

考生姓名： _____

※注意事項

請先確實填寫姓名及准考證號碼。

准考證號碼： _____

嘉南藥理科技大學九十五學年度碩士班暨碩士在職專班考試入學招生

有機化學試題(藥物科技研究所碩士班一般生乙組) 本試題共 1張2面

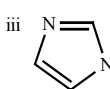
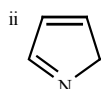
一、選擇題(以下共有 30 題選擇題，每題 2 分，共 60 分。每題只有一個正確答案，請將正確答案填入答案欄內，否則不予計分。答錯者該題以零分計，不倒扣分數。)

答案欄

<背面尚有題目>

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

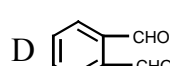
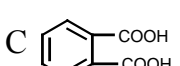
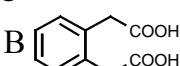
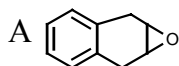
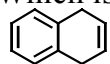
1. Which of the following structures are aromatic? i



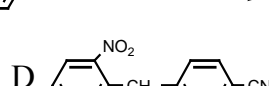
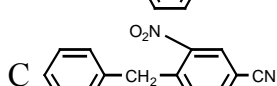
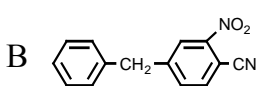
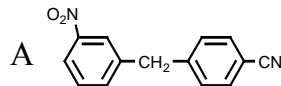
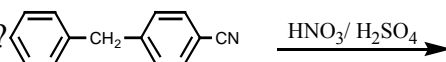
A. i, ii B. i, iii C. ii, iv D. iii, iv

2. How many isomers are possible for xylene? A. 2 B. 3 C. 4 D. 5

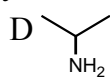
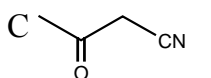
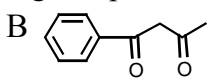
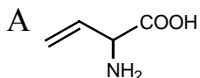
3. Which is the product from the following reaction?



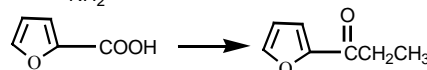
4. Which is a major product from the following reaction?



5. Which of the following is a possible product from a Wittig synthesis?



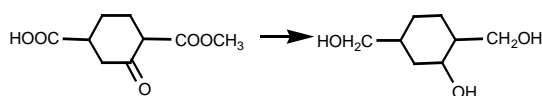
6. What are the best conditions for the following conversion?



A. i) $\text{CH}_3\text{CH}_2\text{MgBr}$ ii) H_3O^+ B. i) SOCl_2 ii) $\text{CH}_3\text{CH}_2\text{MgBr}$ iii) H_3O^+

C. i) SOCl_2 ii) $(\text{CH}_3\text{CH}_2)\text{Cd}$ D. i) SOCl_2 ii) $\text{LiAlH}(\text{OCMe}_3)_3$ iii) $\text{CH}_3\text{CH}_2\text{MgBr}$ iv) H_3O^+

7. Which reagent is best for the following conversion?



A. NaBH_4 B. LiAlH_4 C. $\text{Na}/\text{NH}_3(\text{l})$ D. H_2CrO_4

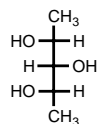
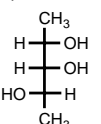
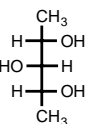
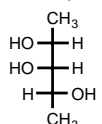
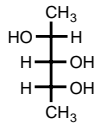
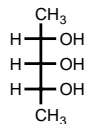
8. Which of the following structures are identical?

A. I and IV, II and III

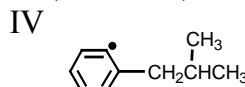
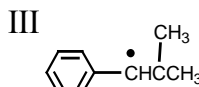
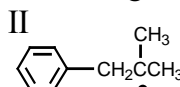
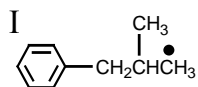
B. III and V, IV and VI

C. II and V, I and III

D. II and III, IV and VI



9. What is the order of increasing stability for the following radicals (least first)?



A. I, III, II, IV B. IV, III, II, I C. IV, I, II, III D. I, II, III, IV

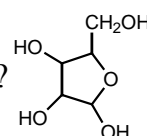
10. What is the order of increasing acid strength for the following compounds (lowest first)?

