

國立臺北科技大學九十五學年度碩士班招生考試

系所組別：3620 生物科技研究所乙組

第二節 有機化學 試題

填准考證號碼

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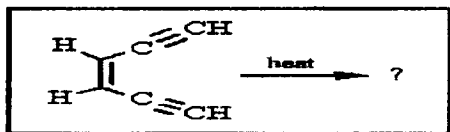
第一頁 共五頁

注意事項：

1. 本試題共 26 題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

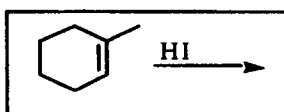
Part I. Please choose a *best answer* for the questions below (3 points each)

- 1 The ene-diyne antibiotics, such as calicheamicin and esperamicin, undergo an unusual cycloaddition reaction of the same basic type shown below. What is the correct product formed immediately after the cycloaddition?



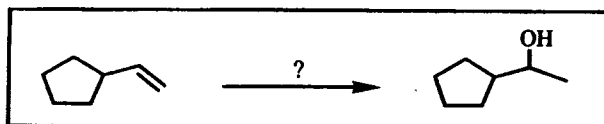
- A) B)
- C) D)

- 2 What is the MAJOR product of the following reaction?



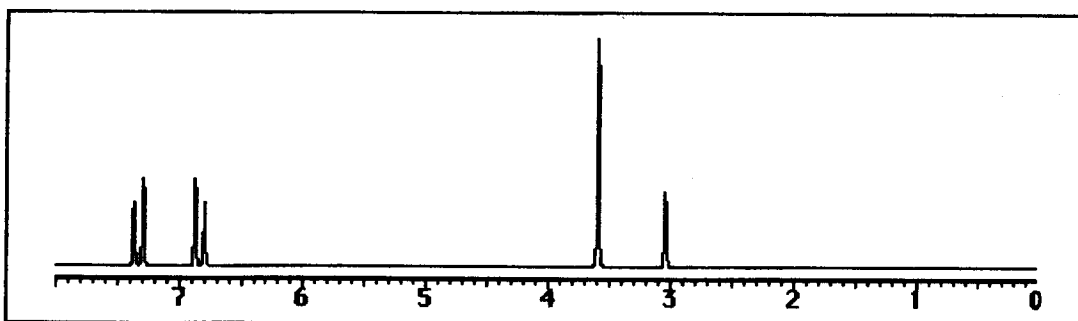
- A) B)
- C) D) No reaction

- 3 Which reagents would you expect to accomplish the following transformation?



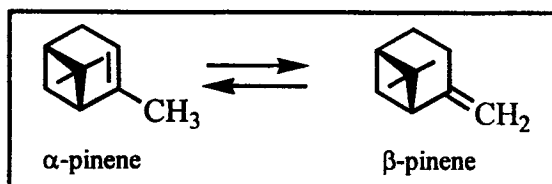
- A) BH_3 then H_2O_2 , OH^- B) $\text{Hg}(\text{O}_2\text{CCH}_3)_2$,
 H_2O then NaBH_4
C) H_2O , H^+ D) KMnO_4 , H_2O , cold

- 4 The following $^1\text{H-NMR}$ spectrum was most likely obtained from which of the compounds listed below?



- A) B)
C) D)

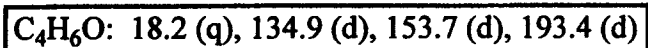
- 5 Under special reaction conditions, α -pinene and β -pinene can be in equilibrium (caused to interconvert reversibly). Using your knowledge of alkene stability, which of the following would be true at equilibrium?


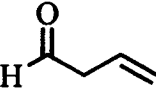


- A) The α -isomer will predominate B) The β -isomer will predominate
C) The isomers would be equally favored. D) A third isomer would predominate.

