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DEPARTMENT: NURSING

COURSE CODE: CHM102

COURSE TITLE: GENERAL CHEMISTRY 102

LEVEL: 100 Level

1. The IUPAC names of the compound

* HCOOH ------ Methanoic acid
* ------- Pentan-1, 5-dioic acid
* ------ Butanoic acid
* ------- Ethanedioic acid
* ------ Hexanoic acid
* ---------- Hex-4-ene oic acid

1. The discussion of the physical properties of carboxylic acid

* Physical appearance: The simple aliphatic carboxylic acid up are liquids at room temperature and most others are solid at room temperature although anhydrous carboxylic acid (Acetic acid) also known as glacial ethanoic acid freeze below room temperature.
* Boiling point: Aliphatic carboxylic acid have high boiling point which increase with the relative molecular mass. The aromatic carboxylic acid have high melting point than aliphatic counterparts of comparable relative molecular mass and the aromatic are crystalline solids.
* Solubility: the carboxylic acids lower molecular mass with up to four carbon atoms in their molecules are soluble in water because of the ability to form hydrogen bond with water molecules. And also the solubility decrease as the relative molecular mass increase due to more of hydrocarbon in nature and they are covalent. All carboxylic acids are soluble in organic solvents.

1. The industrial preparation of carboxylic acids

* From ethanol: Ethanoic acid is obtained by the liquid phase of air oxidation of 5% solution of ethanal to ethanoic acid using manganite (ii) ethanoate catalyst.

Dilute

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* From Carbon (ii) oxide: Methanoic (formic acid) acid can be form from carbon (ii) oxide under pressure of hot aqueous solution of sodium hydroxide. The free carboxylic is liberated by careful reaction with tetraoxosulphate(vi) acid )

NaOH

CO-------------🡪HCOONa-----------🡪 HCOOH + NaHS

1. The synthetic preparation of carboxylic acid.

* Oxidation of primary alcohol and aldehydes: the oxidation of alchols and aldehydes can be used to prepare carboxylic acids using the usual oxidizing agents in acidic solution.

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* Carbonation of Grignard reagent : the aliphatic carboxylic acids are obtained by bubbling carbon(iv)oxide into Grignard reagent and then hydrolyzed with dilute acid

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In the preparation of benzoic acid, the reagent is added to solid carbon (iv) oxide (dry ice) which also serves as coolant to the reaction mixture.

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* Hydrolysis of nitriles (cyanides) or esters.

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(R=Alkyl or aryl radical)

Reflux

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Reflux

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1. The chemical reaction using only chemical equation

* Reduction to primary alcohol.

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* Decarboxylation:

fuse

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Kolbe Synthesis

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* Esterification: