

# 國立中央大學八十六學年度碩士班研究生入學試題卷

所別: 環境工程研究所 丁組 科目: 有機化學 共 1 頁 第 1 頁

1. Is cis-1,3-pentadiene much less reactive than trans-1,3-pentadiene in the Diels-Alder reaction? (Explain) (10%)
2. Treatment of 3,4-dibromohexane with strong base leads to loss of 2 equivalents of HBr and formation of a product with formula  $C_6H_{10}$ . Three products are possible. Name each of the three, and tell how you would use  $^1H$  and  $^{13}C$  NMR spectroscopy to help you identify them. How would you use UV spectroscopy? (20%)
3. Draw and name all possible aromatic compounds with the formula  $C_7H_7Br$ . (10%)
4. 3-Chlorocyclopropene, on treatment with  $AgBF_4$ , gives a precipitate of  $AgCl$  and a stable solution of a product that shows a single  $^1H$  NMR absorption at  $11.04 \delta$ . What is a likely structure for the product, and what is its relation to Huckel's rule? (10%)
5. (a) Propose a mechanism for the reaction of 2,4,6-trinitrochlorobenzene reacts with aqueous NaOH at room temperature to give 2,4,6-trinitrophenol in 100% yield. (10%)  
(b) Does problem 5 (a) reaction undergo  $S_N1$  or  $S_N2$  reaction? Explain. (10%)
6. Propose efficient methods for accomplishing each of the following transformations.  
(a) 1,2-dichloro-4-propylbenzene from chlorobenzene. (10%)  
(b) 2-methyl-3-pentanone from propene (10%)
7. Show all limitation in Friedel-Crafts alkylations. (10%)