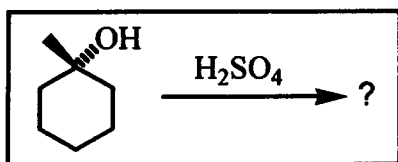
注意：背面尚有試題

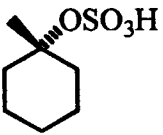
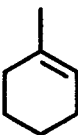
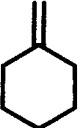
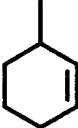
- 6 The molecular formulas and ^{13}C NMR data (in ppm) are given below. The splitting pattern of each signal, taken from the **non-decoupled** spectrum is given in parentheses. Deduce the correct structure:



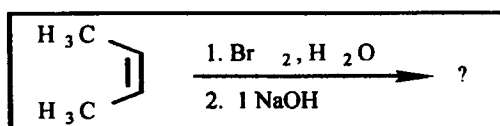
- A)  B) 
- C)  D) 

- 7 What is the MAJOR product of the following reaction:



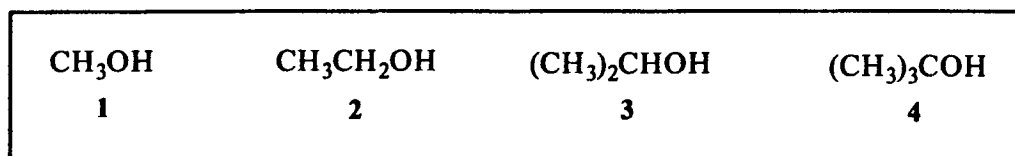
- A)  B) 
- C)  D) 

- 8 What product would result from the following reactions?



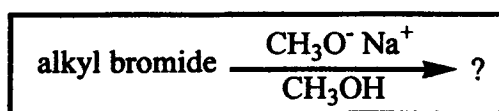
- A)  B) 
- C)  D) 

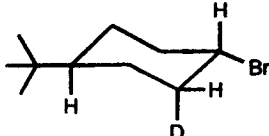
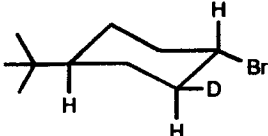
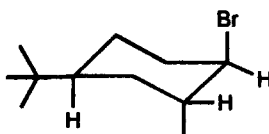
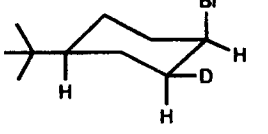
9 Rank the following alcohols in order of decreasing acidity in solution.



- A) $1 > 2 > 3 > 4$ B) $2 > 1 > 3 > 4$
 C) $4 > 3 > 2 > 1$ D) $4 > 3 > 1 > 2$

10 Which of the cyclohexyl bromides would you expect to react the fastest in the following reaction?

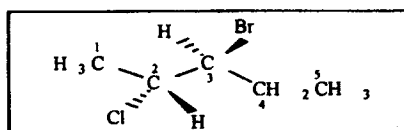


- A) 
- B) 
- C) 
- D) 

11 Which of the following is the least nucleophilic base:

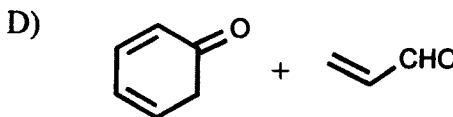
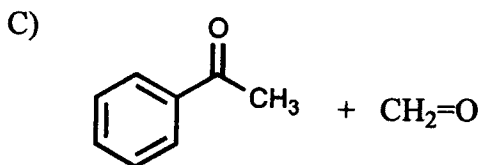
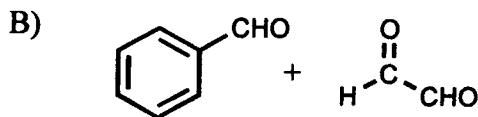
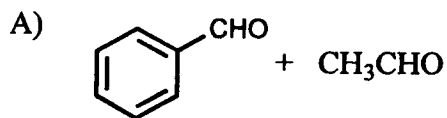
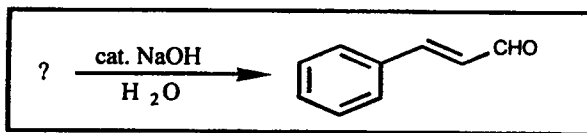
- A) $(\text{CH}_3\text{CH}_2)_3\text{N}$ B) 
- C) 
- D) 

