國立台灣大學九十三學年度碩士班招生考試試題

科目:有機化學(A)

超號: 09

(1) Predict the following product (20%) (a) (R)-3,4-dimethyl-1-pentene + H ₂ /Pt (b) 2-methyl-butane + Br ₂ /hv (c) (E)-2-butene + CH ₂ I ₂ /Zn(Cu)
(d) cyclohexene O_3 Me_2S
(e) cyclohexene + Br ₂ /CCl ₄ → (f) nitrobenzene + HNO ₃ → (g) cyclohexanol + CrO ₃ , H ⁺ → (h) 1-bromobutane + CH ₃ CH ₂ ONa ⁺ (CH ₃ CH ₂ OH) →
(i) 1-butene $\stackrel{\cdot}{\longrightarrow}$ $\stackrel{\cdot}{\longrightarrow}$ $\stackrel{\cdot}{\longrightarrow}$ $\stackrel{\cdot}{\longrightarrow}$

- (j) 1-butanol + CrO₃ · HCl · pyridine →
- (2) Show how 1-butyne could be converted to 3-hexyne using a nucleophilic substitution reaction. (5%)
- (3) Use Fischer projections to draw the stereoisomers of 2,3-dichlorobutane. (5%)
- (4) Provide mechanism for the following reaction (10%) cyclopentane + $Br_2 \xrightarrow{hv}$ bromocyclopentane + HBr
- (5) Can you draw chair conformations of β-D-glucopyranose (the most stable chair form with all OH and CH₂OH groups in the equitorial position)? Convert into the Haworth projection and also draw the Fischer projection for the acyclic D-glucose (15%)
- (6) Glycine is the smallest amino acid, write the structures of glycine (a) at the isoelectric point (b) at pH 8 (c) at pH 6 (10%)
- (7) A compound, C₅H₁₀O₃ has a strong infrared band at 1745 cm⁻¹. Its proton NMR spectrum consists of a quartet at δ4.15 and a triplet at δ1.20 with relative ratio of 2:3 what is the structure? (8%)
- (8) Identify the product of the Claisen condensation of ethyl propanoate with sodium ethoxide. (7%)
- (9) Write simple synthetic route for the following (20%)
 - (a) from bromobenzene and ethylene oxide to 2-phenylethanol (aroma of oil of roses).
 - (b) form butanal to 2-ethylhexane-1,3-diol (a mosquito repellent).
 - (c) from benzene to *m*-bromonitrobenzene.

試題隨卷繳回