

科目：有機化學 適用：應化所

編號：441

考生注意：

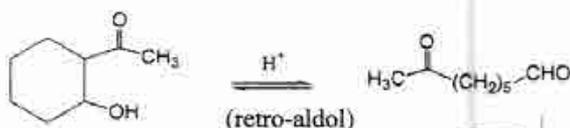
1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 限用藍、黑色筆作答；試題須隨卷繳回。

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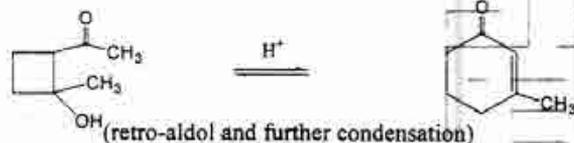
1) Many of the condensations we have studied are reversible. The reverse reactions are often given the prefix *retro-*, the Latin word meaning "backward." Propose mechanisms to account for the following reactions.

(16%; each 8%)

(a)



(b)

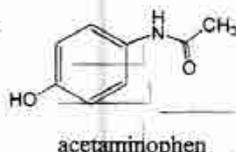


2) Two widely used pain relievers are aspirin and acetaminophen. Show how you would synthesize these drugs from phenol. (16%; each 8%)

(a)



(b)



3) The alkaloid coniine has been isolated from hemlock and purified. Its molecular formula is $C_8H_{17}N$. Treatment of the coniine with excess of methyl iodide, followed by silver oxide and heating, gives the pure (*S*)-enantiomer of *N,N*-dimethyloct-7-ene-4-amine. (a) Propose a complete structure for coniine and (b) show how this reaction gives the observed product. (13%; a:5%, b:8%)

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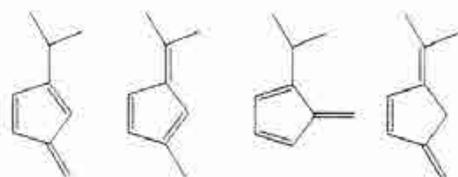
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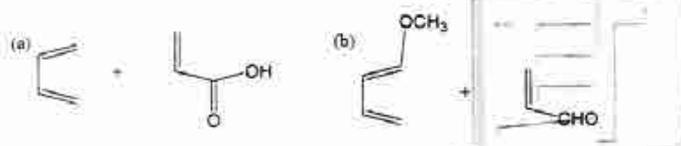
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4) One of the following hydrocarbons is much more acidic than the others.

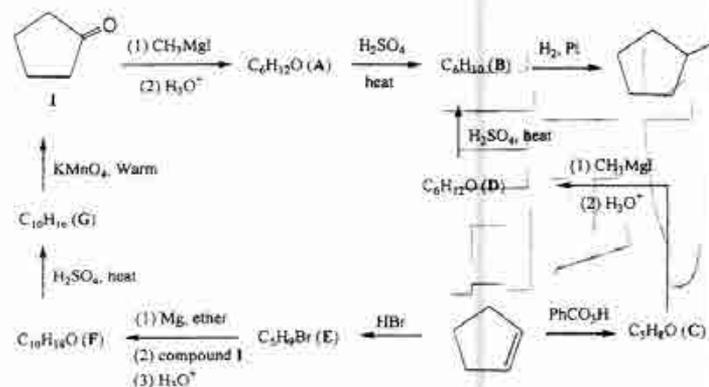
Indicate (a) which one, (b) and explain why it is unusually acidic. (12%; a:4%, b:8%)



5) Predict the products of the following Diels-Alder reactions. Include the stereochemistry where appreciate. (10%; each 5%)



6) Determine the structure of compounds A through G, including the stereochemistry where appreciate. (21%; each 3%)



7) A graduate student wanted to make methylenecyclobutane, and he tried the following reaction. (a) Propose structure(s) for the other product(s), (b) and give the mechanisms to account for the formation. (12%; a:6%, b:6%)

