Last Name	
First Name	
Legi-No.	
Program of Study	

Written Exam
Supramolecular Chemistry (OC VII)
Fall 2006

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Please check:
This exam paper includes 4 pages (in addition to the cover).

Please note:
- All problems have to be solved.
- Unreadable texts or drawings will not yield any points.
- If you use additional sheets, make sure to mark them with your name and to attach them to this paper.

Points

Problem 1	
Problem 2	
Problem 3	
Problem 4	
Total	

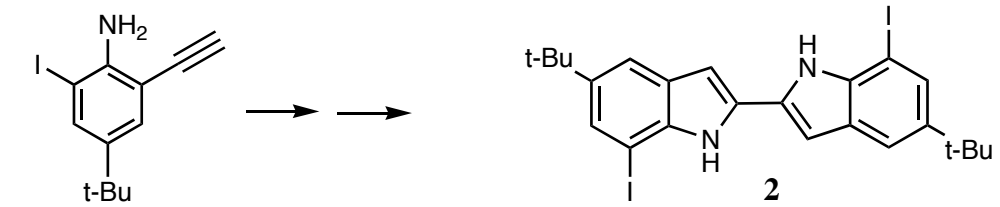
Grades

Written	
Oral	
Final	

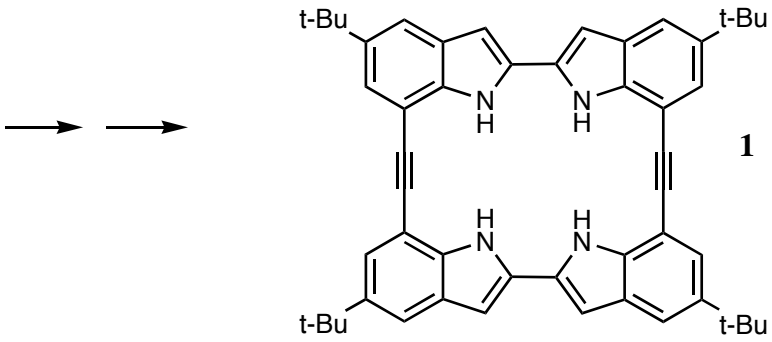
Problem 1:

a) Propose a synthesis for **1**, passing through intermediate **2**. Indicate reagents and relevant reaction conditions for the various reactions.

b) In MeCN, **1** complexes anions such as Cl^-. Make a structural proposal for the most favorable binding geometry. How would you follow the complexation by simple spectroscopic means?



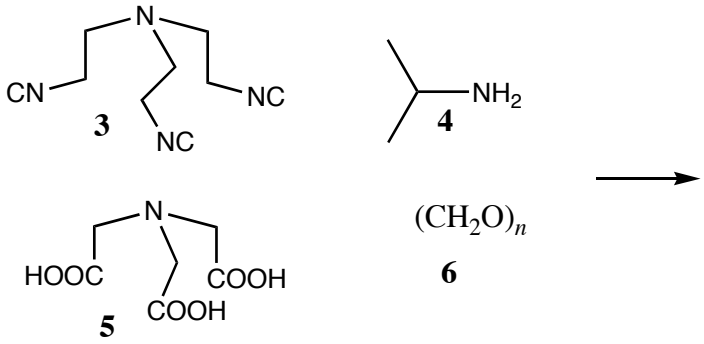
2



1

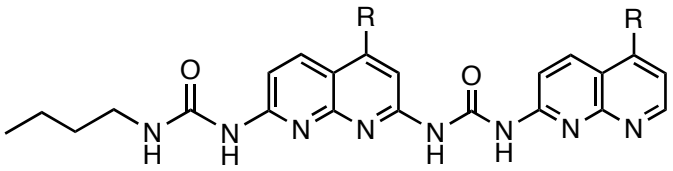
Problem 2:

The *Ugi* four-component reaction (U-4CR) provides a new versatile approach for the construction of macrobicyclic compounds such as cryptands. Propose a structure for the cryptand-type product obtained from **3-6**. Write down the mechanistic details for this reaction.



Problem 3:

In $CDCl_3$, bis-naphthyridine derivative **10** forms an elongated dimer which is stabilized by multiple hydrogen bonding. Draw a structure for the dimer, including the hydrogen bonds. What NMR-spectroscopic technique may have been used to prove the structure? In principle, **10** could also adopt two folded conformations which, however, were not observed. Make structural proposals for the two folded conformers.



10 R = solubilizing group

Problem 4:

Receptor **7** complexes electron-deficient aromatic compounds, X-ray crystal structure analysis showing that the two anthracene moieties approach each other notably to wrap a guest molecule such as 1,2,4,5-tetracyanobenzene.

a) What is the (ideal) C···C distance between the parallel anthracene units of the rectangular box adopted upon complexation of the arene?

b) Propose a synthesis for intermediate **8**, as well as a route from **9** (obtained from **8** by saponification and subsequent ether formation) to receptor **7**. Indicate reagents and reaction conditions.