

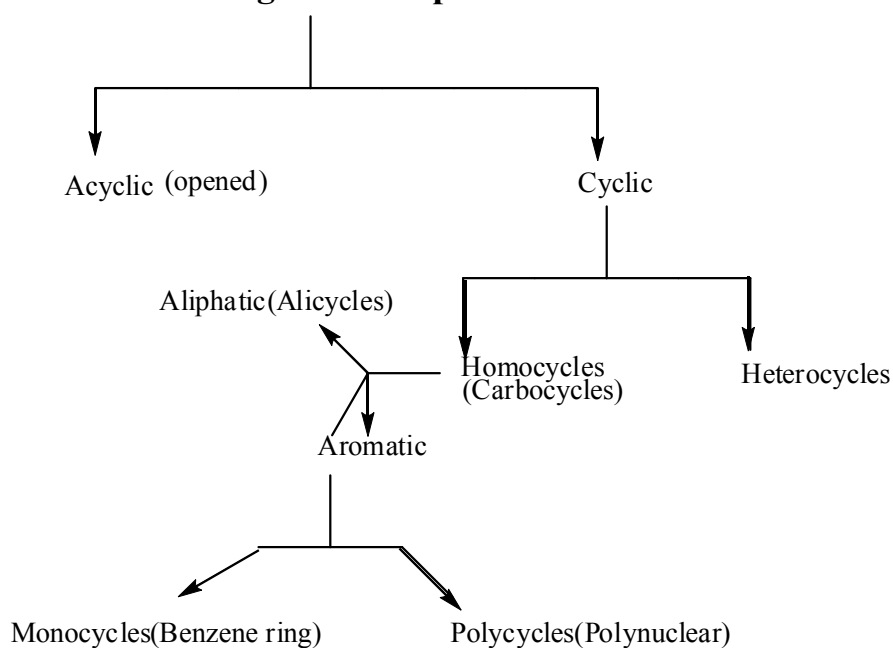


Synthesis of Heterocycles and Their Applications

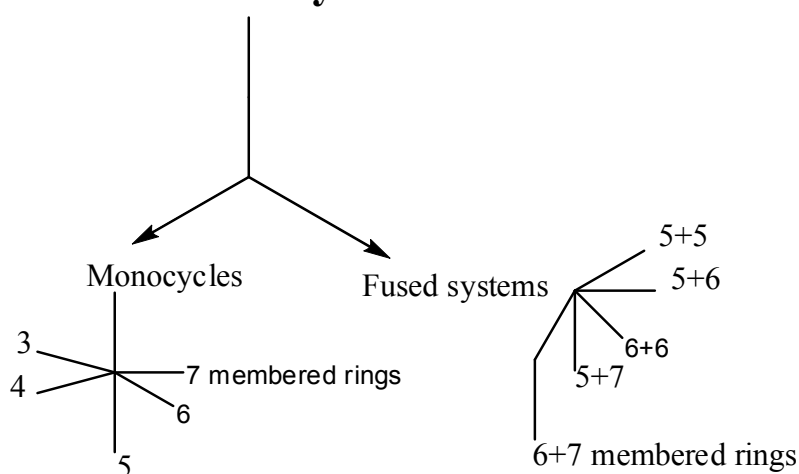
Prepared By

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Organic Compounds



Heterocycles

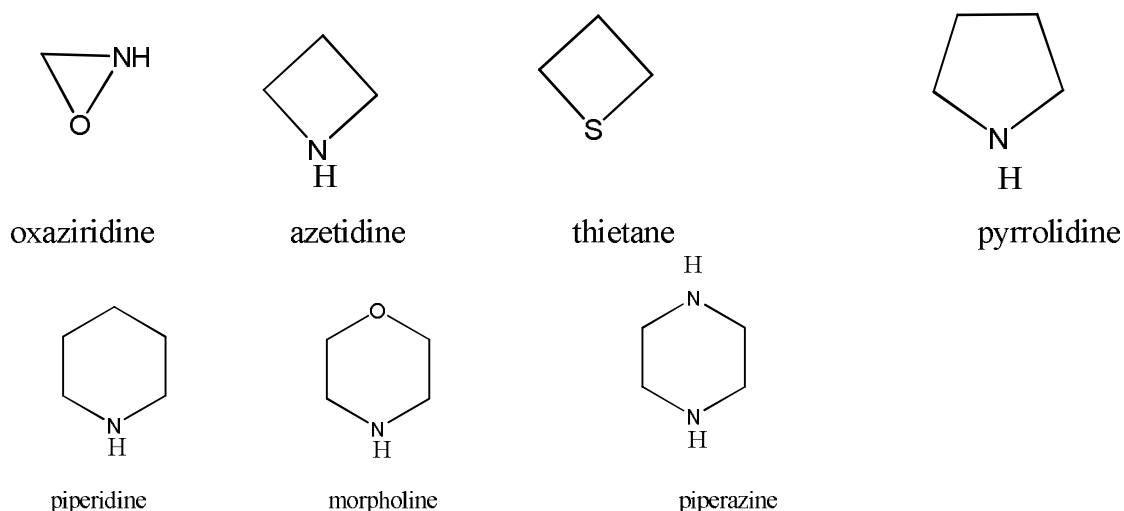


Heterocycles or heterocyclic compounds are cyclic compounds with ring containing carbon and other elements .The commonest being oxygen , nitrogen and sulfur . There are a number of rings which are easily opened and don't possess any aromatic properties ,e.g.ethylene oxide , γ – and δ - lactones etc. These are not considered to be heterocyclic compounds .

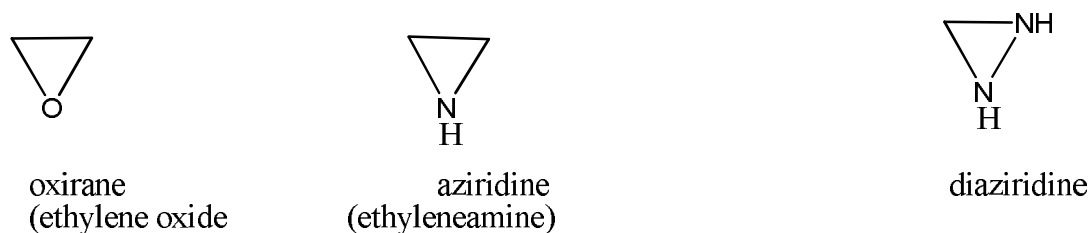
Heterocyclic compounds with five or six membered heterocyclic rings which are stable containing conjugated double bonds and exhibit aromatic character .

They are classified either according to their ring size or according to the number of heteroatoms present and their type . Moreover , they , can be classified according to their structure and their properties into :

- 1) **Heteroalkanes** :They are saturated heterocyclic compounds , which are similar to , or only slightly different from their opened chain analogues e.g.

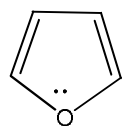


Only smaller rings , especially three membered rings , which suffer from great strain (Bayer strain theory) confer (give) great reactivity in comparison with their opened chain analogues .

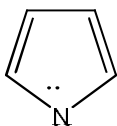


- 2) **Heteroaromatics** : a-They are completely unsaturated 5- and 6-

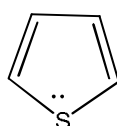
membered rings which like benzene , have a sextet of pi-electrons . Therefore , they are similar to benzene ring in many of their properties . They represent the largest and the most important class of heterocyclic compounds . They represent the largest and the most important class of heterocyclic compounds .



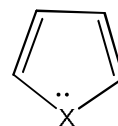
furan



pyrrole

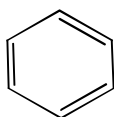


thiophene

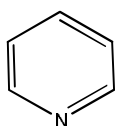


X = O, NH, S

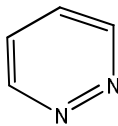
Or π - deficient heteroaromatics belong to the 6- membered heterocycles such as azines (pyridine , pyridazine , pyrimidine and pyrazine) .



