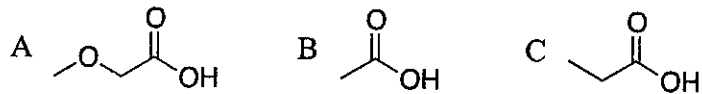
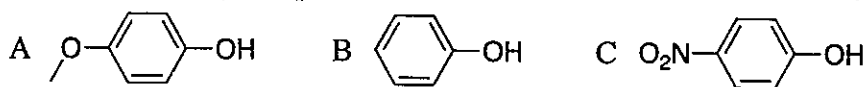


Part I. 排序題. Please order the compounds according to the described characteristics. 請於試卷內之「非選擇題作答區」依題號順序作答。以英文標示作答即可；例如 A>B>C。(每題 2 分，共 18 分)

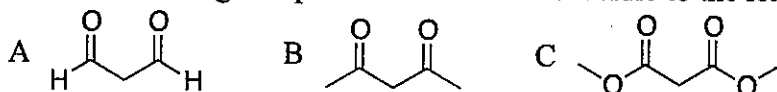
1. Order the following compounds from the most acidic to the least acidic.



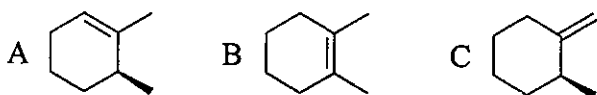
2. Order the following compounds from the most acidic to the least acidic.



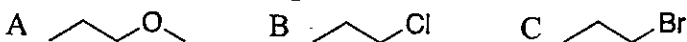
3. Order the following compounds from the most acidic to the least acidic.



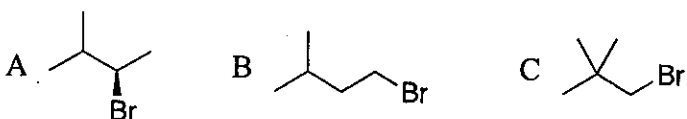
4. Order the following double bonds from the most stable to the least stable.



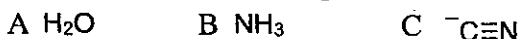
5. Order the following compounds from the most reactive to the least reactive towards S_N2 reactions.



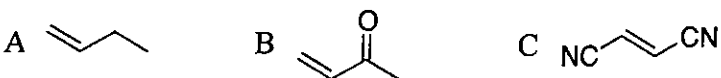
6. Order the following compounds from the most reactive to the least reactive towards S_N2 reactions.



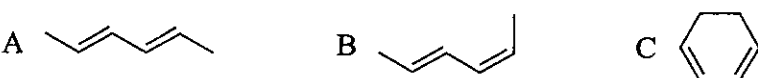
7. Order the following nucleophiles from the most reactive to the least reactive.



8. Order the following dienophiles from the most reactive to the least reactive towards Diels-Alder reactions.

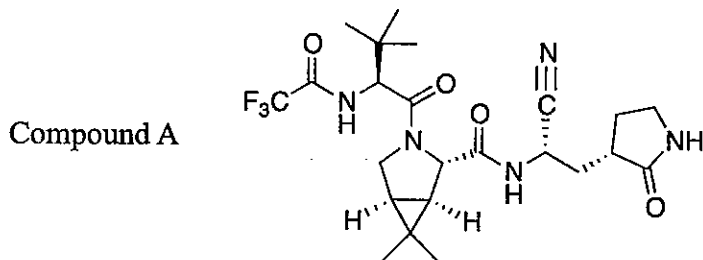


9. Order the following dienes from the most reactive to the least reactive towards Diels-Alder reactions.



Part II. 問答題. Please provide a short answer for the following questions. 請於試卷內之「非選擇題作答區」依題號順序作答。(共 22 分)

