

國立中央大學九十學年度碩士班研究生入學試題卷

所別: 環境工程研究所 丙組 科目: 有機化學 共 2 頁 第 1 頁

1. (4 pts)

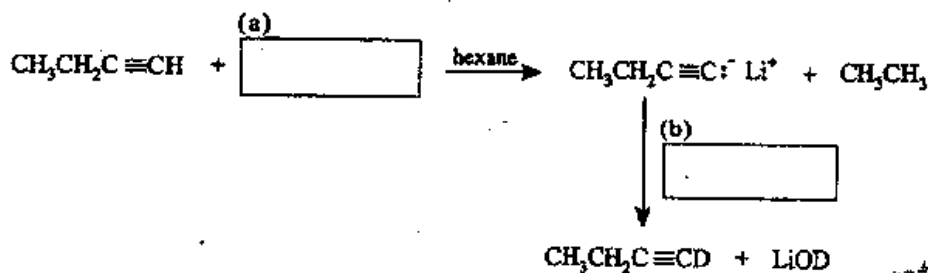
What acid-base reaction (if any) would occur when NaF is dissolved in H₂SO₄?

2. (5 pts)

The pK_a of CH₃NH₃⁺ equals 10.6; the pK_a of (CH₃)₂NH₂⁺ equals 10.7. Which is the stronger base, CH₃NH₂ or (CH₃)₂NH?

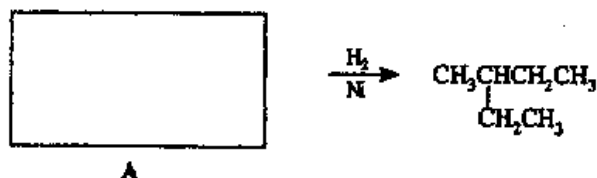
3. (10 pts)

Supply the missing reagents.



4. (5 pts)

Compound A is optically active and is the (S) isomer.



5. (12 pts)

Propose a structure that is consistent with each set of following data.

C₉H₁₀O

¹H NMR spectrum

Singlet δ 2.0 (3H)

Singlet δ 3.75 (2H)

Singlet δ 7.2 (5H)

IR spectrum

3100, 3000, 1720,

740, 700 cm⁻¹

and other peaks.

C₅H₇NO₂

¹H NMR spectrum

Triplet δ 1.2 (3H)

Singlet δ 3.5 (2H)

Quartet δ 4.2 (2H)

IR spectrum

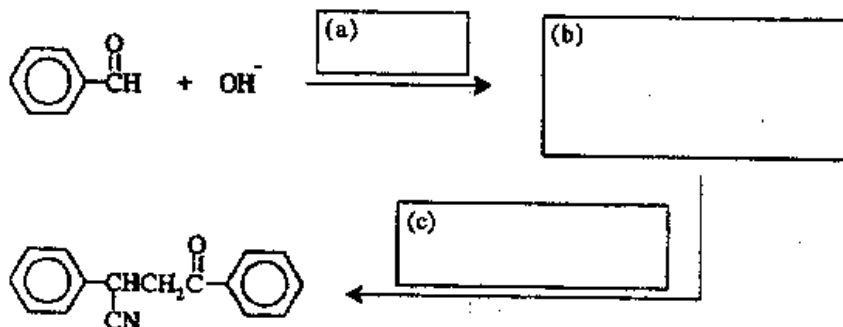
2980, 2260, 1750 cm⁻¹

and other peaks.

This compound has a nitro group.

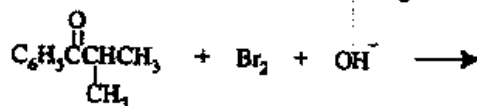
6. (15 pts)

Supply formulas for the missing reagents and intermediates in the following synthesis.



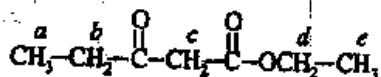
7. (5 pts)

What would be the major product of the following reaction?



8. (4 pts)

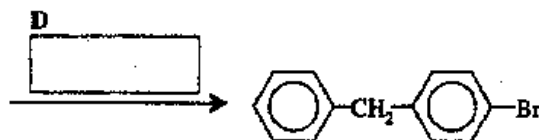
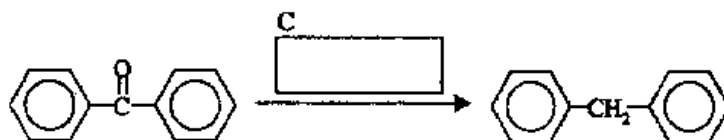
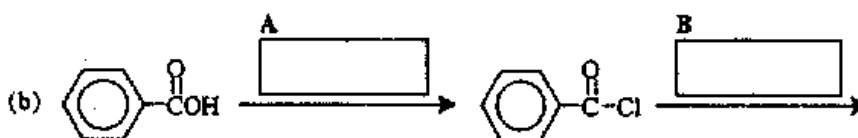
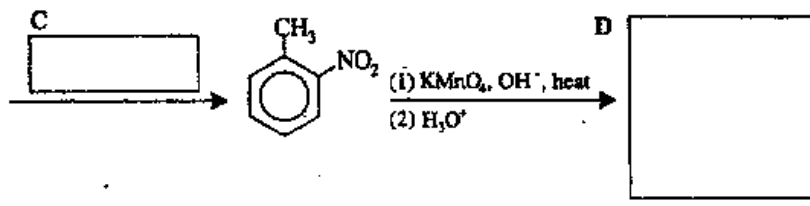
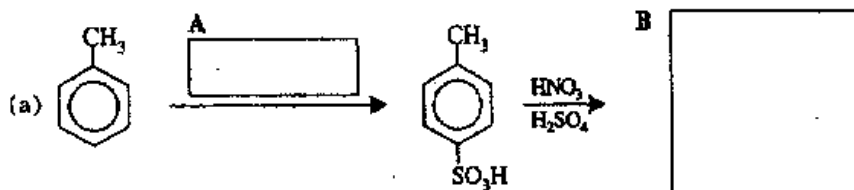
Which hydrogen atoms in the following ester are most acidic?



注意：背面有試題

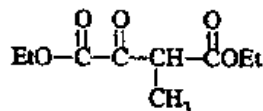
9. (32 pts)

Complete the following syntheses.



10. (4 pts)

What starting materials could be used in a crossed Claisen condensation to prepare the following compound?



- (a) $\text{CH}_3\text{CO}_2\text{Et}$ and $\text{EtO}-\overset{\text{O}}{\parallel}{\text{C}}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_2\text{CH}_3$ (d) $\text{EtO}_2\text{CCHCO}_2\text{Et}$ and HCO_2Et
 CH_3
- (b) $\text{CH}_3\text{CH}_2\text{CO}_2\text{Et}$ and $\text{EtO}_2\text{C}-\text{CO}_2\text{Et}$ (e) More than one of the above
- (c) $\text{CH}_3\text{CH}_2\text{CO}_2\text{Et}$ and HCO_2Et

11. (4 pts)

Which Wittig reagent could be used to synthesize $\text{C}_6\text{H}_5\text{CH}=\text{CHCH}_2\text{CH}_3$? (Assume any other needed reagents are available.)

- (a) $\text{C}_6\text{H}_5\text{CHP}^+(\text{C}_6\text{H}_5)_3$ (d) More than one of these
- (b) $\text{C}_6\text{H}_5\text{CH}=\text{CHCHP}^+(\text{C}_6\text{H}_5)_3$ (e) None of these
- (c) $\text{CH}_3\text{CH}_2\text{CHP}^+(\text{C}_6\text{H}_5)_3$