

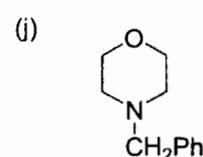
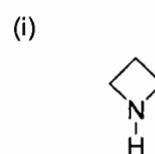
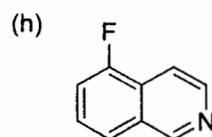
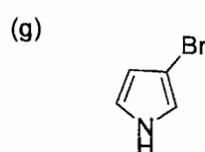
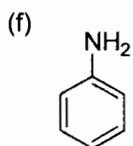
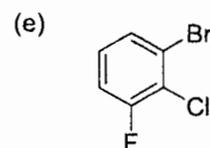
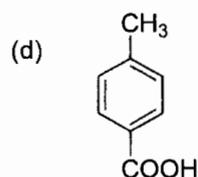
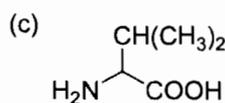
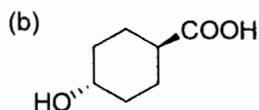
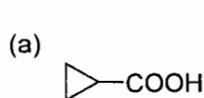
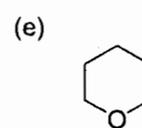
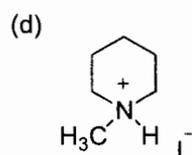
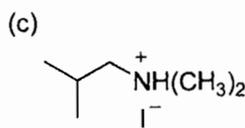
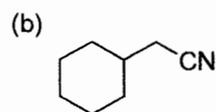
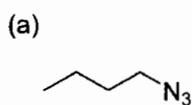
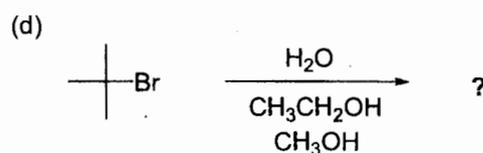
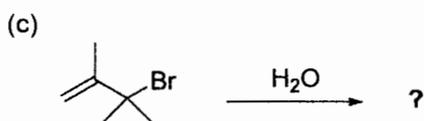
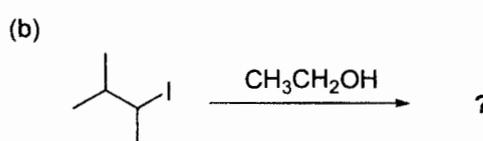
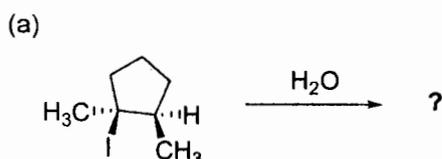
系所組別：化學系

考試科目：有機化學

考試日期：0224，節次：2

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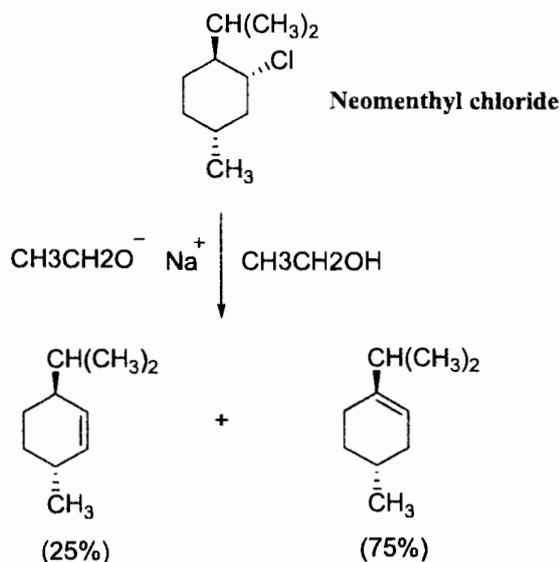
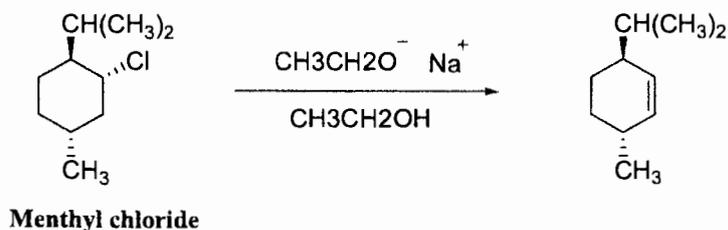
1. Write names for the following structures: (10%)

2. Devise S_N2 reactions that would lead to the following products: (5%)3. Predict the products of the following S_N1 reactions: (4%)

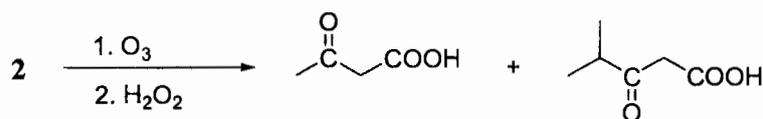
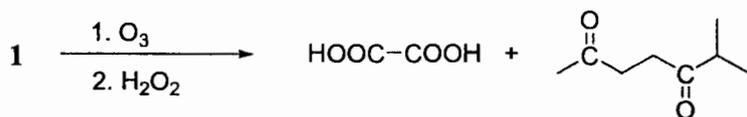
4. Menthyl chloride reacts with sodium ethoxide in ethyl alcohol to give a single product as shown. Analyze this reaction mechanistically to explain why this is the only alkene produced. By contrast, neomethyl chloride treated in the same fashion gives an additional, major, product. Moreover, menthyl chloride reacts much more slowly than neomenthyl chloride. Explain these observations mechanistically, (8%)