I. benzoic acid II. phenol III. p-nitrophenol IV. benzyl alcohol

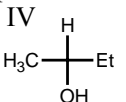
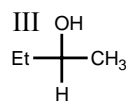
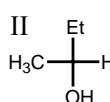
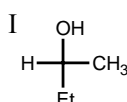
A. II, IV, II, I B. IV, II, III, I C. IV, II, I, III D. III, II, I, IV

11. What is the maximum number of stereoisomers possible for the following structure?

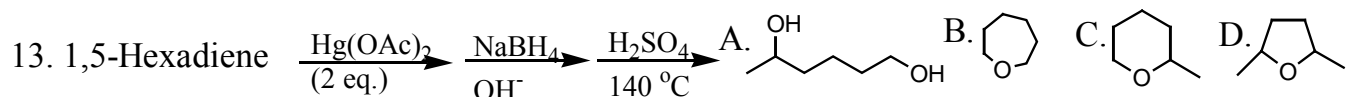
A. 4 B. 8 C. 16 D. 2



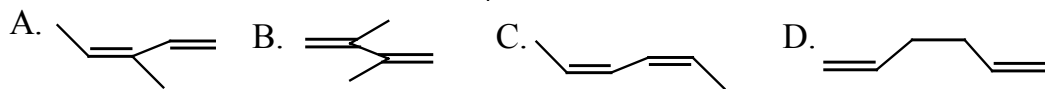
12. Which of the following structures are pairs of enantiomers?



A. I, II B. III, IV C. II, IV D. none



14. Compound **I** has the molecular formula, C_6H_{10} , and an absorption maximum in the UV above 200 nm. When reacted with acetylene, compound **I** forms compound **II** which has 3 sets of signals in the proton NMR spectrum, with 4 equivalent vinyl hydrogens. What is the most likely structure for **I**?



15. Arrange the following substances in the order of increasing boiling point (lowest first).

I. ethanol II. 95% ethanol in water III. diethyl ether IV. ethylene glycol

A. II, III, IV, I B. III, I, II, IV C. III, II, I, IV D. IV, III, II, I

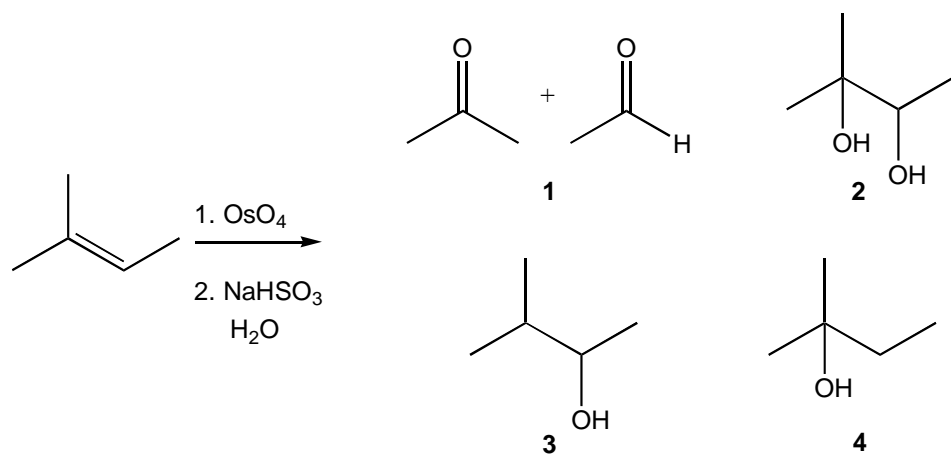
16. 下列那一個化合物的環張力 (ring strain) 最大?

A. cyclopropane B. cyclobutane C. cyclopentane D. cyclohexane

17. 下列那一個化合物的誘導效應最大因此酸性最高?

A. CH_3COOH B. FCH_2COOH C. ClCH_2COOH D. BrCH_2COOH

18. 下列那一個答案為正確的反應產物?

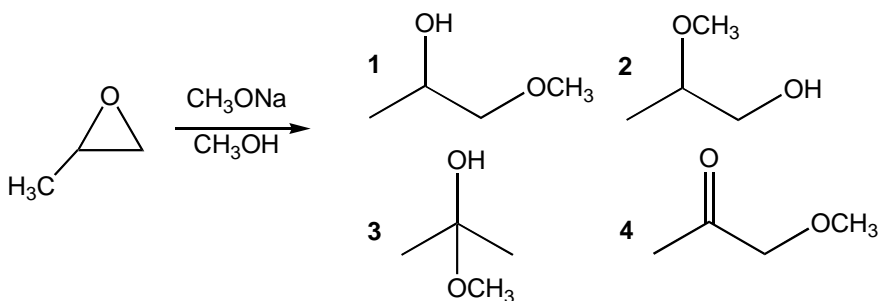


A. 1 B. 2 C. 3 D. 4

19. 下列那一個化合物是最強的親和性試劑 (nucleophile)?

