

國立中央大學八十五學年度碩士班研究生入學試題卷

所別: 生命科學研究所 不分組 科目: 有機化學

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1. Give structural formulas for each of the following compounds: (14 pts)
 - (a) (+)-Maltose (Haworth formula)
 - (b) Pyrimidine
 - (c) Benzo[a]pyrene
 - (d) The most acidic nitrophenol
 - (e) The most reactive butyl chloride in an S_N2 reaction
 - (f) The least stable C-5 alkene (C_5H_{10})
 - (g) The C-5 alkane (C_5H_{12}) with the highest melting point
2. Define and give an example for each of the following: (36 pts)
 - (a) Aldol condensation
 - (b) Mutarotation
 - (c) *Trans*-Addition to an alkene
 - (d) Hofmann elimination
 - (e) Claisen rearrangement
 - (f) Conformational analysis
3. Answer the following questions: (40 pts)
 - (a) What is the major product of the reaction of *trans*-1-*tert*-butyl-3-chlorocyclohexane with sodium iodide, and why?
 - (b) Which one is the better nucleophile, CH_3O^- or CH_3COO^- , and why?
 - (c) How would you distinguish between dimethylamine and trimethylamine by chemical or spectroscopic methods?
 - (d) How would you make 4-chlorobenzoic acid from toluene?
 - (e) Is acetamide a base or an acid, and why?
 - (f) Which one is more reactive in cyanohydrin formation, acetaldehyde or 2-butanone and why?
 - (g) What is the proper pH for diazo coupling of phenols, and why?
 - (h) How would you make methyl *tert*-butyl ether from *tert*-butanol?
4. Briefly discuss the mechanism of acid- and base-catalysed ester hydrolyses, respectively. (10 pts)