

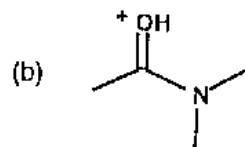
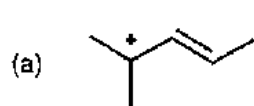
國立中央大學八十七學年度碩士班研究生入學試題卷

所別： 環境工程研究所 丙組 科目：

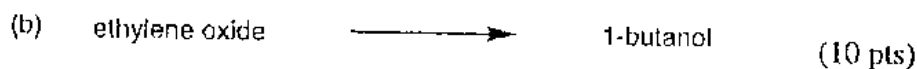
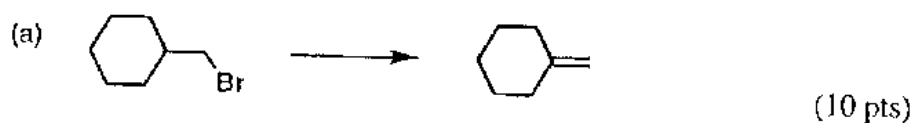
有機化學

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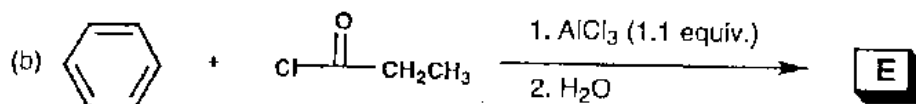
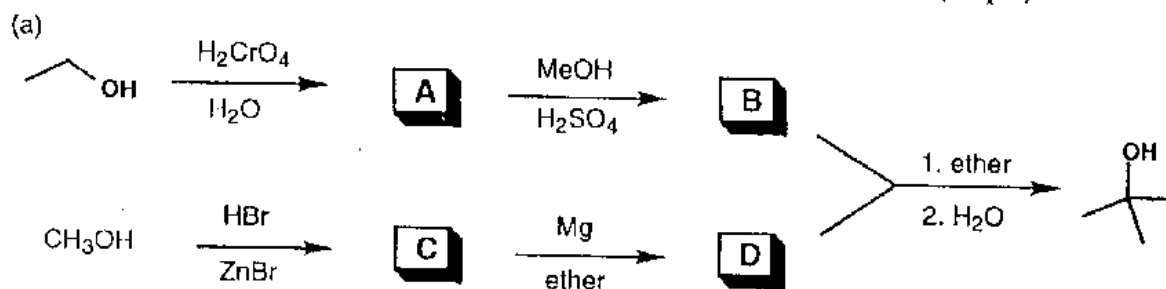
1. Draw contributing resonance structures for each of the following compounds. Rank the structures in order of decreasing contribution to the hybrid. (10 pts)



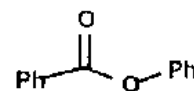
2. Indicate how you would carry out each of the following chemical transformations. What are some of the changes in the infrared spectrum that could be used to indicate whether the reaction has proceeded as indicated?



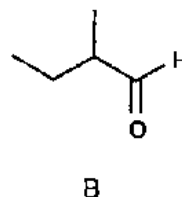
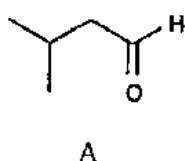
3. Predict the major product (A, B, C, D, E) of the following reactions. (15 pts)



4. Predict the major products expected from the reaction of Br_2 and AlBr_3 with phenylbenzoate, being sure to explain why one ring is more active than the other. (10 points)



5. In the acid-catalyzed aldol reaction of **compound A**, an α,β -unsaturated aldehyde is obtained; but, in that of the isomeric **aldehyde B**, a β -hydroxy alcohol is formed. Please explain and also show the products from compound A and B. (10 pts)



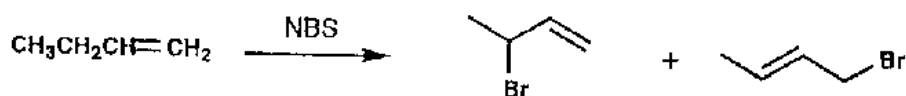
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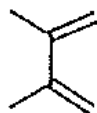
6. How can the following compound be prepared, starting with a carbonyl compound with one fewer carbons than the desired product? (6 points)



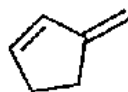
7. When an unsymmetrical alkene is brominated with N-bromosuccinimide (NBS), a mixture of allylic bromides is formed. For example, bromination of 1-butene yields two products. Explain this observation. Give a mechanism to support your explanation. (9 points)



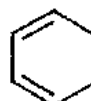
8. List the following dienes in order of decreasing activity in a Diels-Alder reaction. Please give the reasons of your arrangement. (10 points)



A



B



C



D

9. Briefly define each of the following terms and give an example. (10 pts)
- nucleophilic substitution reaction
 - polar protic solvent