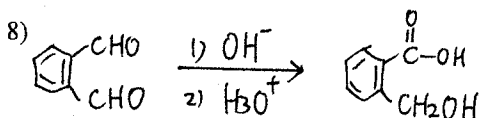
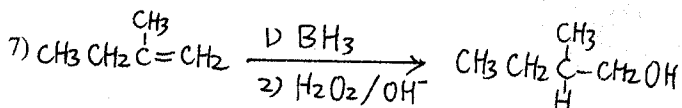
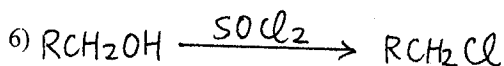
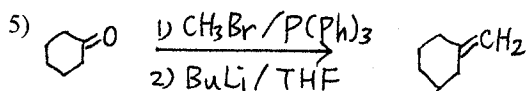
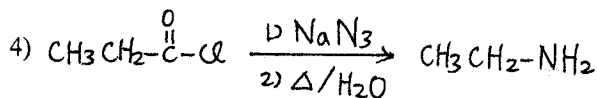
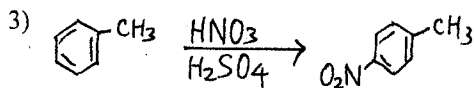
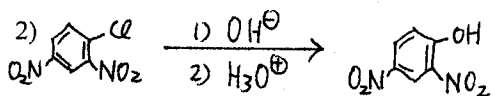
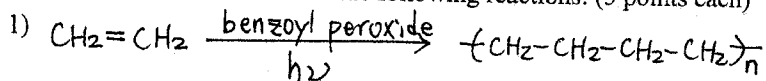


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I. Draw detailed mechanisms for the following reactions: (5 points each)

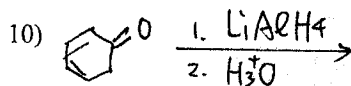
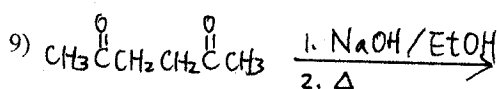
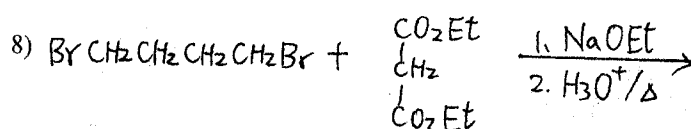
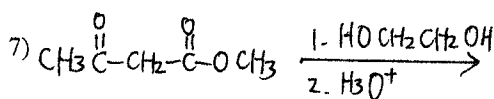
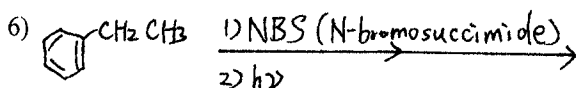
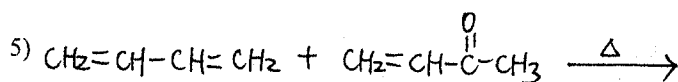
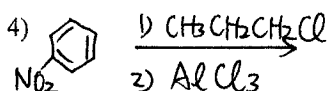
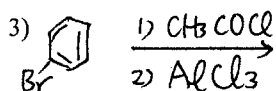
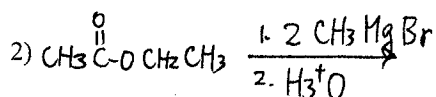
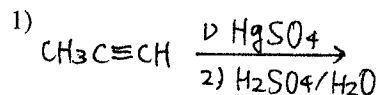


參考用

注意：背面有試題

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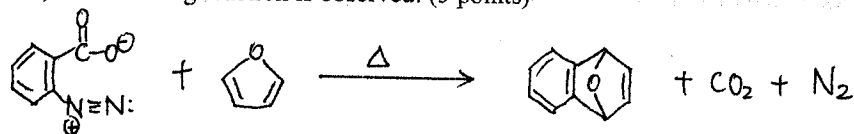
II. Predict the **major** products for the following reactions: (3 points each)



參考用

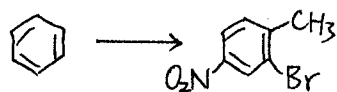
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III. Benzenediazonim carboxylate decomposes when heated to yield N_2 , CO_2 , and a reactive substance that can't be isolated. When Benzenediazonim carboxylate is heated in the presence of furan, the following reaction is observed: (5 points)

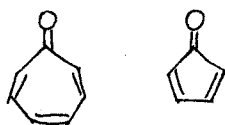


What intermediates is involved in this reaction? Propose a mechanism for its formation.