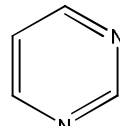
benzene



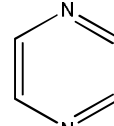
pyridine



pyridazine



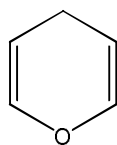
pyrimidine



pyrazine

d)Heteroalkenes :

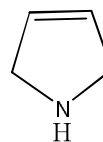
They lie between the previously discussed two groups such as



γ -pyran

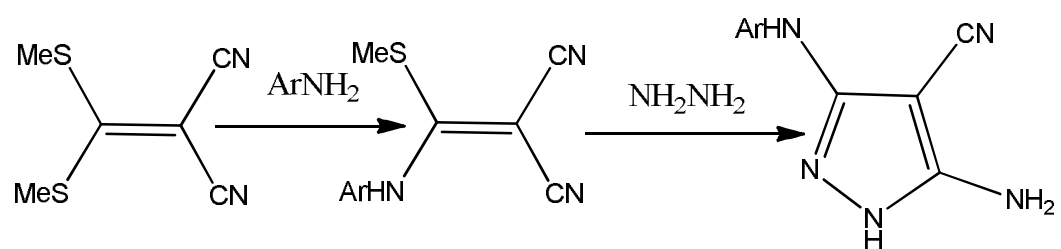
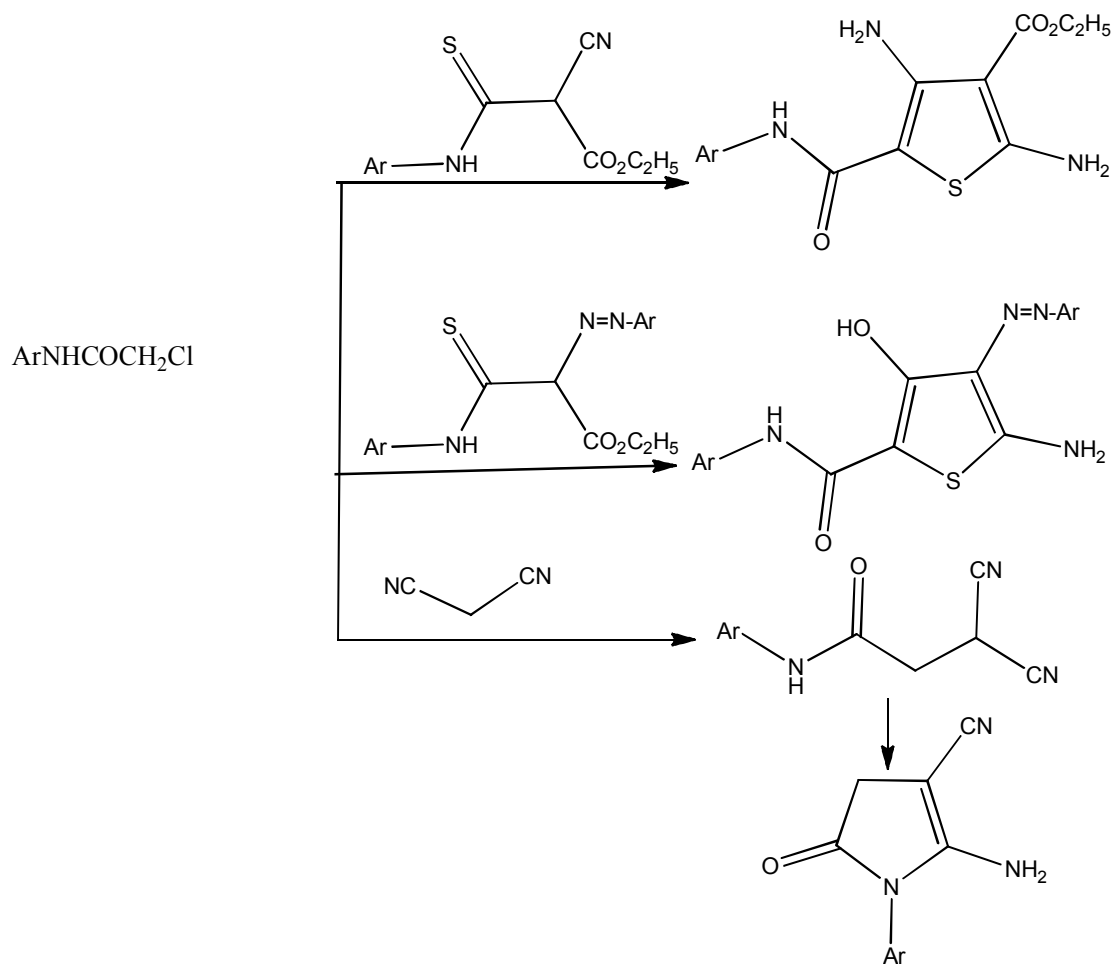
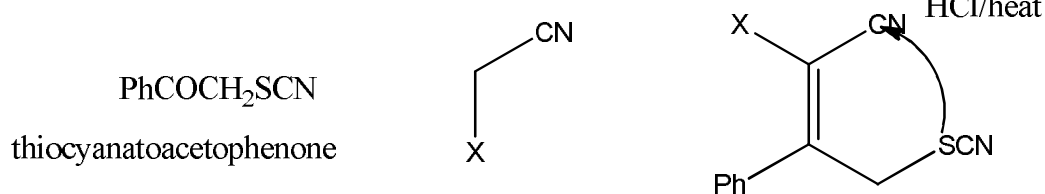
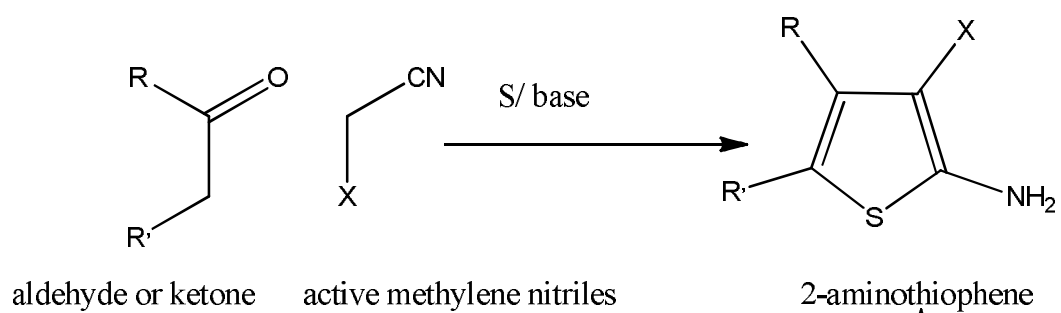


