國立成功大學

115學年度碩士班招生考試試題

編　號：54

系　所：化學工程學系

科　目：有機化學

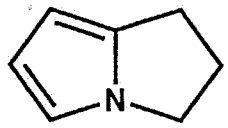
日　期：0203

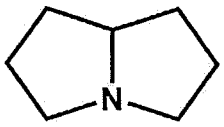
節　次：第 1 節

注　意：1.不可使用計算機
2.請於答案卷(卡)作答，於試題上作答，不予計分。

1. Select the correct answer. (12%)

1.1. Which compound is expected to be a stronger base? (Single choice) (4%)

(A) 

(B) 

1.2. Which of the following acid-base reactions will take place? (Single choice) (4%)

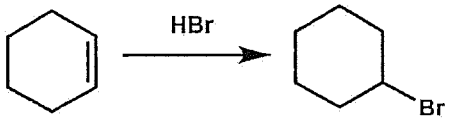
(A) $H-C\equiv C-H$ + CH_3Li

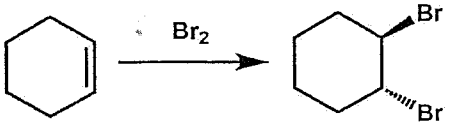
(B) $H-C\equiv C^- Na^+$ + $H_2C=CH_2$

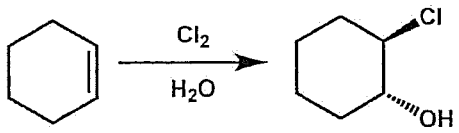
(C) $H_2C=CH_2$ + $NaNH_2$

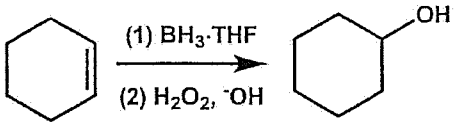
(D) $H-C\equiv C-H$ + $NaOCH_3$

1.3. Which of the following reactions can be considered as oxidation processes? (Multiple choices, you must choose all correct answers.) (4%)

(A) 

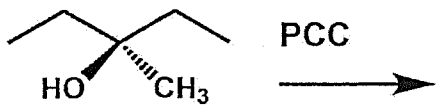
(B) 

(C) 

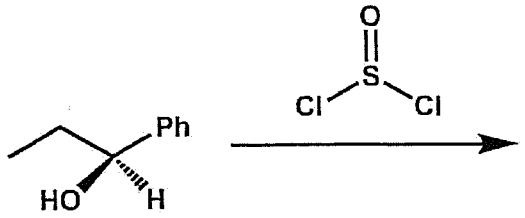
(D) 

2. Draw the chemical structures of the major products for the following reaction. Include correct stereochemistry if necessary. (20%)

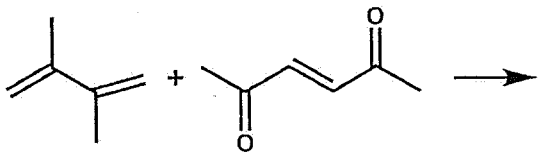
2.1. (5%)



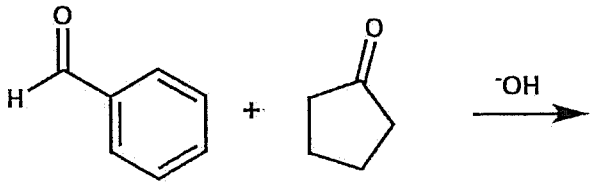
2.2. (5%)



2.3. (5%)



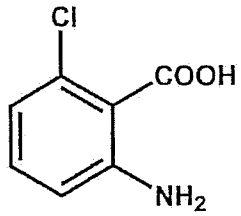
2.4. (5%)



3. (14%)

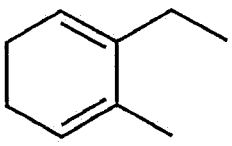
3.1. Use any reagents of your choosing, show how you would convert 2-methyl-2-propanol into 2-methyl-1-propanol. (7%)