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5. α -Terpinene (**1**) and β -terpinene (**2**) are isomeric compounds ($\text{C}_{10}\text{H}_{16}$) that are constituents of many plants. Upon catalytic hydrogenation, they both afford 1-isopropyl-4-methylcyclohexane. However, on ozonolysis followed by oxidative workup, each compound yields different products. Provide structures for **1** and **2** and explain your reasoning. (4%)

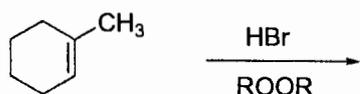


6. Give the major product(s) expected for each of the following reactions. Pay attention to regiochemistry and stereochemistry where appropriate. Mechanisms are not required, although they may be useful in finding the answers. (12%)

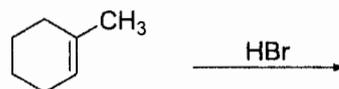
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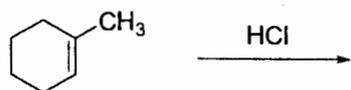
(a)



(b)



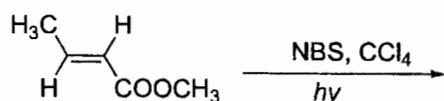
(c)



(d)



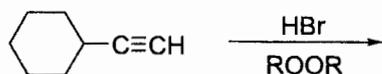
(e)



(f)



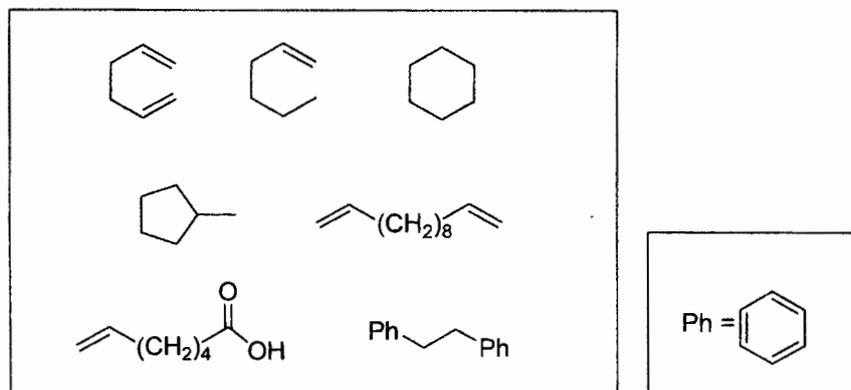
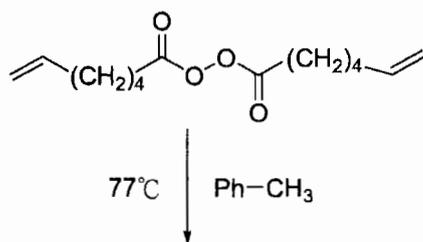
(g)



(h)



7. Provide mechanisms for the formation of the following products: (10%)

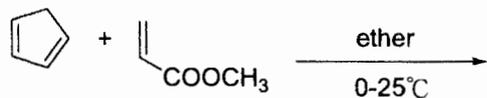


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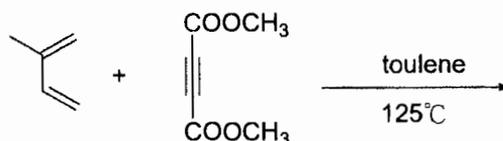
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8. Predict the products of the following Diels-Alder reactions: (10%)

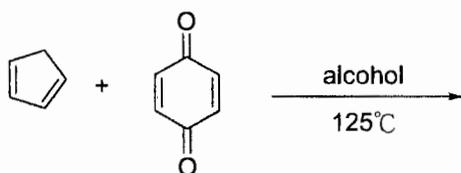
(a)



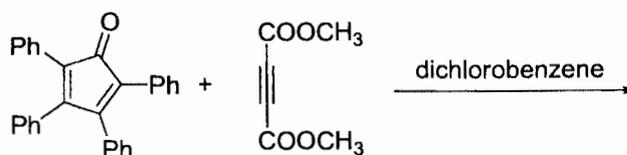
(b)



