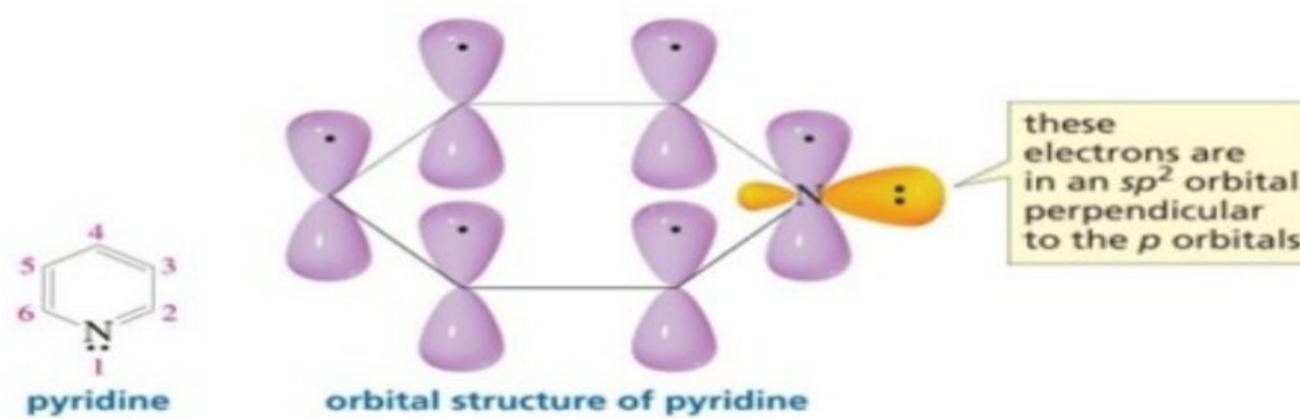


## 4.6 SIX-MEMBERED RING (PYRIDINE)

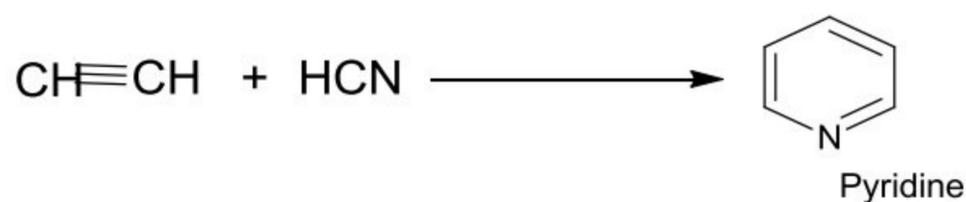
Pyridine is a 6 membered ring, with one heteroatom, Nitrogen. Aromatic in nature.

Carbon are in  $sp^2$  hybridisation, planar in nature.

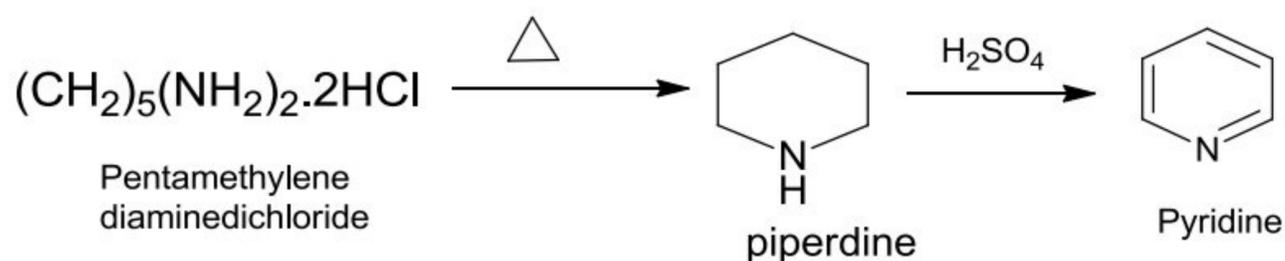


### 4.6.1 Synthesis:

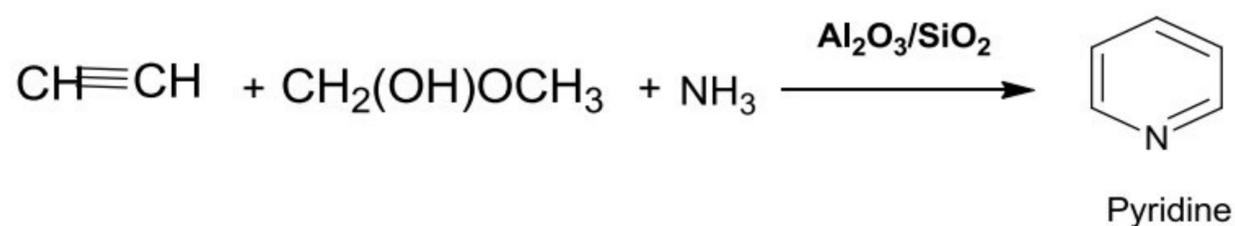
1) Passing acetylene and HCN through a red hot tube.