IV. How would you synthesize the following compound from benzene? Assume that ortho and para isomers can be separated. (5 points)



V. Cycloheptatrienone is stable, but cyclopentadienone is so reactive that it can't be isolated. Explain why! (5 points)



VI. Compound A, $C_{10}H_{18}O$, undergoes reaction with dilute H_2SO_4 at $250^\circ C$ to yield a mixture of two alkenes, $C_{10}H_{16}$. The major alkene product, B, gives only cyclopentanone after ozone treatment followed by reduction with zinc in acetic acid. Identify A and B, and write the reactions. (5 points)

注意：背面有試題

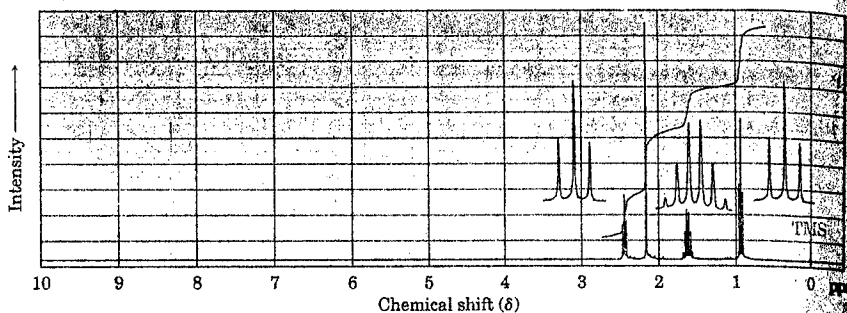
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VII. Propose structures for the compounds that fit the following ^1H NMR data: (2 points each)

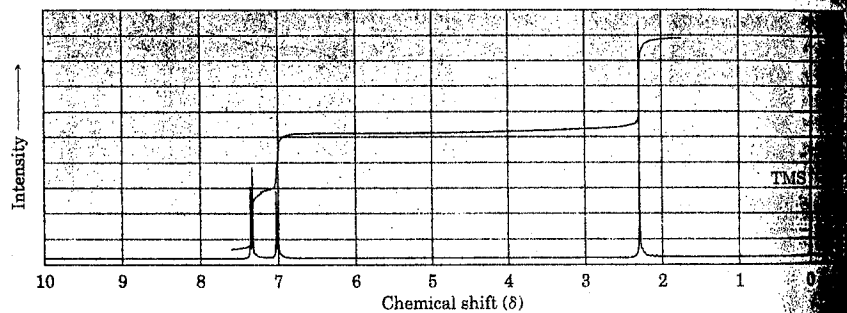
- a) $\text{C}_5\text{H}_{10}\text{O}$, 0.95 δ (6H, doublet, $J = 7$ Hz); 2.10 δ (3H, singlet); 2.43 δ (1H, septet)
b) $\text{C}_4\text{H}_7\text{BrO}$, 2.11 δ (3H, singlet); 3.52 δ (2H, triplet, $J = 6$ Hz); 4.40 δ (2H, triplet, $J = 6$ Hz)

VIII. Propose structures for the three compounds whose ^1H NMR spectra are shown. (2 points each)

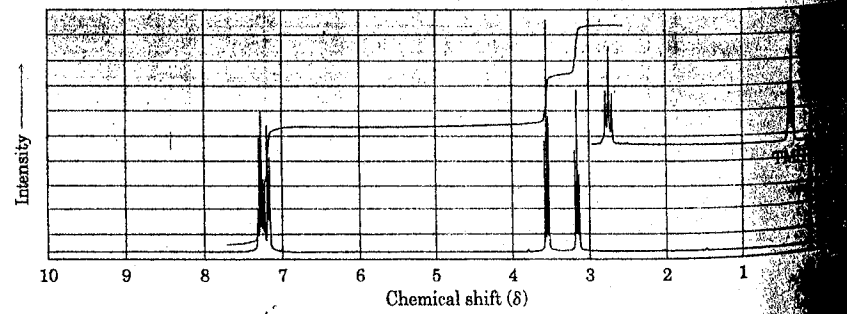
(a) $\text{C}_5\text{H}_{10}\text{O}$



(b) $\text{C}_7\text{H}_7\text{Br}$



(c) $\text{C}_9\text{H}_9\text{Br}$



參考用