1. Please answer the following questions regarding Compound A. (8 分)

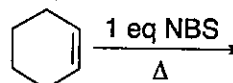
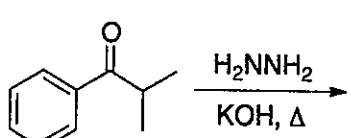
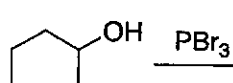
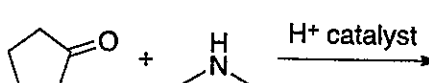
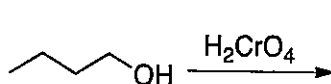
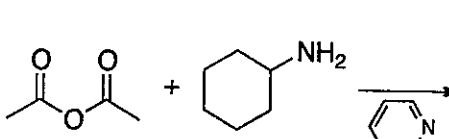
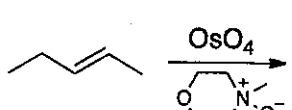
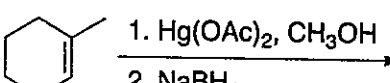
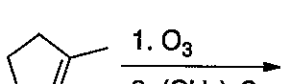
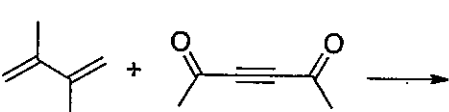
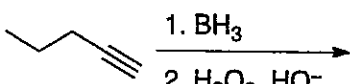
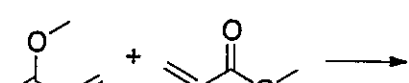
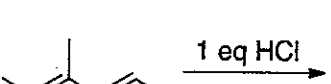
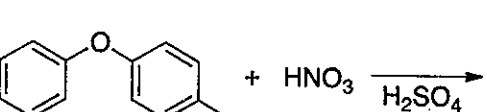
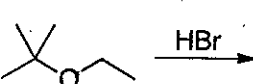
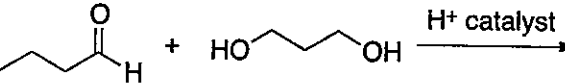
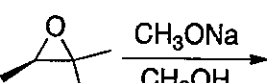
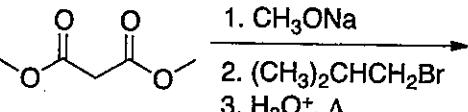
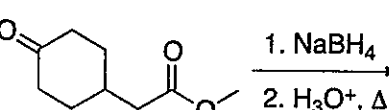
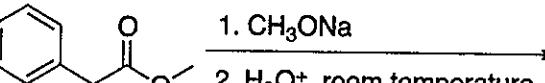
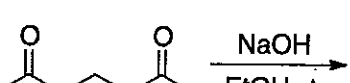
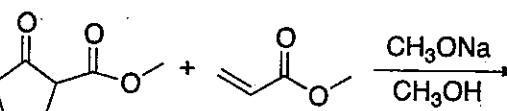


- How many primary carbons are in Compound A? (1 分)
 - How many tertiary carbons are in Compound A? (1 分)
 - How many secondary hydrogens are in Compound A? (1 分)
 - How many sp hybridized carbons are in Compound A? (1 分)
 - How many sp² hybridized carbons are in Compound A? (1 分)
 - How many sp³ hybridized carbons are in Compound A? (1 分)
 - How many S configuration stereocenters are in Compound A? (2 分)
- What is the degree of unsaturation for the molecular formula C₁₁H₁₂N₂O₂? (2 分)
 - Please draw the Newman projection of the most stable conformation for 2-methylbutane sighting along the C2-C3 bond. (2 分)
 - Please draw the more stable chair conformation for (1S,2R,5S)-2-tert-butyl-5-methylcyclohexanol. (5 分)

5. A compound shows the parent peak $M^+=86$ in the mass spectrum. The IR (infrared) spectrum of the compound shows a strong sharp absorption at 1715 cm^{-1} . The ^1H NMR spectrum of the compound consists of δ 1.05 (doublet, 6H, $J=7\text{ Hz}$), 2.12 (singlet, 3H), and 2.67 ppm (septet, 1H, $J=7\text{ Hz}$). The ^{13}C NMR spectrum of the compound consists of δ 18.2, 27.2, 41.6, and 211.2 ppm. Please draw the chemical structure of the compound. (5分)

Part III. 簡答題. Please draw the major product(s) for the following reactions. Please include stereochemistry when necessary. Line angle structures (also known as skeletal structures) are preferred. 請於試卷內之「非選擇題作答區」依題號順序作答。

(共 60 分)

1. (2分) 
2. (2分) 
3. (2分) 
4. (2分) 
5. (2分) 
6. (2分) 
7. (3分) 
8. (3分) 
9. (3分) 
10. (3分) 
11. (3分) 
12. (3分) 
13. (3分) 
14. (3分) 
15. (3分) 
16. (3分) 
17. (3分) 
18. (3分) 
19. (3分) 
20. (3分) 
21. (3分) 
22. (3分) 

試題隨卷繳回