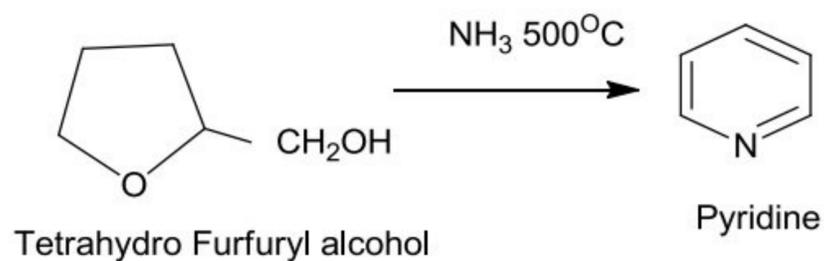
2) Heating pentamethylene diamine hydrochloride followed by heating with conc.  $\text{H}_2\text{SO}_4$



3) Passing acetylene, HCHO and  $\text{NH}_3$  over alumina catalyst.



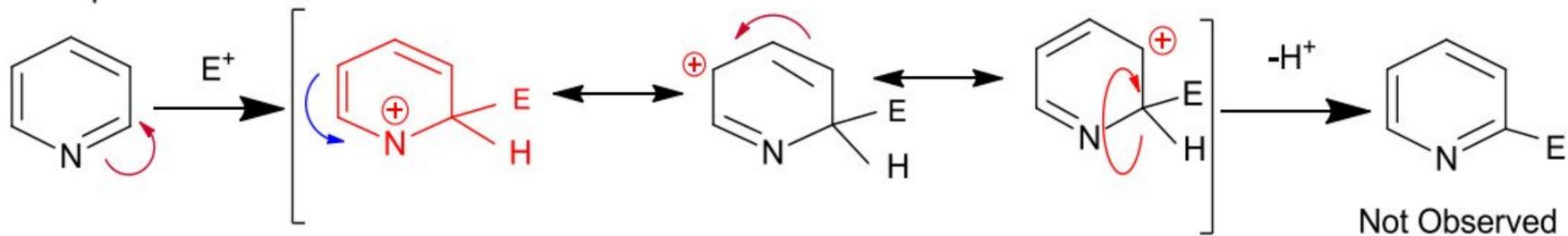
4) Heating tetrahydrofurfuryl alcohol with  $\text{NH}_3$



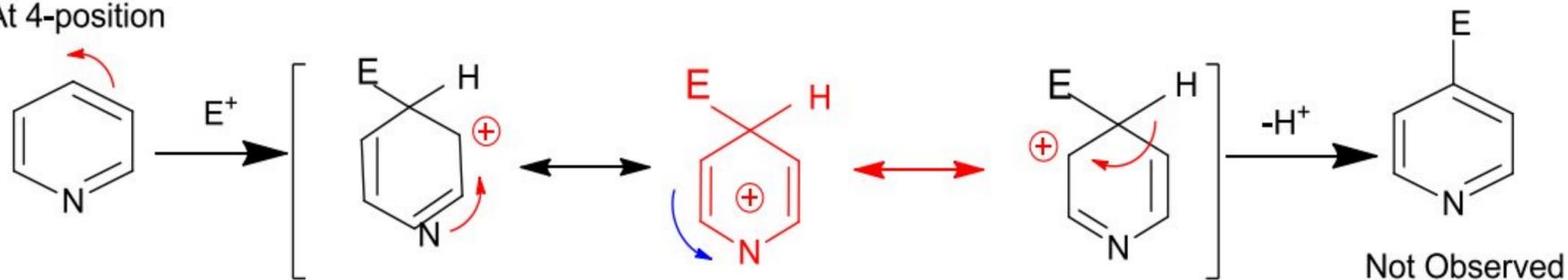
#### 4.6.2 Electrophilic substitution-II electron excess reaction

The attack of 2 and 4 position involves the formation of positive charge on the highly electronegative nitrogen atom. The cations from these structures are highly unstable. Hence, substitution occurs only at 3-position.

