH3 d) OCOCH3

2) N-Substituted amide results from reaction of acid chloride with?

a) Ethanol b) primary amine c) RMgBr d) ammonia

3) What is the common name of the molecule shown below?

HCOOH

a) Acetic acid b) propionic acid c) Formic acid d) acetaldehyde

4) Benzoyl chloride is prepared from benzoic acid by:

a) Cl2, hv b) SO2Cl2 c) SOCl2 d) Cl2,H2O

5) The first four members of carboxylic acid are completely soluble in water. This is due to

a) Acidic nature b) H – bonding c) Polymerization d) Reduction

Subject: Organic chemistry 3 **Time: 1 Hr.**
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الأسم الثلاثي:

Question 1: **Give structures and names of the main products for each of the following reactions[10 mark]**

1- Benzamide + H_2SO_4 + H_2O ⟶

2- *p*-Toluic acid + $NaHCO_3$ ⟶

3- Phthalic anhydride + CH_3CH_2OH ⟶

4- Ethylacetate + $2CH_3MgBr$ ⟶

5- Acetic acid + NH_3 ⟶

Question 2 : [10 mark]

A- Outline all steps to synthesis the following compounds using any needed reagents

1- Phenyl acetic acid from Benzyl chloride.

2- p-Toluic acid from benzene

B- Arrange the following compounds in order of Acidity:

p- Cyano benzoic acid, p-nitrobenzoic acid, p-methoxy benzoic acid, Benzoic acid

Question 3 **Write possible mechanism for the following reactions: [10 marks]**

1- $CH_3COOCH_3 + H_2O.\ OH^- \longrightarrow CH_3COO^- + CH_3OH$

Question 4: Circle the correct answer in each of the following [10 marks]

1) Which one of the following will increase the acidity of Benzoic acid?

a) CH 3 **b) NO_2** **c) CN** **d)Both b & c**

2) Reaction of Acyl chlorides with primary amines will give?

a) Esters **b) Amides** **c) Aldehydes** **d) Anhydride**

3) The relative reactivities of carboxylic acid derivatives towards nucleophilic substitution are in the order of ?

a) Acyl chloride > acid anhydride > ester > amide **b) Ester > acyl chloride > amide > acid anhydride**
c) Acid anhydride > amide > ester > acyl chloride **d) none of these**

4) What is the common name of the molecule shown below?

$COOHCH_2CH_2COOH$

a) Oxalic acid **b) maleic acid** **c) adipic acid** **d) succinic acid**

5) Acetyl chloride is formed by the reaction of CH_3COOH with

a) $SOCl_2$ **b) NH_3** **c) Alcohol** **d) NaOH**

Mustansiriyah University | First semester | Subject: Organic Chemistry
College of Science | 2022-2023 | Class: third class
Chemistry Department | | Time: 1 hour

Q1: Give the structures of the products for the following reactions. [15 marks]

1- *p*-toluidine + acetic anhydride $\xrightarrow{\text{pyridine}}$

2- Acetone + NH_3 $\xrightarrow{H_2/Ni}$

3- Acetaldehyde + dimethylamine + H2, Ni $\longrightarrow$

4- Aniline + Br_2.eq $\longrightarrow$

5- Benzene diazonium chloride + phenol $\xrightarrow{10\%\ NaOH}$

6- N,N-dimethyl aniline + $NaNO_2$/HCl $\longrightarrow$

7- Trimethyl-n-propyl ammonium hydroxide $\xrightarrow{\text{heat}}$

8- p-Nitroaniline + HCl, Sn heat $\longrightarrow$

9-CH_3COCl + NaN_3 $\xrightarrow{\text{heat}}$

Q3: A/ Arrange the following compounds in order of Basicity(draw structures) [4 marks]

Aniline , *P*-nitroaniline , *p*-chloroaniline , *p*-toluidine , 2,4-dinitroaniline

B/ Write possible mechanism for the following reaction (Hofmann Rearrangements) [6 marks]

CH_3CONH_2 + NaOH/Br_2 $\xrightarrow{H_2O}$?

Q3: Outline all steps to synthesis the following compounds from the indicated starting material [15 marks]

1- **Iodo benzene from benzene**

2- **phenol from benzene**

3- ***p*-toluic acid from toluene**

5-Benzanalide from benzene