



# SHIKSHA CLASSES

Subject : Chemistry

BOARD ANSWER PAPER

Total Marks : 20

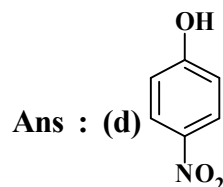
Class : XII

Topic: 11. Alcohols, Phenols and Ethers

## Section (A)

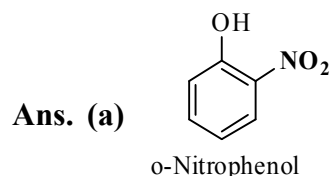
**Q.1 : a) Select and write the most appropriate answer from given alternatives in each sub-question [5]**

**i) Which of the following compound is more acidic?**

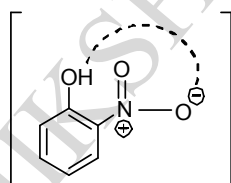


when electron withdrawing group is attached to aromatic nucleus, which increase the acidity of compound.

**ii) Which of the following is major product for the nitration of phenol?**



o-Nitrophenol is major this is due to presence of intramolecular hydrogen bonding between - hydroxy and nitro group as.



Intramolecular hydrogen bonding

The more electronegative nature of oxygen atom which bonded to less electronegative hydrogen atom.

Thus, presence of intramolecular hydrogen bonding.

**iii) The general molecular formula of Alcohol is**

**Ans : b)  $C_nH_{2n+1}OH$**

**iv) What is bond angle of ether (R-OR)?**

**Ans : c)  $110^\circ$**

**v) Anisole on heating with concentrated HI gives**

**Ans : c) Phenol + Iodomethane**

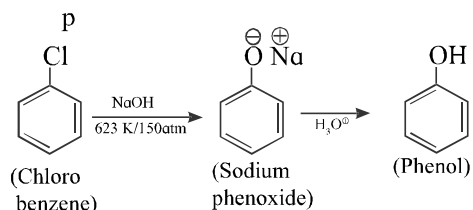
**Q.1. (b): Very short answer type Question [2]**

**i) What are phenols or Aromatic hydroxy Compound?**

**Ans. :** "When hydroxyl  $-(OH)$  group is directly attached to the Aromatic carbon atom is known as phenol or Aromatic hydroxy Compound.

**ii) Write the preparation of Phenol by Dow process?**

**Ans. :** Chlorobenzene is fused with NaOH at high temperature and pressure (623K and 150atm) followed by treatment with dilute HCl to obtain phenol.



## Section (B)

**Q.2 : Answer the following question. (Any three) [6]**

**i) Give the classification of Mono-hydroxy compound.**

**Ans. : Monhydroxy compound.**

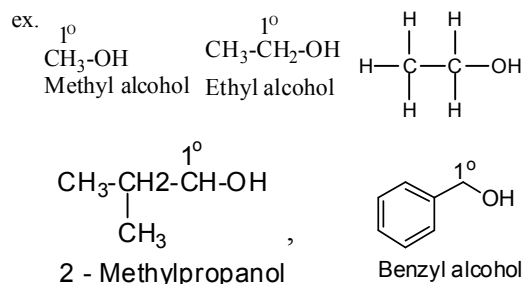
“The one hydroxyl group is present in hydrocarbon is known as monhydric/ monhydroxy compound.”

**Classification :**

The monhydroxy / monhydric alcohol is classified on the basis of carbon atom.

**i) Primary alcohol :**

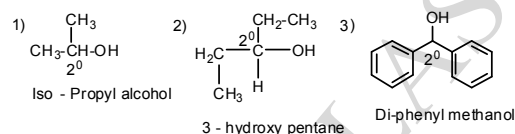
“The hydroxyl group is attached to the primary carbon atom or single carbon atom which is next to the only one alkyl group is known as primary alcohol.”



**ii) Secondary Alcohol :**

The hydroxyl group is attached to secondary carbon atom which is next to two alkyl or two carbon atoms is known as secondary Alcohol.

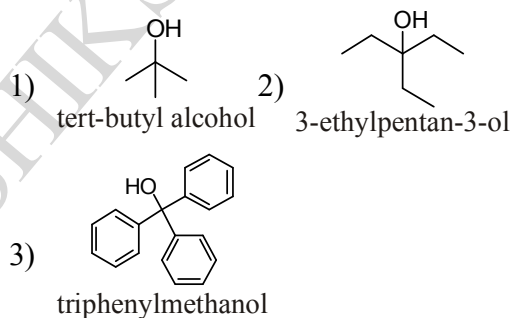
Ex.



