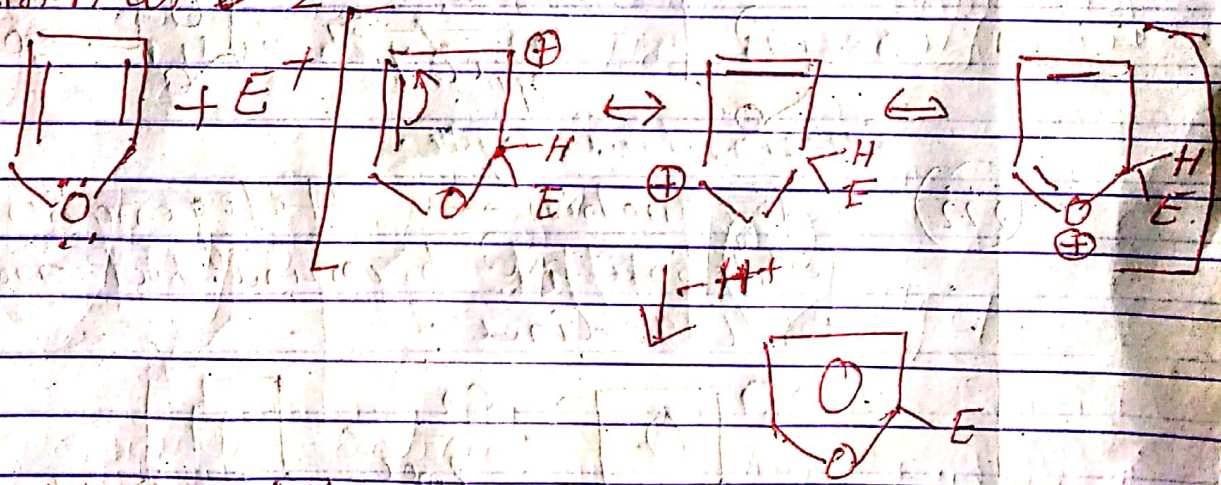


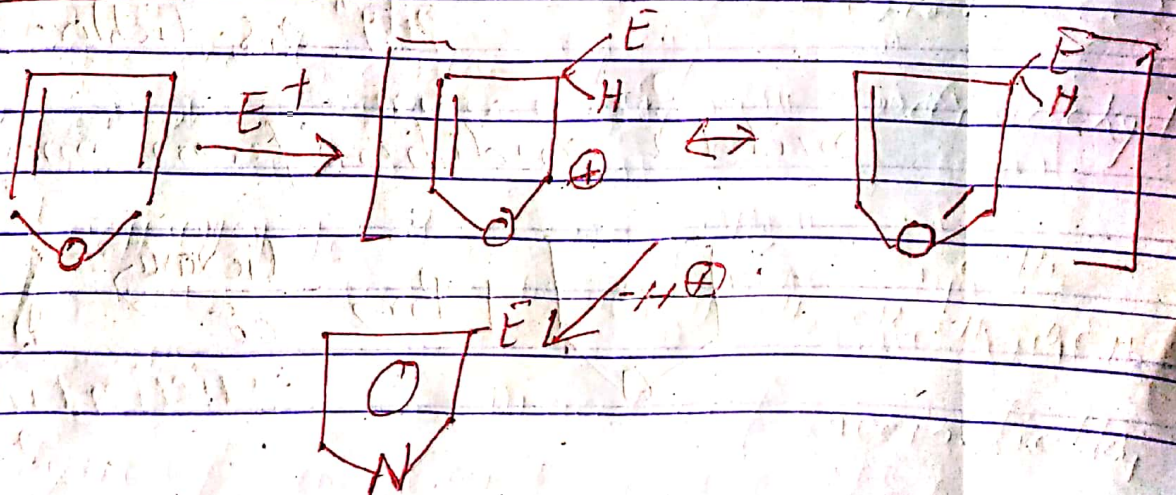
# B.Sc. III - Paper VII

## Chemical reaction of Furan

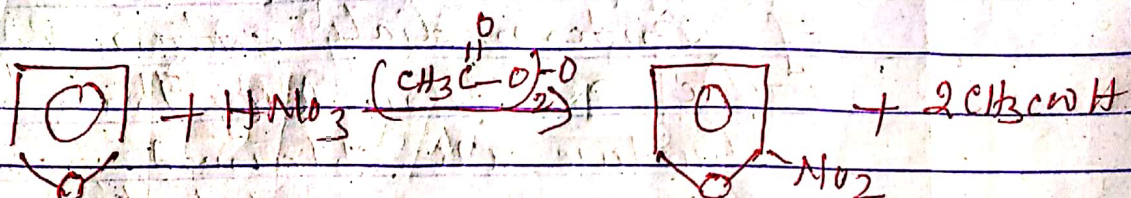
(1) Electrophilic substitution :- Furan undergoes electrophilic substitution reaction at C-2 position. This is due to high stability of intermediate cation formed in the reaction. ~~only~~ Three resonance structures are obtained from attack of  $E^+$  at carbon C-2 while two resonance intermediate is obtained at attack C-3. Therefore electrophilic substitution is performed at C-2 and when both C-2 position is blocked then electrophilic substitution can be performed at C-3 position at C-2.