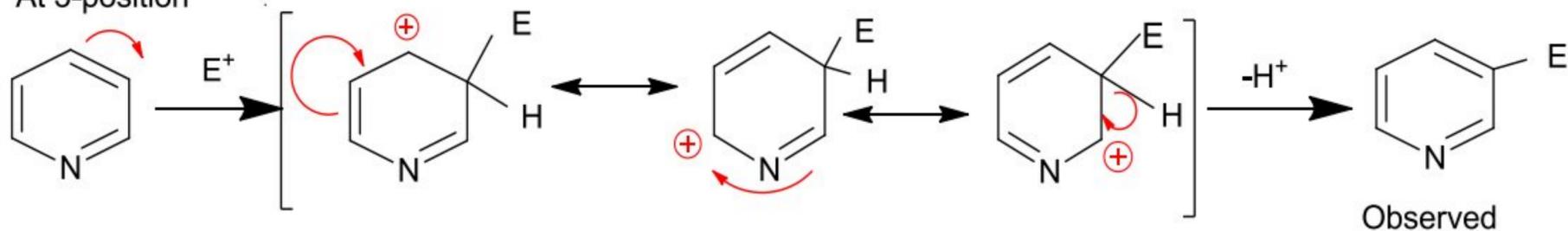
At 2-position



At 4-position



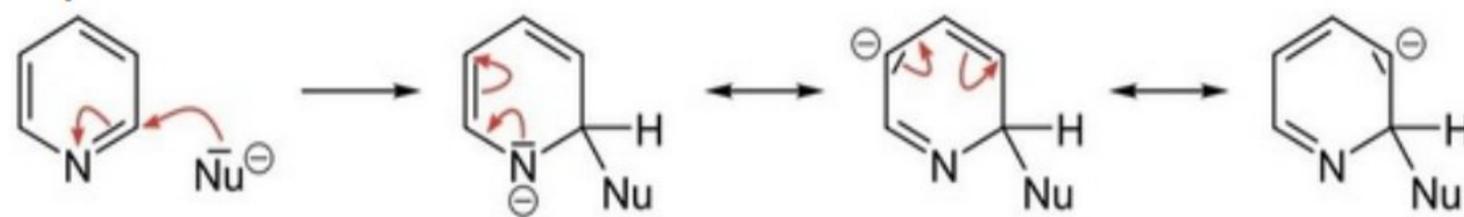
At 3-position



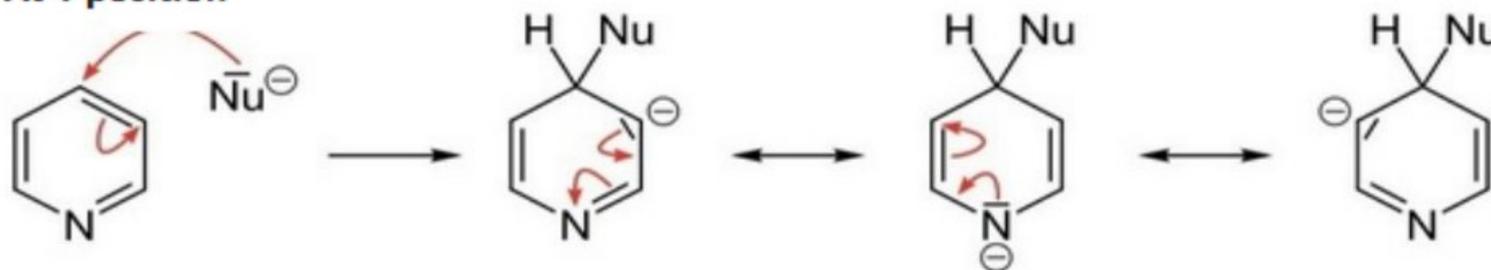
#### 4.6.3 Nucleophilic substitution-II electron deficient

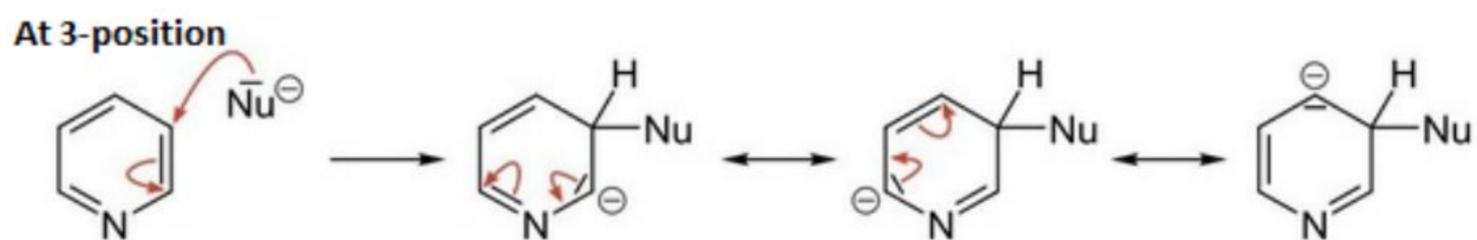
The electron density at position 2 and 4 is less. The negative charge on nitrogen is more resonance stabilized. Nucleophilic substitution occurs at 2 and 4 position.

At 2-position



At 4-position





**Electrophilic substitution-II electron excess reaction**