12 What (*R*) or (*S*) stereochemistry is proper for the following molecule?

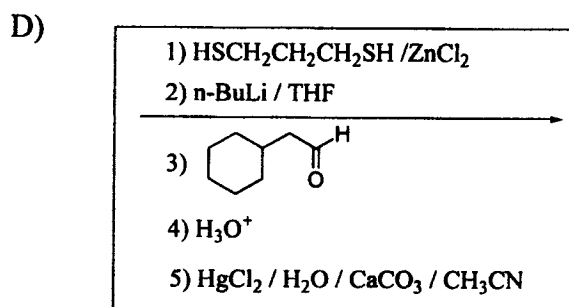
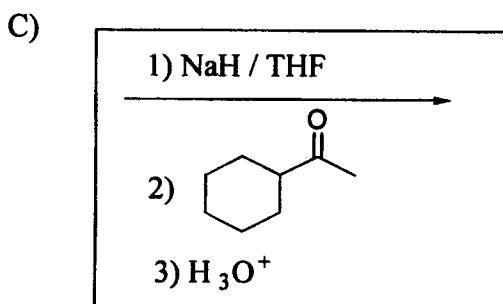
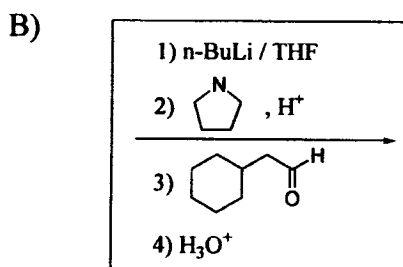
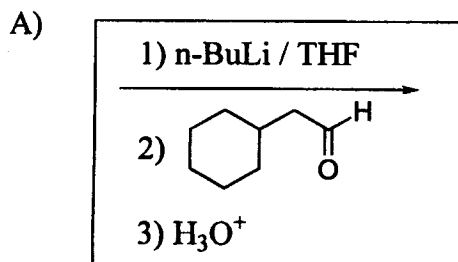
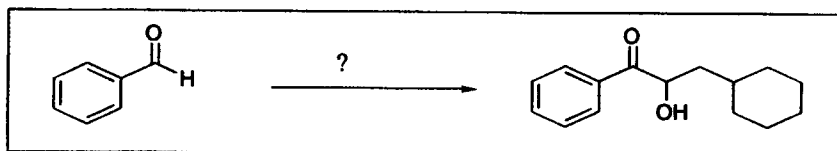


- A) (*2R,3R*) B) (*2R,3S*)
 C) (*2S,3S*) D) (*2S,3R*)

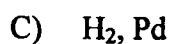
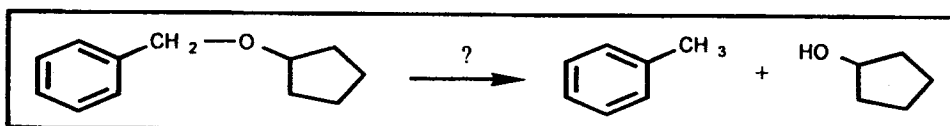
13 What reactants would be used to produce cinnamaldehyde?



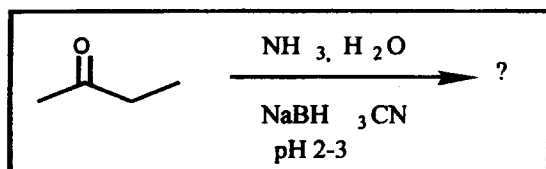
14 Which of the following reaction sequences will effect the following transformation?