**iii) Teritary Alcohol (3<sup>o</sup>)**

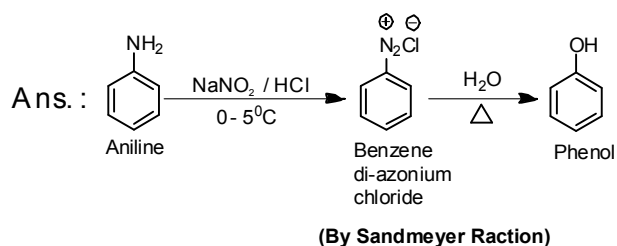
“The hydroxyl group is attached to the 3<sup>o</sup>- carbon atom that carbon atom which is next to three alkyl group ex three carbon atom is known as “Tert. alcohol”.

Ex. of tert. alcohol / 3<sup>o</sup> alcohol



**ii) Give the method of preparation of phenol**

**from aniline.**



When Aniline (primary amine) is reacted with diazotization mixture at 0-5<sup>o</sup>C formed BDC which is heated with water molecule obtained phenol.

**iii) Write the uses of Alcohol & ethers.**

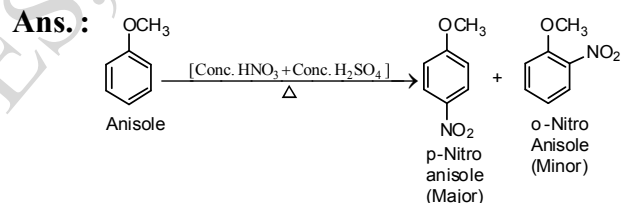
Ans.: Alcohols : i) Methyl alcohol is used as a solvent for paints and varnishes.

ii) Ethyl alcohol is used as a antifreeze agent in automobile radiator it is also used as a solvent.

Ethers : i) Diethyl ether was used as a genral anaesthetic in surgical operations.

ii) Diethyl ether is used as a solvent for Grignard reagent, fats, wates, oil etc.

**iv) Give the nitration reaction of Anisole.**



When Anisole (Methoxy benzene) is heated with nitrating mixture to give P-nitro anisole and ortho-nitro anisole.

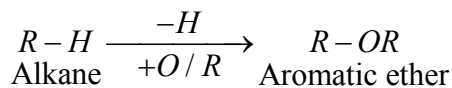
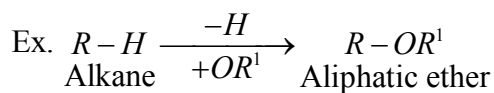
Here p-Nitroanisole is major this is due to absence of steric crowding between the methoxy and nitro group.

**Section (C)**

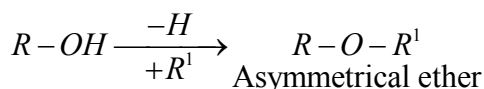
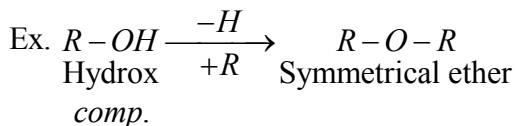
**Q.3 : Answer the following question (Any one) [3]**

**i) What are Ether? Give method of preparation of ether by Williamson's Synthesis.**

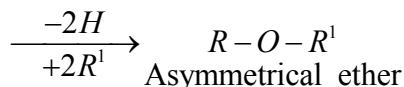
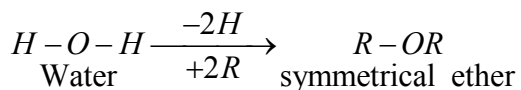
Ans : 1) “The hydrocarbon in which replacement of hydrogen atom by an alkoxy (-OR) or aryloxy (-OAr) group is known as ether.”



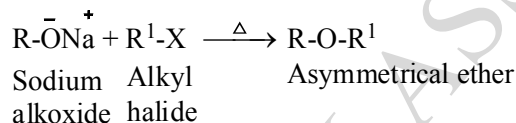
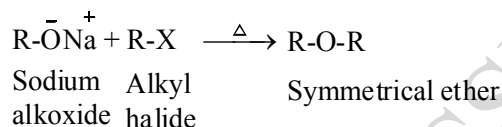
2) "The hydroxy derivative of hydrocarbon in which replacement of hydrogen atom by alkyl or aryl group is known as ether."



3) "Replacement of two hydrogen atom by two alkyl aryl group in water molecule is known as Ether".



#### Methods preparation of ether :



When sodium alkoxide is heated with alkyl halide to obtained ether (symmetrical / asymmetrical ether) such types of reaction is known as Williamson's synthesis.

