

國立中央大學八十四學年度碩士班研究生入學試題卷

所別：化學研究所

組

科目：有機化學

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注意：務請依題目順序作答，否則扣分

1. Give the structural formula for the following compounds: (10 pts)
 - (a) indole
 - (b) D-fructose (use Fischer projection formula)
 - (c) the haloalkane $C_8H_{17}X$ with highest boiling point
 - (d) the most stable isomer of dimethylbenzene
 - (e) the methylaniline with largest basicity constant
2. Usually there are several reagents and/or different reaction conditions could be employed to prepare a target compound from a specified starting material. Suggest a proper way, including reagents and reaction conditions, to carry out the following transformations and give the reason(s) of your choice: (20 pts)
 - (a) 2-acetylnaphthalene from naphthalene
 - (b) 2-bromophenol from phenol
 - (c) *cis*-1,2-cyclohexanediol from cyclohexanone
 - (d) 1-butanol from acetaldehyde
3. Use a specific example to illustrate each of the following name reactions: (20 pts)
 - (a) Claisen rearrangement
 - (b) Kolbe-Schmitt reaction
 - (c) Robinson annulation
 - (d) Wolff-Kishner reduction
4. Answer the following questions: (35 pts)
 - (a) Which one is more acidic, 3- or 4-nitrophenol, and why?
 - (b) Which one is more reactive in the saponification reaction, methyl acetate or ethyl acetate, and why?
 - (c) Can 2,2-dimethylpentanoic acid be made from sodium cyanide 2-chloro-2-methylpentane and followed by hydrolysis, and why?
 - (d) What is the best reducing agent for converting 4-cyanobenzaldehyde to 4-cyanobenzyl alcohol, and why?
 - (e) What is the proper pH for the preparation of a hydrazone from a ketone, and why?
 - (f) What is the reaction mechanism of Beckmann rearrangement?
 - (g) What is a "chromophore" in ultraviolet-visible spectroscopy?
5. Distinguish the four isomeric butenes (C_4H_8) by using at least one kind of chemical reaction and one spectroscopic method. (15 pts)