15 What reagent(s) would be required to accomplish the following reaction?

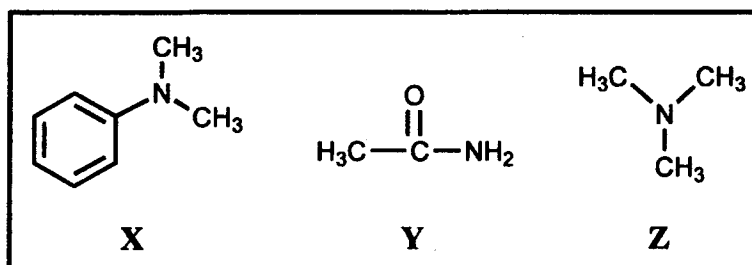


16 What product would result from the following reaction?



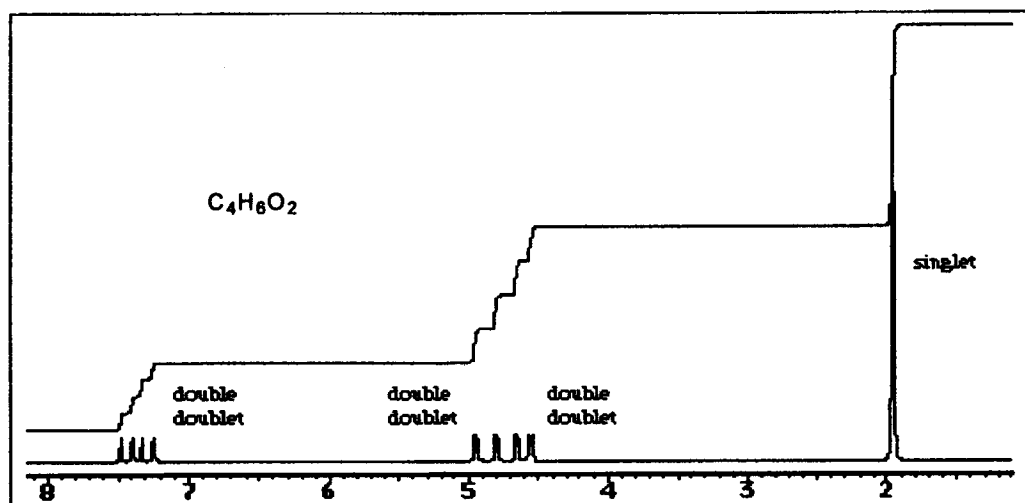
- A) B)
- C) D)

17 Rank the following in order of **decreasing** basicity (most basic on left):



- A) $Z > X > Y$ B) $Y > X > Z$
 C) $Z > Y > X$ D) $X > Z > Y$

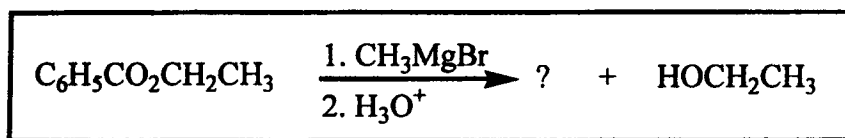
18 When compound X is heated with aqueous acid, acetic acid and acetaldehyde (ethanal) are formed. The proton NMR spectrum of X is shown below. What is the structure of X?



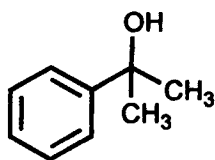
- A) $\text{CH}_2=\text{CHO}_2\text{CCH}_3$ B) $\text{CH}_2=\text{CHOCH}_2\text{CH}$
 C) $\text{CH}_2=\text{C}(\text{CH}_3)\text{O}_2\text{CH}$ D) $\text{CH}_3\text{CH}=\text{CHO}_2\text{CH}$

注意：背面尚有試題

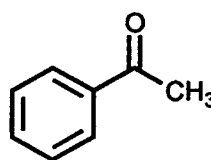
19 What would be the other product of the following reaction?



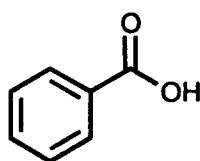
A)



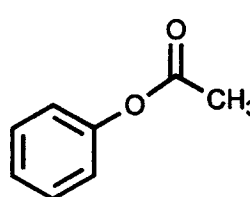
B)



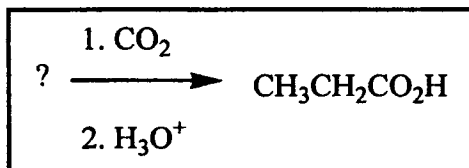
C)



