

淡江大學九十學年度碩士班招生考試試題

系別：化學工程學系

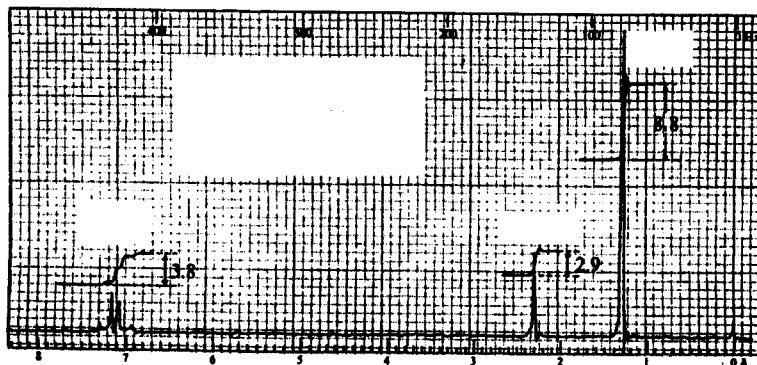
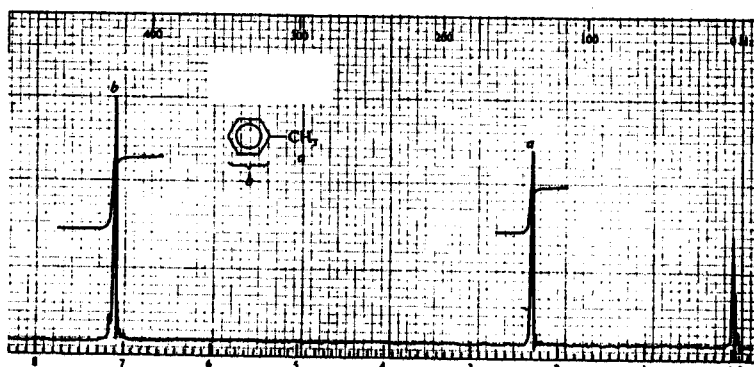
科目：有機化學

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1. Given the NMR spectrum of toluene as follows, try to elucidate the structure of molecule of which the NMR spectrum and the integration of each peak are shown in the next figure. Give also your explanation in detail for your proposed molecular structure. Finally, give the name of this molecule of interest. (20%)



2. What is the reaction mechanism of Grignard agent $\text{CH}_3\text{CH}_2\text{CHMgBrCH}_3$ with formaldehyde in the presence of water? Draw the schematic reaction equation with detail molecular structure concerned. Give the name of final product. (10%)
3. Epoxides undergo acid-catalyzed reactions with extreme ease. Draw the mechanism of reaction between ethanol and ethylene oxide in the presence of acid with detail molecular structure and give the name of final product. (10%)
4. The electrophilic aromatic substitution by H_2SO_4 gives aromatic sulfonic acid. Write down an example of complete steps of reaction mechanism with detail molecular structure. (10%)
5. A group already attached to the benzene ring should affect the reactivity in electrophilic aromatic substitution. What kind of group will activate the

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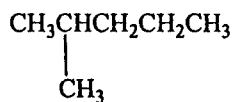
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aromatic ring? Explain how it works and give two examples of such group.

(10%)

6. What is the reaction mechanism of free radical chain polymerization. Write the structure and name of two examples of substituted vinyl monomer. (10%)
7. Draw the structure formula for each of the following compounds. (30%)

For example: isohexane,



- (a) Poly(styrene)
- (b) Ethylene chloride
- (c) Dimethylformamide
- (d) Ethylene glycol
- (e) 2-Hydroxyethyl methacrylate
- (f) Aniline
- (g) m-Dibromobenzene
- (h) tert-Butylalcohol
- (i) Poly(acrylonitrile)
- (j) cis-2-Pentene