

# 臺北醫學大學 104 學年度碩士班暨碩士在職專班招生入學考試

有機化學試題

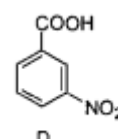
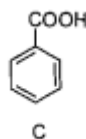
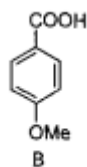
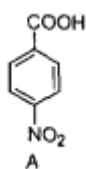
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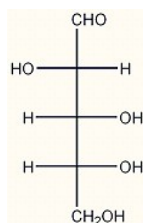
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| 注<br>意<br>事<br>項 | <p>一、本試題共二大題，共計 100 分。</p> <p>二、請將最適當的答案依題號作答於答案用卷上。</p> <p>三、試題答錯者不倒扣。</p> |
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## 一、選擇題 (每題 3 分，共 60 分)

- Triethylamine (TEA) is a stronger base than  
 (A)  $\text{CH}_3\text{COONa}$                       (B) t-BuOK                      (C) NaOH                      (D) pyridine
- Cyclohexane prefers the  
 (A) boat form                      (B) twist form                      (C) chair form                      (D) none of the above
- Which of the following molecules is chiral?  
 (A) 1,2-pentadiene                      (B) 2,3-pentadiene  
 (C) 2-methyl-2,3-pentadiene                      (D) 2-chloro-4-methyl-2,3-pentadiene
- In the proton NMR, what region of the spectrum does typically indicate the hydrogens bound to the aromatic ring?  
 (A) 9.0-10.0 ppm                      (B) 7.0-8.0 ppm                      (C) 4.5-5.5 ppm                      (D) 2.0-3.0 ppm
- If a signal is observed in the range of 170 to 200 ppm in a C-13 NMR spectrum, what is the most likely type of functional group associated with that carbon atom?  
 (A) carbon/carbon double bond                      (B) carbonyl carbon  
 (C) aromatic carbon                      (D) carbon/carbon triple bond
- About pKa of carboxylic acid A, B, C and D, which of the following statements is correct?



- (A)  $D < A < C < B$                       (B)  $B < C < D < A$                       (C)  $A < D < C < B$                       (D)  $B < C < A < D$
- What type of carbon environment does not generate a signal in the DEPT-90 spectrum and give a negative signal in the DEPT-135 spectrum?  
 (A) carbonyl                      (B) methane                      (C) methylene                      (D) methyl
  - The structure of D-arabinose is shown below. Which of the following statements correctly describes the configurations of the asymmetric carbons in D-arabinose?

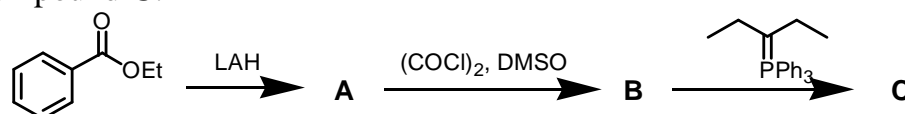


- (A) 2S, 3R, 4R                      (B) 2R, 3S, 4S                      (C) 2S, 3R, 4S                      (D) 2R, 3S, 4R
- Which of the following statements correctly describes the structural relationship between D-gulose and L-gulose?  
 (A) diastereomers and epimers                      (B) diastereomers but not epimers  
 (C) enantiomers                      (D) constitutional isomers

10. Amino acids have:

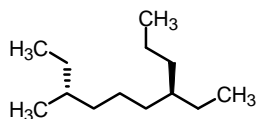
- (A) high melting points and low solubility in water.
- (B) large dipole moments and are more acidic than most carboxylic acids.
- (C) high melting points and large dipole moments.
- (D) low solubility in water and small dipole moments.

11. What is the structure of compound C.



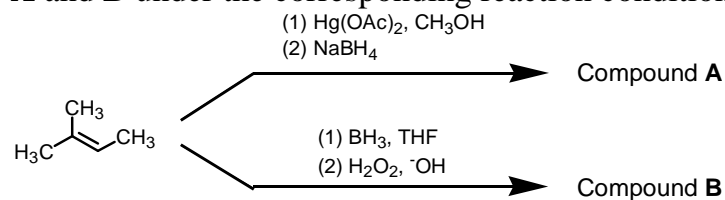
- (A)
- (B)
- (C)
- (D)