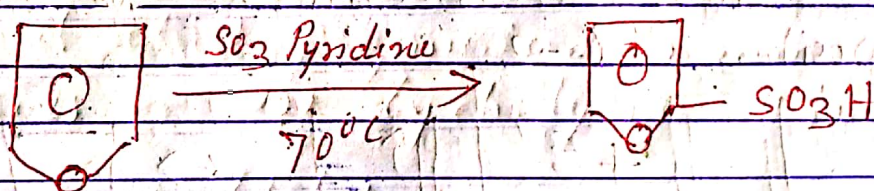
### Position-3 (C-3)



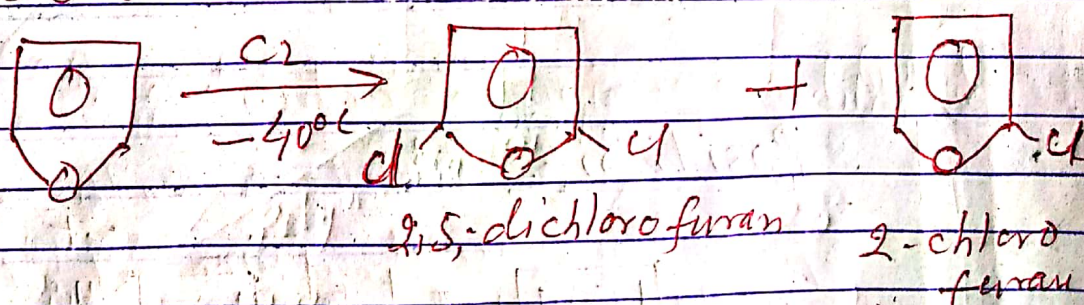
(i) Nitration - Nitration of Furan occurs with hot nitric acid in presence of acetic anhydride to form 2-nitro furan.



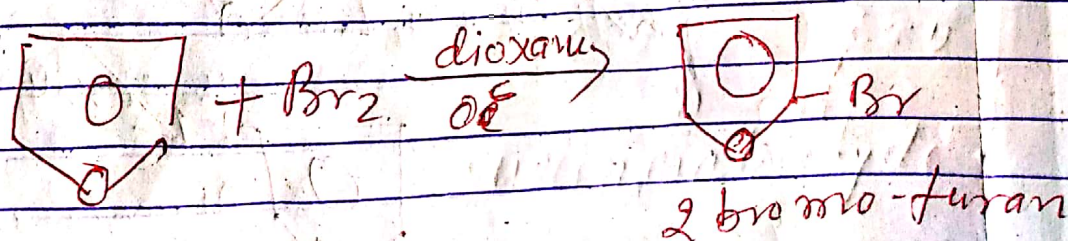
(ii) Sulphonation - Sulphonation is done with sulphur trioxide in presence of pyridine at 70°C to form ~~2~~ furan-2-sulphonic acid.



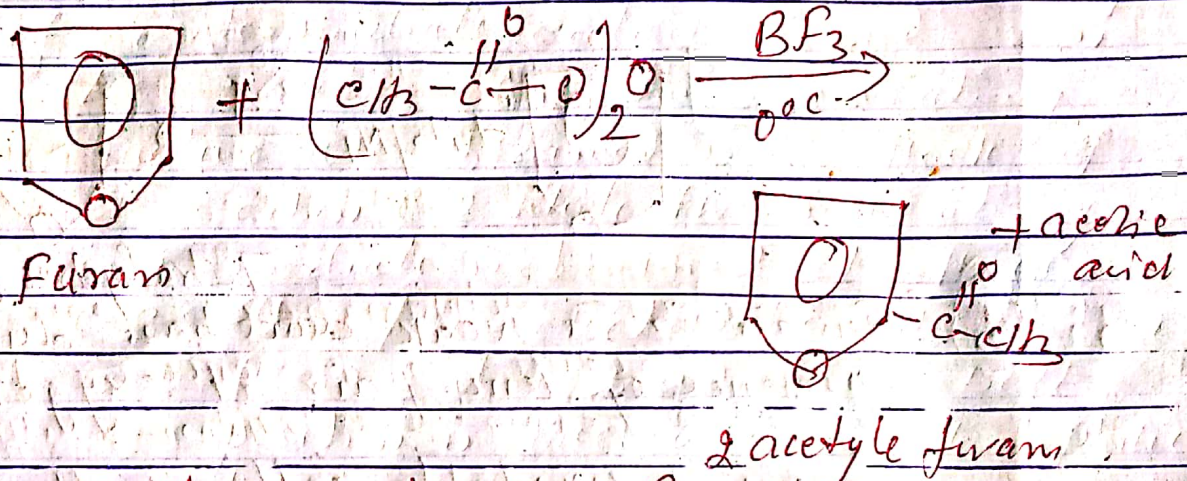
(iii) Halogenation - Halogenation occurs with chlorine and bromine but no reaction is with iodine.



