B.Sc. Semester-VI
Organic Chemistry
Paper-XIV

3. Heterocyclic Compounds

Coverage:

1. Heterocyclic Compounds : Classification and Structure

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Homocyclic and Heterocyclic Compounds

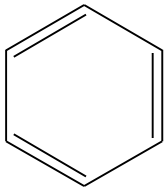
Cyclic Compounds

Heterocyclic

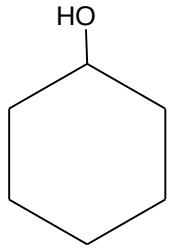
Compounds contain ring made up of carbon atoms and another kind of atoms. (most commonly N, O, S)

Homocyclic =(allicyclic = carbocyclic)

Compounds contain ring made up only of carbon atoms .



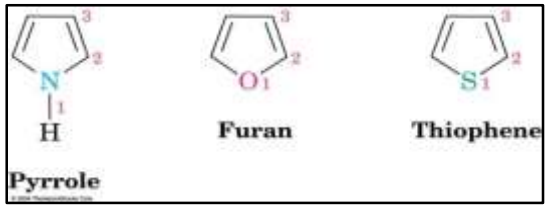
benzene

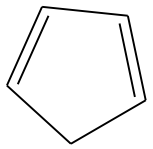


cyclohexanol

Aromatic

Non aromatic





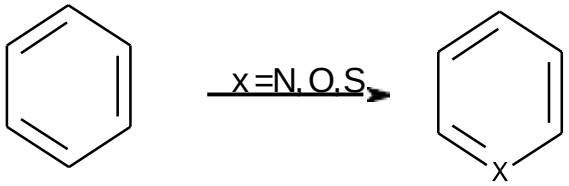
cyclopentadiene

Heterocyclic Compounds

Heterocyclic Compound:

If the ring system is made up of carbon atoms and at least one other element is hetero atom, the compound can be classified as heterocyclic.

As hetero atom can be N, O, S, B, Al, Si, P, Sn, As or Cu. But, the elements that are found most commonly together with carbon in a ring system are Nitrogen (N), Oxygen(O), and Sulfur(S).

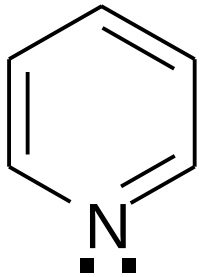


Definition: **Heterocyclic compounds** are organic compounds that contain a ring structure containing atoms in addition to carbon, such as sulfur, oxygen or nitrogen, as the heteroatom. The ring may be aromatic or non-aromatic

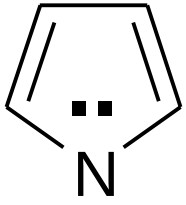
Significance – Two thirds of all organic compounds are aromatic heterocycles. Most pharmaceuticals are heterocycles.

Heterocyclic Compounds

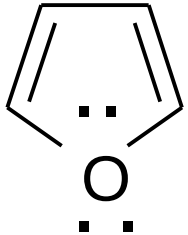
Some Examples of Heterocyclic Compounds:



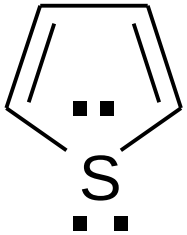
Pyridine



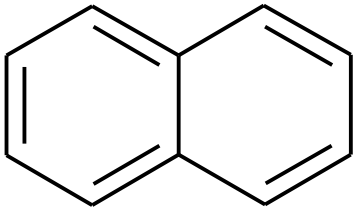
Pyrrole



Furan

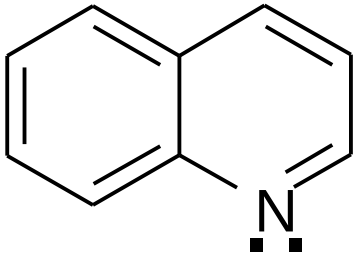


Thiophene

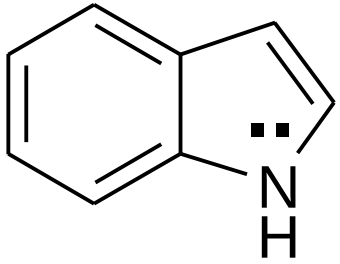


Naphthalene

Not Heterocyclic



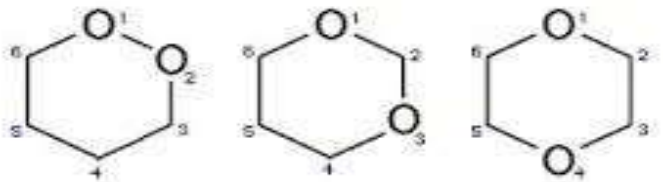
Quinoline



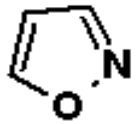
1H-Indole

Heterocyclic Compounds

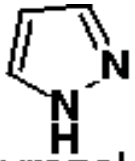
Some More Examples of Heterocyclic Compounds:




Oxazole
(1,3-oxazole)

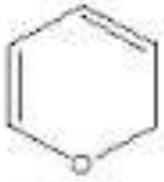

Isoxazole
(1,2-oxazole)


Imidazole
(1,3-diazole)


Pyrazole
(1,2-diazole)

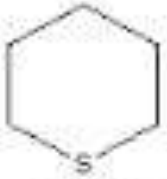

Pyridine


Pyperidine


Pyran


Oxane

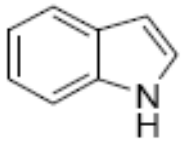

Thiopyrane


Thiane

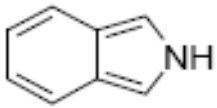
Heterocyclic Compounds

Some More Examples of Heterocyclic Compounds:

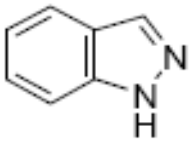
common ring-fused azoles



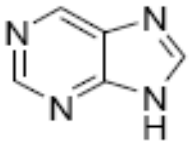
indole
(found in the amino acid tryptophan)



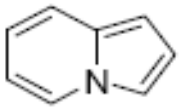
isoindole



indazole



purine
(DNA/RNA base)



indolizidine

THANK YOU