**Upper sixth**

Chemistry note; organic chemistry

**Summary note on the laboratory preparation of all the homologous series**

1.laboratory preparation of alkanes

**A. FROM HALOGENATION OF ALKENES AND ALKYNES**

* CH2= CH2 + H2 Pt/Ni cat CH3CH3

**B. from wurtz reagents**

* SS 2CH3I + 2 Na Dry ether CH3CH3 2NaI

**C.FROM GRIGNARD REAGENT**

* CH3MgBr + H2O/HCL CH4 +Mg**(OH)Br**

**D.FROM SODIUM SALT OF CARBOXYLIC ACID**

* **CH3COONa + NaOH CH4 +Na2CO3**

**E.FROM REDUCTION OF CARBONYL (clemensens reaction)¨**

* **CH3CHO + Zn/concHCL/ REFLUX** CH3CH3

**F.FROM REDUCTION OF HALOGENOALKANES**

* 2CH2I + 2(H) Zn\_/\_CU/ALCO CH3CH3 + 2HI

2. LABORATORY PREPARATION OF ALKENES

**A. FROM HYDROGENATION OF ALKYNE**

* C2H2 +3H2 Pt/Ni CAT CH2=CH2

**B. FROM DEHYDRATION OF ALCOHOL**

* CH3CH2OH EXCESS H2SO4/170°C CH2=CH2 + H2O
* CH3CH2OH AL2O3/350°C CH2=CH2 + H2O

**C. FROM HALOALKANE**

* CH3CH2CL NaOH/ALCO/350°C CH2=CH2 + HCL

3.LABORATORY PREPARATION OF ALKYNES

**A. FROM CALCIUM DICARBIDE BY HYDROLYSIS**

* CaC2 + H2O Ca(OH)2 + C2H2

**B. FROM DIHALOGENOALKANE**

* CH3CHBrCH2CH2Br 2KOH/ALCO/REFLUX C4H6
* HC2HNa +CH3I C3H4 + NaI

4.LABORARORY PREPARATION OF HALOGENOALKANE

**A. FROM ALCOHOL**

* CH3CH2CH2OH + HCL ZnCLcat/REFLUX CH3CH2CH2CL + H2O
* CH3CH2CH2OH + KBr concH2SO4/REFLUX CH3CH2Br + H2O
* CH3CH2CH2OH + I/Red P/REFLUX CH3CH2CH2I H3PO3
* CH3CH2HC2OH + PCL5 CH3CH2CH2CL + POCL3 + HCL
* CH3CH2CH2OH + SOCL2 REFLUX CH3CH2CH2CL + SO2 + HCL

**B.ADDITION OF HYDROGEN HALIDE TO ALKENES**

* CH2=CH2 + HBr CH3CH2Br
* CH2=CH2 + HCL CH3CH2CL

5.LABORATORY PREPARATION OF HALOARENES

1. **FROM DIAZONIUM SALT (SANMEYER REACTION )**
* C6H5NH2 NaNO2/dilHCL at 0°C C2H5N2CL CUBr/100°C C6H5Br + N2

B. **DIRECT HALOGENATION**

* C6H6 + CL2 ALCL3 C6H5CL

6.LABORATORY PREPARATION OF BENZENE

**A. FROM ALKYNES**

* 2C2H2 CU/350°C C6H6

**B.FROM PHENOL**

* C6H5OH + Zndust cat C6H6 ZnO
1. **FROM DIAZONIUM SALT**
* C6H5NH2 NaNO2/dil HCL/0-5°C C6H5N2CL H3PO2 C6H6

6 .LABORATORY PREPARATION OF METHYBENZENE

1. **FROM BENZEN (friede craft alkylation)**
* C6H6 + CH3CL ALCL3/REFLUX C6H5CH3 + HCL
* **FROM FITTING REAGENT**
* C6H6 + CH3Br + 2Na dry ether C6H5CH3 + NaBr

7.LABORATORY PREPARATION OF ALCOHOLS

**A. HYDROLYSIS OF HALOALKANE**

* CH3CH2CL NaOH(aq) OR KOH (aq)/ REFLUX CH3CH2OH
* CH3CH2I + Ag2O H2O/REFLUX CH3CH2OH + AgI
* **B.GRIGNARD SYSTHESIS (reduction of carbonyl compounds )**
* CHO + CH3MgI dry ether CH3 CH2OMgI H2O/dilHCH CH3CH2OH +Mg(OH)I
* CH3COCH3 + CHMgI ETHER CH3Ch(CH3)OMgI H2O/dilHCL CH3CH(CH3)OH + Mg(OH)I

**OR FROM DIRECT REDUCTION OF CARBONYL**

* CH3CHO LiALH4/dry ether CH3CH2OH
* CH3COCH3 LiALH4/dry ether CH3CH (OH)CH3

C.**REDUCTION OF CARBOXYLIC ACID**

* CH3COOH LiALH4dry ether CH3CH2OH
* CH3COOCH3 LiALH4/ dry ether CH3CH2OH CH30H

D.**HYDRATION OF ALKENES**

* CH2=CH2 concH2SO4 /H2O CH3CH2OH
* CH2=CH2 H3PO4/H2O at 300°C CH3CH2OH

**E.NITRIOUS ACID ON AMINES**

* CH3NH2 + HNO2 0°C CH3OH + H2O + N2

**F.FROM HYDROBORATION (B2H6)**

* CH3CH =CH2 B2H6/H2O2 CH3CH2CH2OH

II.LABORATORY PREPARATION OF PHENOL

**A.FROM HYDROLYSIS OF DIAZONIUM SALT**

* C6H5N2CL H2O/50°C C6H5OH + HCL

**B. FROM ALKALI FUSSION OF BENZENASULPHONIC ACID**

* C6H5SO3Na NaOH(aq)/300-350°C C6H5ONa CO2/H2O C6H5OH + Na2CO3
1. **FROM CHLOROBENZENE**
* C6H5CL NaOH/360 at 150atm C6H5Ona CO2/H2O C6H5OH + Na2CO3

III.LABORATORY PREPARATION OF ETHERS

**A. FROM DEHYDRATION OF ALCOHOLS**

* 2CH3CH2OH ConcH2SO4/140°C CH3CH2-O-CH2 CH3 + H2O
* 2CH3CH2OH AL2O3/250°C CH3CH2-O-CH2CH3 + H2O

**B. FROM WILLIAMSONS SYSTHESIS**

* CH3CONa CH3I RELUX CH3CH2-O-CH3
* C6H5OH + (CH3)2SO4 NaOH/HEAT C6H5OCH3 +CH3NaSO4

**C. HALOALKANE IN SILVER OXIDES**

* 2CH3CH2CH2Br + Ag2O warm CH3CH2-O-CH2CH3 + AgBr
* CH2=CH2 + O2 Ag/at 200°C CH2-O-CH2