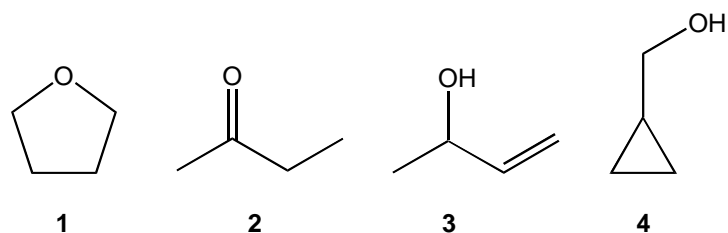
A. sodium ethoxide B. acetic acid C. methanol D. water

20. 下列那一個產物是正確的產物?



A. 1 B. 2 C. 3 D. 4

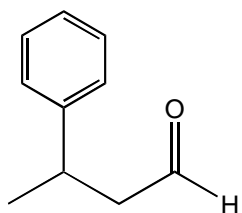
21. 下列那一個化合物在進行紅外線光譜 (infrared spectrum) 測定時會出現 1730 cm^{-1} 的強大吸收訊號 (strong peak)?



A. 1 B. 2 C. 3 D. 4

<背面尚有題目>

22. 下述化合物的正確名稱為何?



- A. 3-methyl-3-phenylpropanol B. 3-phenylbutanal C. 3-phenyl-1-butanone D. 3-phenylbutanoic acid

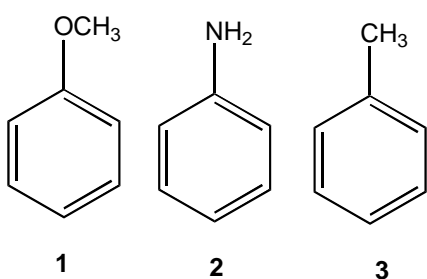
23. 下列那一個化合物的沸點最高?

- A. pentane B. 1-pentanol C. 2-pentanol D. pentanoic acid

24. 下列化合物針對水解速度的快慢，由快而慢的順序何者正確?

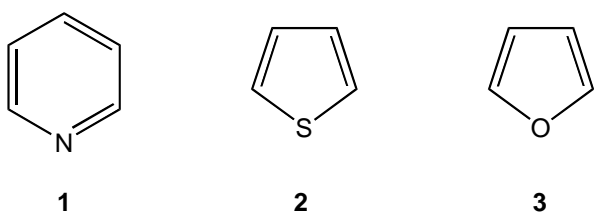
- A. esters > amides > acid chlorides B. amides > acid chlorides > esters
C. acid chlorides > esters > amides D. esters > acid chlorides > amides

25. 下列那一組名稱是正確的?



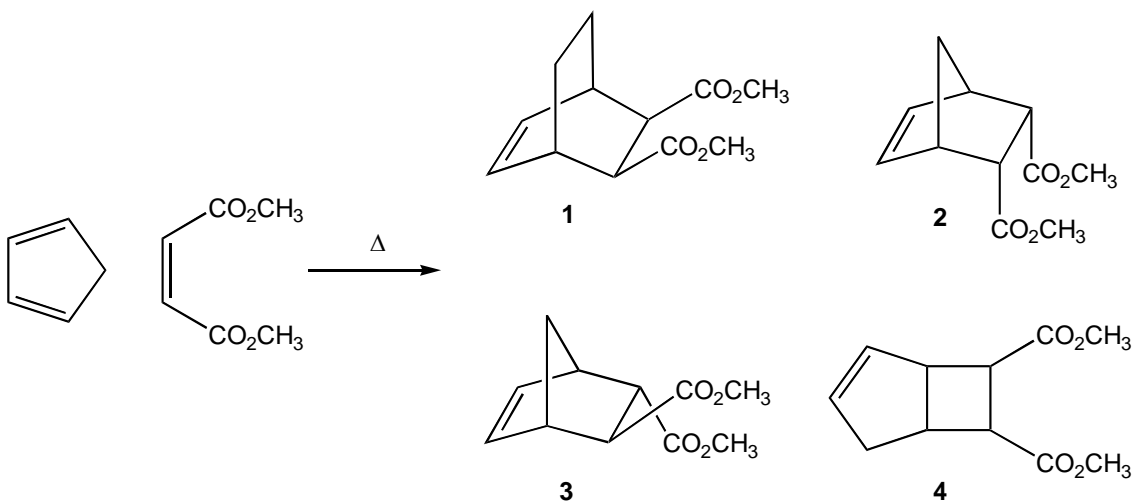
- A. 1 = phenol; 2 = aniline; 3 = anisole B. 1 = benzaldehyde; 2 = anisole; 3 = toluene
C. 1 = anisole; 2 = xylene; 3 = toluene D. 1 = anisole; 2 = aniline; 3 = toluene

26. 下列雜環骨架名稱那一組是正確的?



