

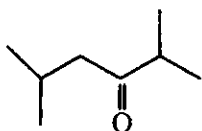
系所組別： 化學工程學系乙組

考試科目： 有機化學

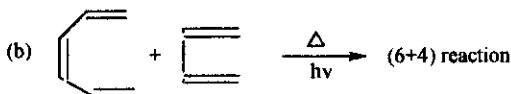
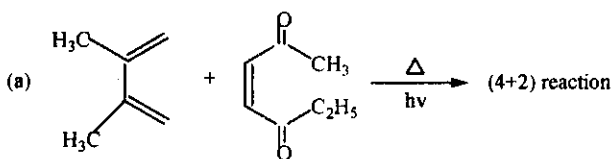
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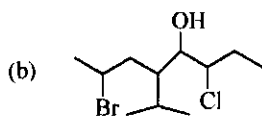
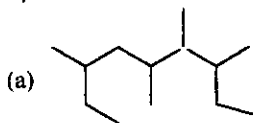
- Write a Lewis structure for each of the following negative ions, and assign the formal negative charge to the correct atom. (a) HSO_4^- , (b) NO_2^- . (8%)
- Using an alcohol of no more than four carbon atoms as your only organic starting material, outline a synthesis of following compound. (10%)



- Predict the product(s) of the following reactions. Are the reactions thermal or photo performable? Use molecular orbital (LCAO, the method of linear combination of atomic orbitals) theory to describe it in detail. (16%)



- Give systematic IUPAC name or draw molecular structure for each of the following. (10%)

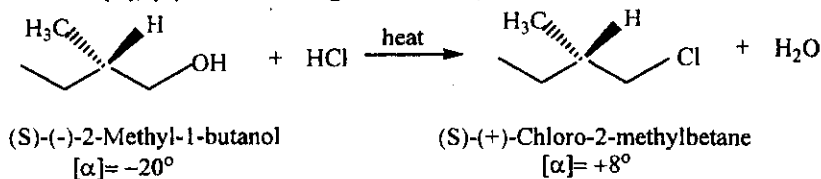


(c) trans-1,2-Dimethylcyclopropane

(d) 1,4-Dicyclopropylhexane

(e) 7-Methylbicyclo[2.2.1]heptane

- Following substitution shows an optically pure compound reaction. If we use a reagent to synthesize a product with $[\alpha] = -2^\circ$, estimate e.e.% of the reaction and the content of the (R)/(S) in feed reagent. (10%)



(背面仍有題目,請繼續作答)

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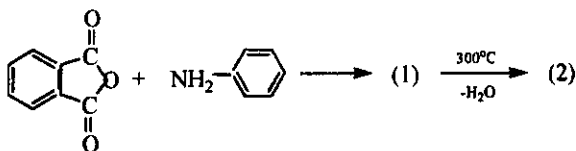
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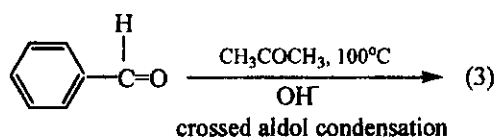
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6. Complete the following reactions. (20%)

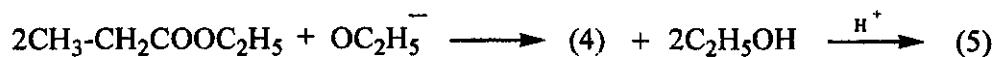
(a)



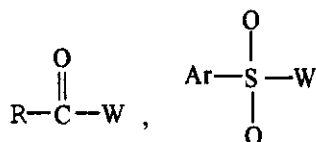
(b)



(c)



7. Compare the reactivity of sulfonyl compounds and acyl compounds for the nucleophilic substitution. Describe your reasons in detail. (10%)



8. Select suitable structures consistent with each of the proton NMR spectra in Figure 1.

- (1) phenyl methyl ketone (2) ethyl methyl ketone (3) 2-pentanone
 (4) isopropyl methyl ketone (5) aniline (16%)