#### ii) Give any two electrophilic substitution reaction of Phenol

Ans. : 1) Nitration Reaction of phenol :

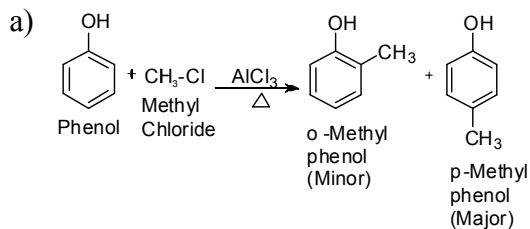


When phenol is heated with nitration mixture (Conc. HNO<sub>3</sub> & Conc. H<sub>2</sub>SO<sub>4</sub>) to obtain p-nitro phenol and ortho-nitrophenol.

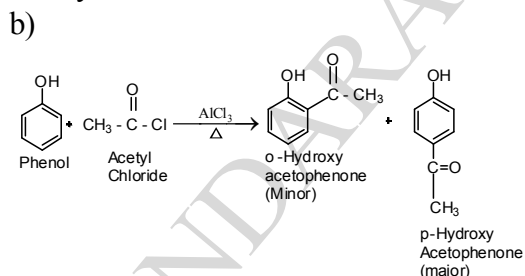
o-Nitrophenol is major due to presence of

Intramolecular hydrogen bonding.

#### ii) Friedal Craft Reaction of phenol :-



∴ a) Methylation of phenol is Friedal Craft + alkylation reaction.



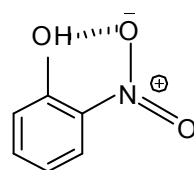
b) Acylation of phenol using acetylchloride and Lewis acid (AlCl<sub>3</sub>) to p-hydroxy and o-hydroxy acetophenone such types of reaction is known as Friedal Craft acylation reaction.

#### Section (D)

Q.4 : Answer the following question (Any one) [4]

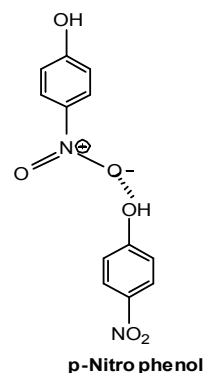
#### i) Explain Hydrogen bonding in ortho and para nitrophenol.

Ans : Hydrogen bonding :



O-Nitro Phenol

"The bonding between more electronegative & less electronegative atom is Hydrogen bonding".



There are two types of hydrogen bonding.

- I) Intramolecular Hydrogen bonding.
- II) Intermolecular Hydrogen bonding.

**I) Intramolecular Hydrogen bonding (IHB) :** The hydrogen bonding between within or single molecule. Having less

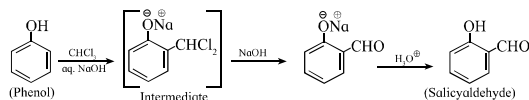
melting and boiling point ex. (I)

**II) Intermolecular Hydrogen bonding :** The hydrogen bonding between two molecule

ex. Having more melting and boiling point

**ii) Explain Reimer Tiemann Reaction its example.**

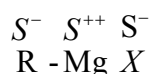
**Ans : Reimer-Tiemann Reaction :** When phenol is treated with chloroform in aqueous sodium hydroxide solution followed by hydrolysis with acid, salicylaldehyde is formed. This reaction is known as Reimer-Tiemann reaction.



OR

**iii) Explain and use of Grignard Reaction.**

**Ans. :** The alkyl magnesium Halide is known as GRIGNARD REAGENT which is discovered by scientist "Victor Grignard" in 1808.

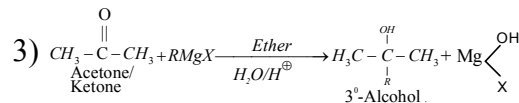
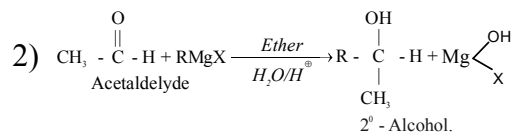
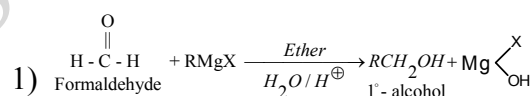


where;



**Use of Grignard reaction :**

The grignard reagent is used for the preparation of alcohol from carbonyl compound as :



- When formaldehyde is reacted with Grignard reagent to form 1°-alcohol.
- Secondary alcohol is formed by reacting of Acetaldehyde with Grignard reagent, while 3°-alcohol is obtained by reacting of Acetone with Grignard reagent.

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