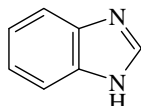
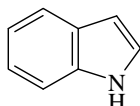
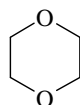
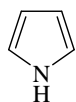


Problem Set No. 11/12 (4.2.2013)

1. Give the appropriate name to the 10 formulas of heterocycles!



2. 4-*tert*-Butylcyclohexanone and 4-methylphenylhydrazine provide an indole derivative by treatment with acid. Give the detailed mechanism of this Fischer indole synthesis! A crucial step involves a pericyclic reaction. Which step is meant and which type of pericyclic reaction is involved?

3. Draw the frontier orbitals of the allyl system. Construct an interaction diagram to demonstrate that the reaction of an allyl anion type system with an alkene is an allowed process according to the Woodward-Hoffmann rules!

4. a) Write down an example for a nitron, nitrile oxide, azomethine ylide, diazoalkane and aryl azide. Give three mesomeric formulas for each of these 1,3-dipoles!

Nitron

Nitrile oxide

Azomethine imine

Diazoalkane

Aryl azide

b) What are the possible products of the 1,3-dipolar cycloadditions of all five 1,3-dipoles with phenylacetylene!
Nitron

Nitrile oxide

Azomethine ylide

Diazoalkane

Aryl azide

5. Propose the reaction mechanism of the formation of benzonitrileoxide starting from phenylnitromethane (Mukaiyama method)!

6. The condensation reaction of (*S*)-4-methyl-5-hexenal with *N*-benzylhydroxylamine provides a nitron which by heating undergoes an intramolecular cycloaddition. Describe the mechanism of all steps involved and reduce the product with LiAlH_4 !