

銘傳大學 99 學年度轉學生招生考試

生物科技學系

第三節

有機化學試題

(第 | 頁共 | 頁) (限用答案本作答)

可使用計算機 不可使用計算機

1. Give appropriate structural formulas to illustrate each of the following: (畫出結構式，每小題 5 分)
(A) isopropyl bromide ;
(B) 1-chloro-4-methylpentane ;
(C) cis-1,2-dimethylcyclobutane ;
(D) 3-ethylcyclohexene
(E) tetrahydrofuran (THF)
(F) (R)-1,2,4-butanetriol
2. Outline a procedure for separating hexylamine from cyclohexane using dilute HCl, aqueous NaOH, and diethyl ether. (10 分)
3. Draw basic structural formulas of steroids, derivatives of perhydrocyclopentanophenanthrene ring system. (劃出類固醇之基本結構式(-共 19 個 C)，並予以標號，此題 10 分)
4. What product would be obtained from the ethanolysis of *tert*-butyl chloride?
Outline the steps of this S_N1 reaction. (20 分)
5. Arbutin (雄果素) can be isolated from the leaves of barberry and pear trees, has the molecular formula $C_{12}H_{16}O_7$.
When arbutin is treated with aqueous acid or with a β -glucosidase, the reaction produces D-glucose and a compound X with the molecular formula $C_6H_6O_2$. The 1H NMR spectrum of compound X consists of two singlets, one at δ 6.8 (4H) and one at δ 7.9 (2H).
Methylation of arbutin followed by acidic hydrolysis yields 2,3,4,6-tetra-O-methyl-D-glucose and a compound Y ($C_7H_8O_2$). Compound Y is soluble in dilute aqueous NaOH but is insoluble in aqueous $NaHCO_3$. The 1H NMR spectrum of Y shows a singlet at δ 3.9 (3H), a singlet at δ 4.8 (1H), and a multiplet at δ 6.8 (4H).
Treating compound Y with aqueous NaOH and $(CH_3)_2SO_4$ produces compound Z ($C_8H_{10}O_2$). The 1H NMR spectrum of Z consists of two singlets, one at δ 3.75 (6H) and one at δ 6.8 (4H).
Propose structures for arbutin and for compounds X, Y, and Z. (30%)

試題完