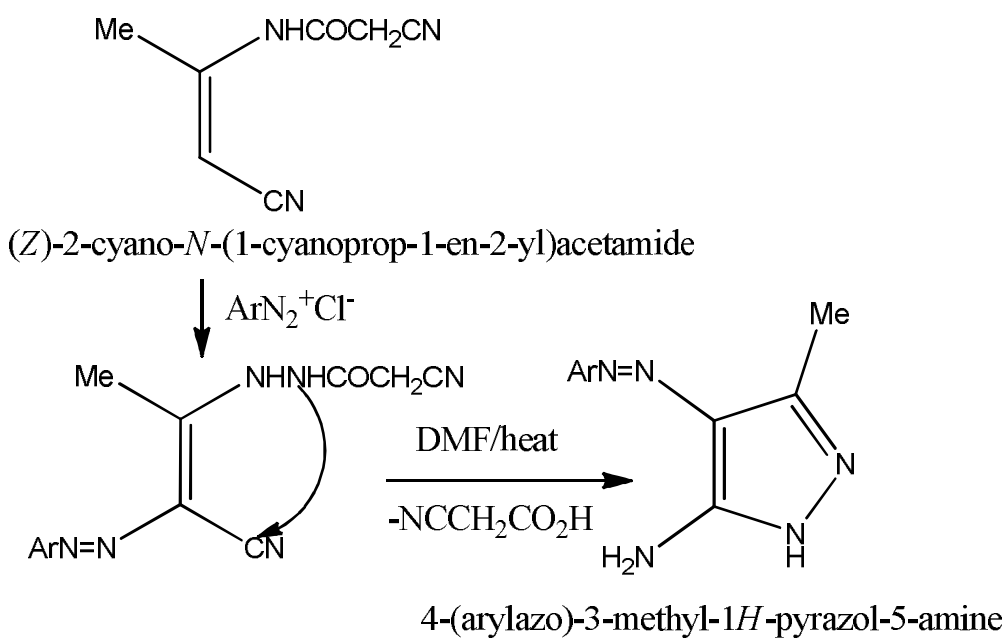
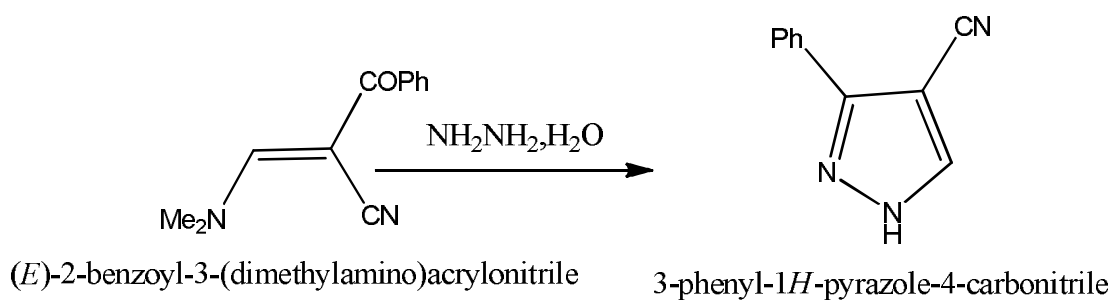
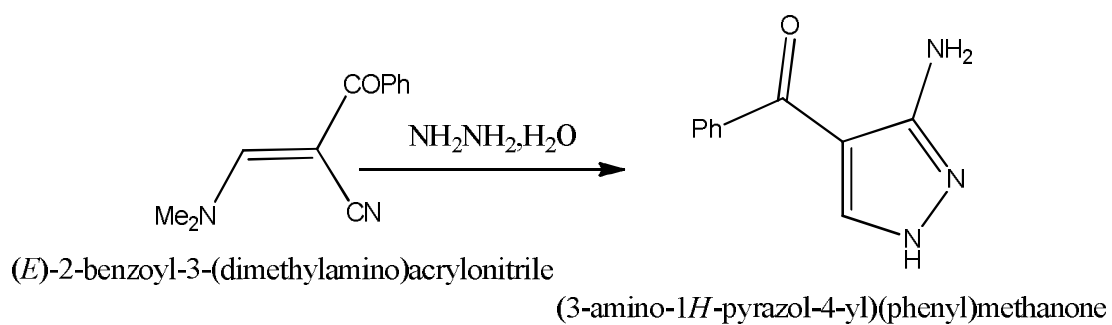
diazirine