3.2. Starting from toluene, propose a synthesis of this trisubstituted benzene. (7%)



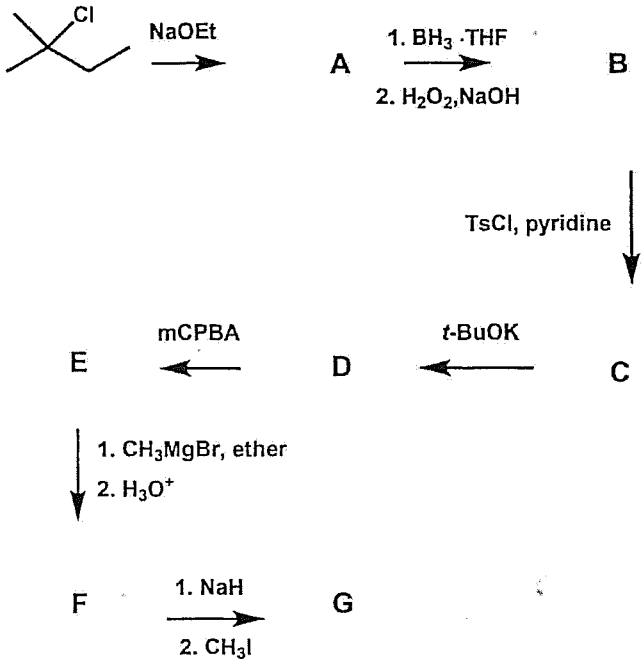
4. (18%)

4.1. Draw all products that are expected by treating the following compound with one equivalent of HBr at room temperature, and show the mechanism for their formation. (10%)



4.2. After performing the above reaction, the reactor is heated to 40 °C and two of the products become the major products. Explain why an increase in temperature causes a change in the product distribution. (8%)

5. (26%)



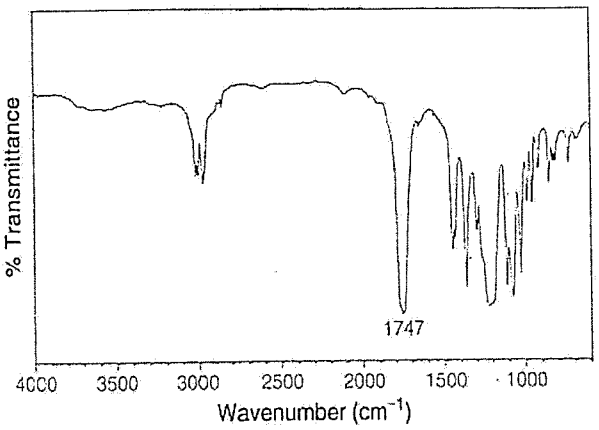
5.1. Draw the structures of compounds A, B, C, D, E, F, and G. (14%)

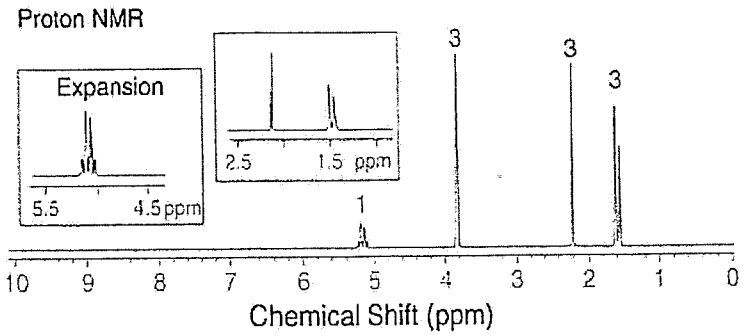
5.2. Explain how you would use IR spectroscopy to differentiate between compounds F and G. (4%)

5.3. Explain how you would use IR spectroscopy to differentiate between compounds D and E. (4%)

5.4. If you want to distinguish between compounds B and F, would it be more suitable to use IR spectroscopy or mass spectrometry? Please provide your reason (4%)

6. Deduce the structure of a compound with the molecular formula $C_6H_{10}O_4$ that exhibits the following IR, ^1H NMR, and ^{13}C NMR spectra. The numbers above the ^1H NMR peaks represent the integral areas of the peaks. (10%)





Carbon NMR