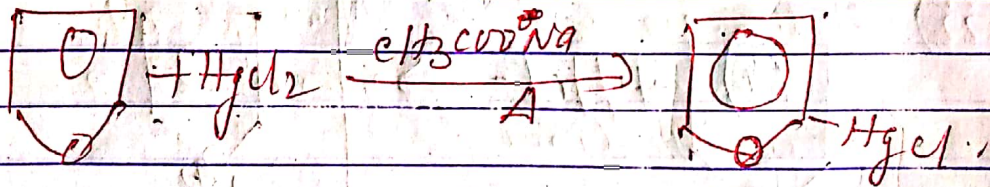
under conditions forms monoderivative.



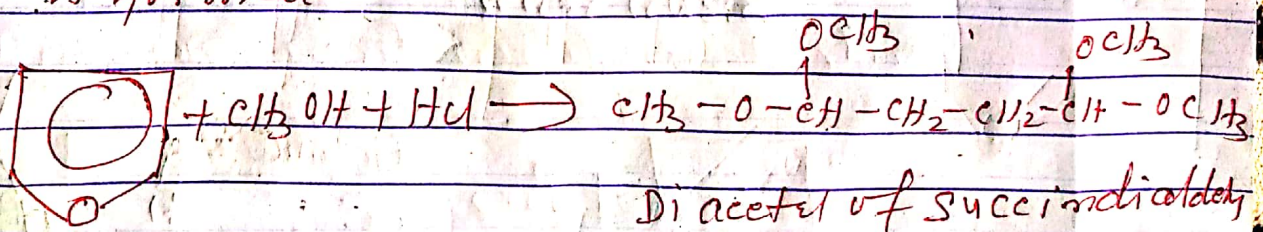
(iv) Acylation — In presence of  $\text{BF}_3$  or  $\text{SnCl}_4$  at  $0^\circ\text{C}$  with acetic anhydride forms 2-acetyl furan.



(v) ~~Mercuric~~ Mercuration — Furan goes to mercuration on heating with mercuric chloride to form 2-chloromercurifuran.

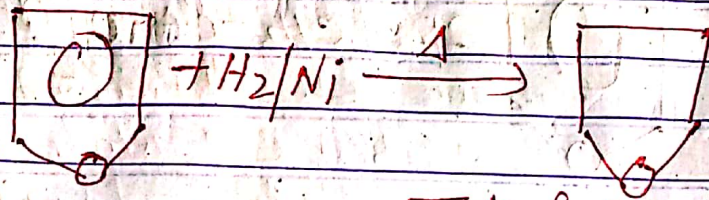


(2) Ring-opening reaction: — When furan is treated with methanol and hydrochloric acid, diacetal of succinaldehyde is formed.



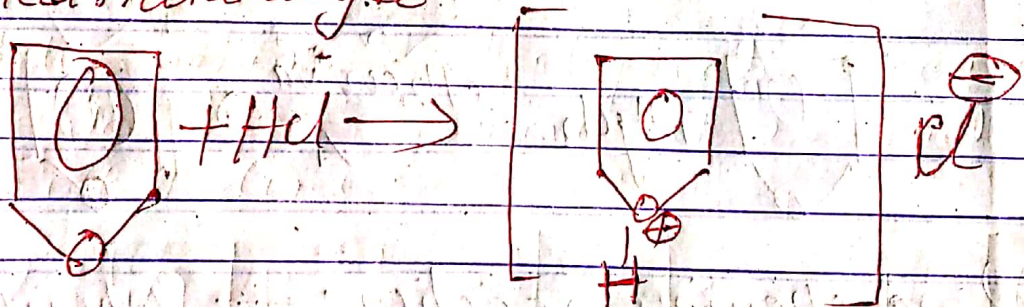
Diacetal of succinaldehyde  
Hydrolysis of furan with dilute  $\text{HCl}$  also leads to ring-opening.

④ Reduction - Furan is reduced to Tetrahydrofuran with  $H_2$  in presence of catalyst nickel.



Tetrahydrofuran

⑤ Furan is a weak ~~acid~~ base due to presence of lone pair at oxygen. It forms ~~a~~ unstable salts with mineral acid which polymerised to ~~form~~ form resins or on hydrolysis gives Succindialdehyde.



$\swarrow$  Polymerisation  $O_2$   
 Brown resin