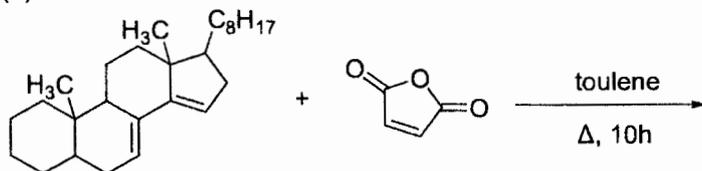
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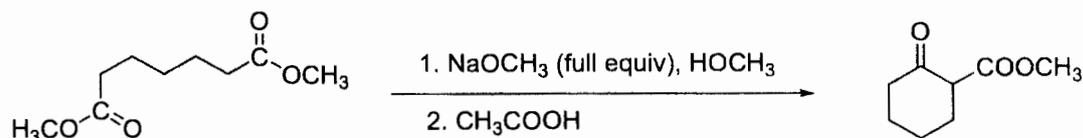
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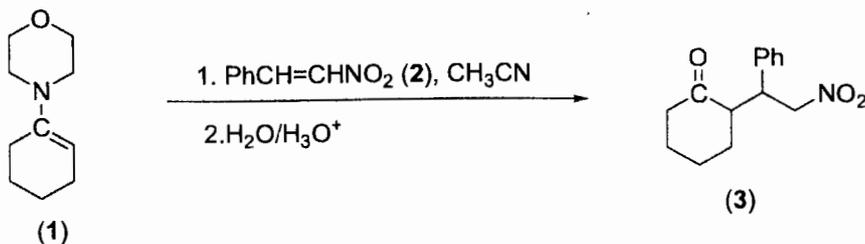
(e)



9. Write a mechanism for the following Dieckmann condensation: (5%)



10. Reaction of 1-morpholinocyclohexene (1) and β -nitrostyrene (2), followed by hydrolysis, yields the nitro ketone (3). Write an arrow formalism mechanism for this reaction sequence and sure to explain the observed regiochemistry. (4%)



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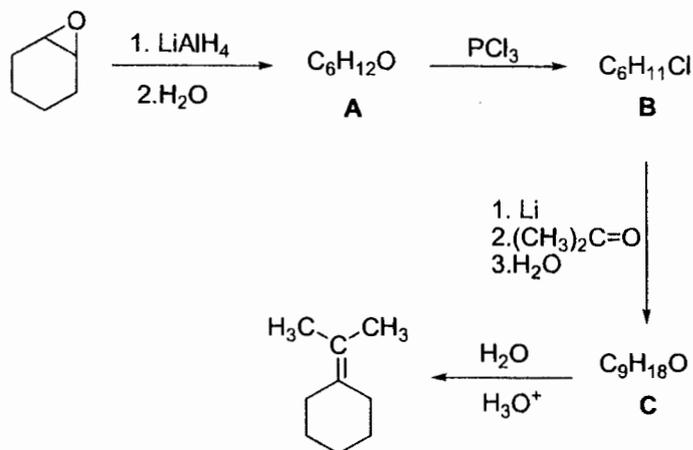
系所組別：化學系

考試科目：有機化學

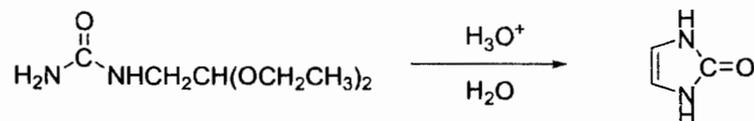
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11. Provide structures for compounds A-C. (6%)



12. Propose an arrow formalism mechanism for the following reaction: (4%)

13. Isomeric compounds A and B have the composition $\text{C}_{11}\text{H}_{12}\text{O}_4$. Spectral data are summarized below. Deduce structures for A and B and explain your reasoning. (10%)

Compound A

IR(KBr): 1720(s), 1240(s) cm^{-1} $^1\text{H NMR}(\text{CDCl}_3)$: δ 2.46 (s, 3H)

3.94 (s, 6H)

8.05 (d, $J=2$ Hz, 2H)8.49 (s, $J=2$ Hz, 1H)

Compound B

IR(Najol): 1720(s), 1245(s) cm^{-1} $^1\text{H NMR}(\text{CDCl}_3)$: δ 2.63 (s, 3H)

3.91 (s, 6H)

7.28 (d, $J=8$ Hz, 1H)8.00 (dd, $J=8, 2$ Hz, 1H)8.52 (d, $J=2$ Hz, 1H)

(背面仍有題目,請繼續作答)

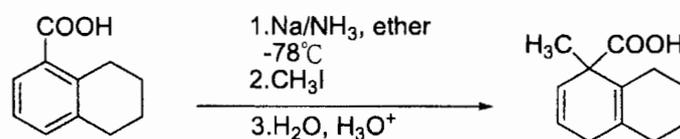
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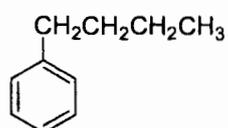
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14. Provide a mechanism for the following reaction sequence: (4%)

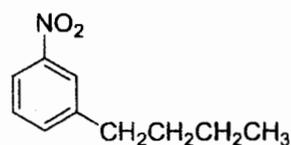


15. Provide syntheses for the following compounds, as free of other isomers as possible. You do not need to write mechanisms, and you may start from benzene, inorganic reagents of your choice, organic reagents containing no more than four carbons, and pyridine. (4%)

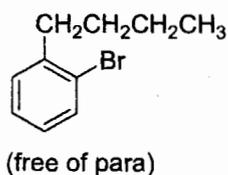
(a)



(b)



(c)



(d)