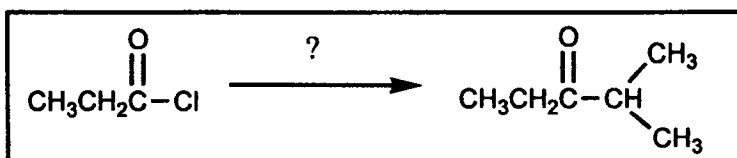
D)



20 What reagent(s) is (are) needed to complete the reaction shown?

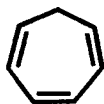
A) $\text{CH}_3\text{CH}_2\text{Br}$ B) $\text{KMnO}_4/\text{OH}^-$ C) $\text{CH}_3\text{CH}_2\text{MgBr}$ D) CH_3Li

21 What reagent is needed to complete the reaction shown?

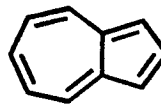
A) $((\text{CH}_3)_2\text{CH})_2\text{CuLi}$ B) KCN/NaOH C) $\text{HOCH}(\text{CH}_3)_2$ D) $\text{BrMgCH}(\text{CH}_3)_2$

22 Which of the following would you expect to be aromatic?

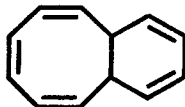
A)



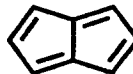
B)



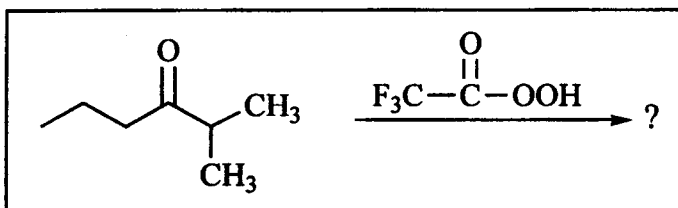
C)



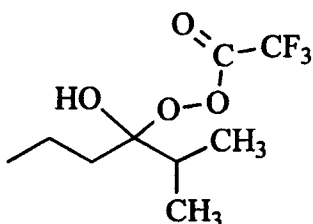
D)



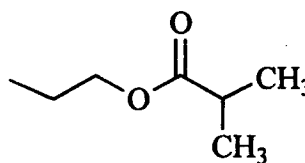
23 What would be the major product of the following reaction?



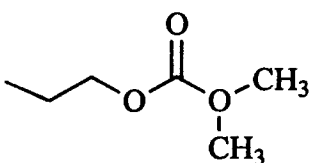
A)



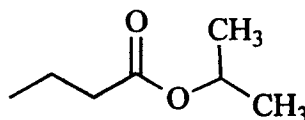
B)



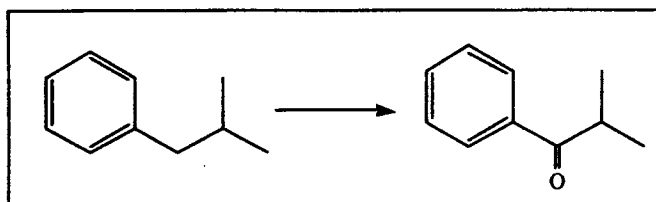
C)



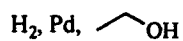
D)



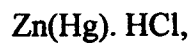
24 Choose the appropriate reagents necessary to achieve this reaction:



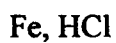
A)



B)



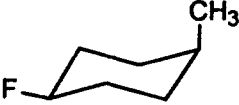
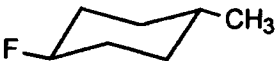
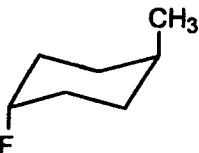
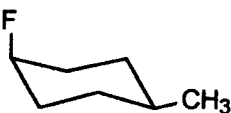
C)



D)



25 What is the most stable conformation of *trans*-1-fluoro-4-methylcyclohexane?

- A) 
- B) 
- C) 
- D) 

Part II Show the mechanisms for each of the reactions below. Please be *very clear*. (A & B are 5 points each, and C is 15 points)