- A. 1 = pyrrole; 2 = thiophene; 3 = pyridine B. 1 = thiophene; 2 = furan; 3 = pyrrole
C. 1 = pyridine; 2 = thiophene; 3 = furan D. 1 = pyridine; 2 = thiophene; 3 = pyrrole

27. 下述反應那一個是主產物?



- A. 1 B. 2 C. 3 D. 4

28. 下列那一個是硬脂酸 (stearic acid) 的結構?

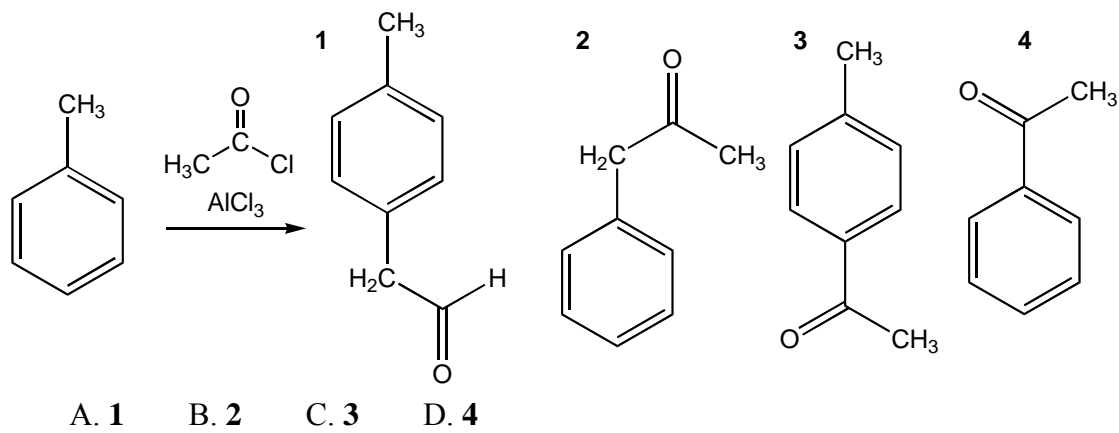
- A. $\text{CH}_3(\text{CH}_2)_{16}\text{COOH}$ B. $\text{CH}_3(\text{CH}_2)_7\text{CH}=\text{CH}(\text{CH}_2)_7\text{COOH}$
C. $\text{CH}_3(\text{CH}_2)_{18}\text{COOH}$ D. $\text{CH}_3\text{CH}_2(\text{CH}=\text{CHCH}_2)_3(\text{CH}_2)_6\text{COOH}$

29. 下列那一個鍵結為極性共價鍵 (polar covalent bond)?

- A. Na-F B. C-H C. C-O D. Cl-Cl

<背面尚有題目>

30. 下列那一個產物是該反應的主產物?



二、問答題(共 4 題，共 40 分，請依題意提出重點回答。)

1. 舉例說明酯類的皂化反應機制(mechanism of saponification of esters)。
2. *p*-toluidine, *p*-methylphenol, 和 *p*-xylene 如何以酸鹼反應的方法分離。
3. 請寫出一個流程，利用分液漏斗及乙醚、鹽酸溶液、氫氧化鈉溶液、碳酸氫鈉溶液等試劑將苯甲酸(benzoic acid)、苯胺(aniline)及酚(phenol)三個化合物的混合溶液中將其分離開來？
4. 某一個具光學活性的化合物，其純的 R 形態之標準旋光度 specific rotation, $[\alpha]$ 為 $+40^\circ$ ，而目前你拿到一個該化合物之 R 及 S 兩種形態的混合物，你用 10 公分的旋光儀之石英管，配上 0.2 g/mL 的濃度，測出旋光度為 -2° ，請算出該光學混合物中 R isomer 與 S isomer 的比例?(請寫出計算過程，過程正確仍有部分分數)。