12. Please assign the correct chirality of the structure.



- (A) 2R,6R
- (B) 3R,7R
- (C) 3S,7R
- (D) 4R,8R

13. Please select the major products A and B under the corresponding reaction conditions.



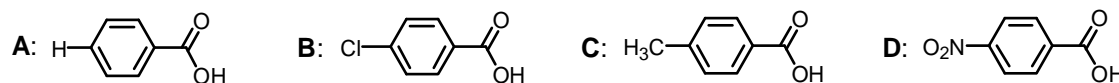
- (A) A: B:
- (B) A: B:
- (C) A: B:
- (D) A: B:

14. Please choose the correct sequence of reactivity of following carboxylic acid derivatives.



- (A) A > B > C > D
- (B) C > A > B > D
- (C) A > C > B > D
- (D) C > A > D > B

15. Which of the following substituted benzoic acids is the most acidic?



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

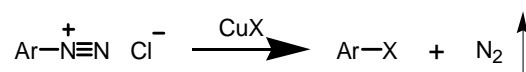
16. Which of the following reagents could react with acid halide to afford a ketone?

- (A)  $(\text{CH}_3\text{CH}_2)_2\text{CuLi}$
- (B)  $\text{NaBH}_4$
- (C)  $\text{LiAlH}_4$
- (D)  $\text{RMgBr}$

17. Which of the following amines could be prepared by Gabriel amine synthesis?

- (A) 1<sup>o</sup> amine
- (B) 2<sup>o</sup> amine
- (C) 3<sup>o</sup> amine
- (D) 4<sup>o</sup> amine

18. What is the name of the following reaction?



- (A) Sonogashira reaction
- (B) Suzuki reaction
- (C) Sandmeyer reaction
- (D) Stille reaction

19. Which of the following amino acids contains an imidazole ring?

- (A) proline
- (B) arginine
- (C) tryptophan
- (D) histidine

20. Which of the following anions is the best leaving group?

(A)  $F^-$

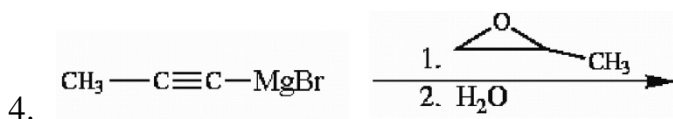
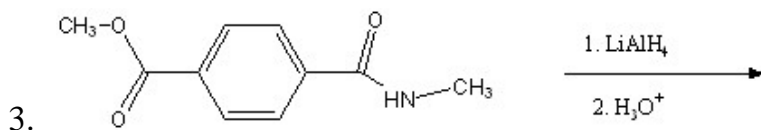
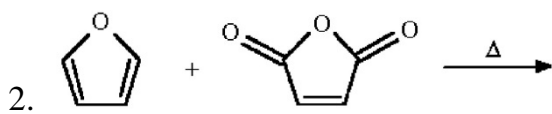
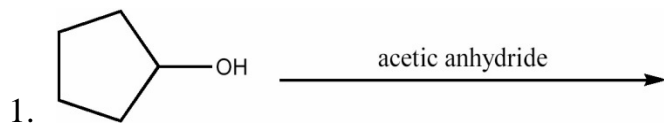
(B)  $Cl^-$

(C)  $Br^-$

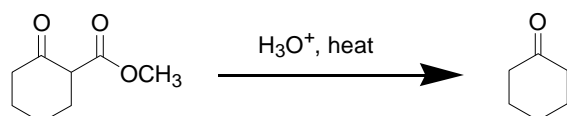
(D)  $I^-$

二、問答題 (每題 5 分，共 40 分)

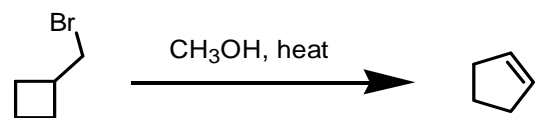
1~4 題請寫出反應終產物



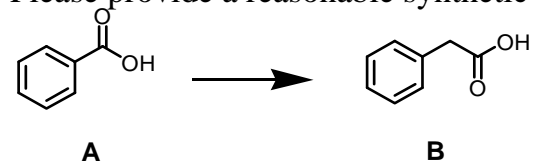
5. Please draw the plausible mechanism of the following reaction.



6. Please draw the plausible mechanism of the following reaction.



7. Please provide a reasonable synthetic route and appropriate reagents to prepare compound B from compound A.



8. Please predict the correct structure and write down your reasons.

(A) Elemental analysis: C, 61.22%; H, 6.16%; O, 32.62%.

(B) Molecular Weight: 196 g/mole

(C)  $^{13}C$ -NMR &  $^1H$ -NMR spectra:

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本試題第 4 頁；共 4 頁

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