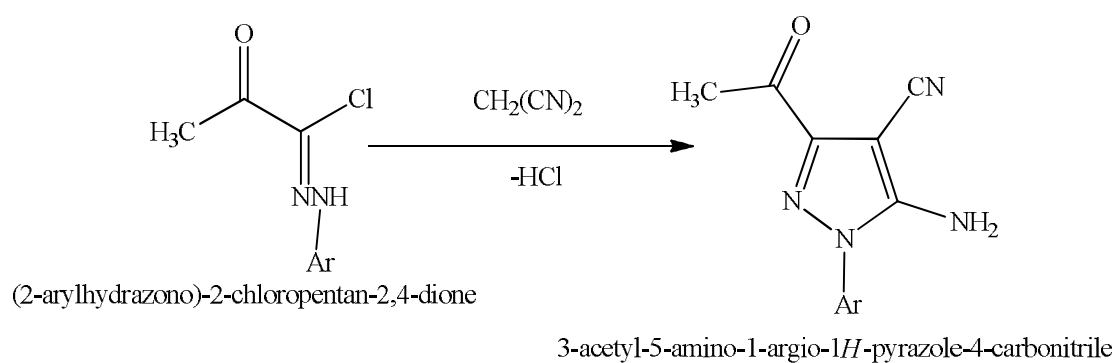
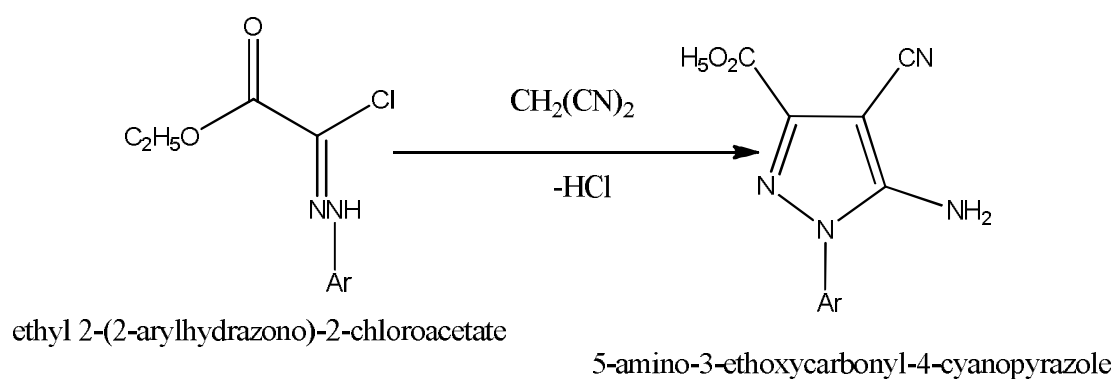
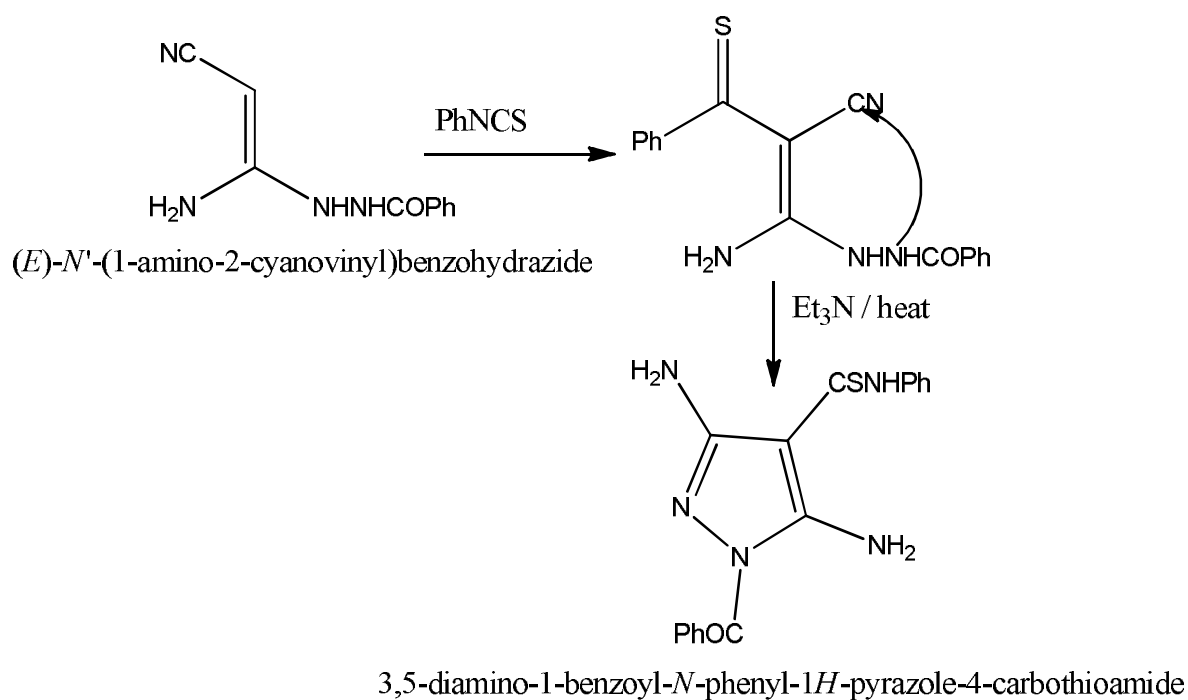


2,5-dihydropyrrole

li)Monocycles : The is the best method for synthesis of 2-aminothiophenes at which active methylene nitriles reacted with carbonyl compounds (aldehydes or ketones) and elemental sulphur in the presence of base is Gewald reaction.







b) Fused heterocycles :

