107cH04

國立臺北科技大學 107 學年度碩士班招生考試

系所組別：3520 化學工程與生物科技系化學工程碩士班乙組

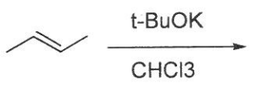
第二節　有機化學　試題

注意事項：

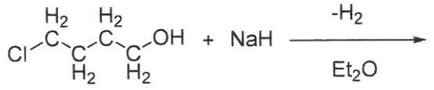
1. 本試題共六題，共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. Predict the products (show the isomers as well if necessary) of the following reactions. (40 pts, 4pts each)

(1)



(2)



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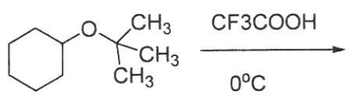

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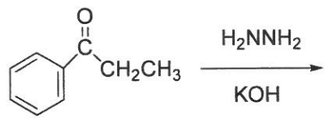

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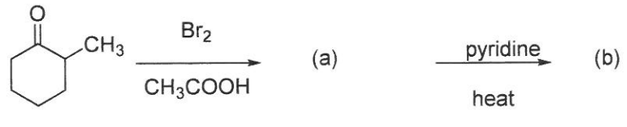

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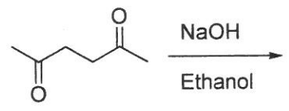

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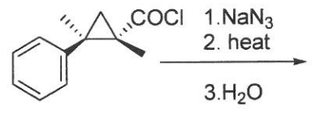
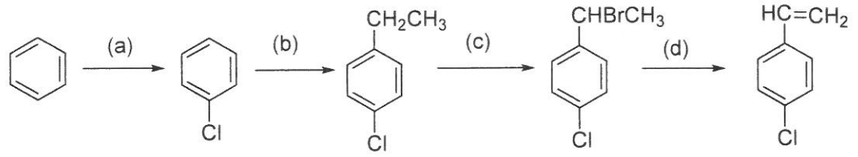


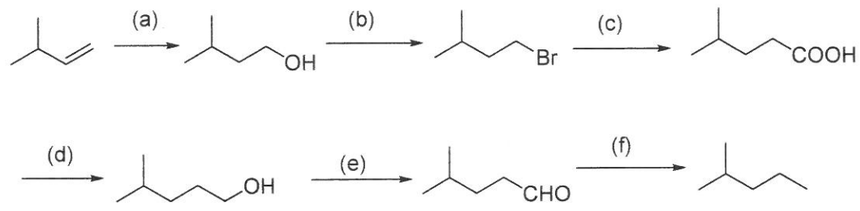
(8)

2. Show the reagents of the following reactions. (20 pts, each 2pts)

(1)



(2)



3. Compound **A**, a hydrocarbon with M^+=96 in its mass spectrum, has the ^{13}C spectral data shown below. On reaction with BH_3 followed by treatment with basic H_2O_2, **A** is converted to **B**, whose ^{13}C spectral data are also shown. Propose structures for **A** and **B**. (10 pts, 5 pts each)

Compound **A**:

Broadband decoupled ^{13}C NMR: 26.8, 28.7, 35.7, 106.9, 109.7 δ

DEPT-90: no peaks

DEPT-135: no positive peaks; negative peaks at 26.8, 28.7, 35.7, 106.9 δ

Compound **B**:

Broadband decoupled ^{13}C NMR: 26.1, 26.9, 29.9, 40.5, 68.2 δ

DEPT-90: 40.5 δ

DEPT-135: positive peaks at 40.5δ; negative peaks at 26.1, 26.9, 29.9, 68.2 δ

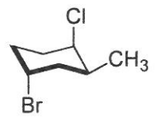
4. Propose a structure consistent with the following spectral data for a compound of formula $C_8H_{18}O_2$:

^1H NMR: 1.24 δ (12H, singlet); 1.56 δ (4H, singlet); 1.96 δ (2H, singlet);

IR: 3350 cm^{-1}　(10 pts)

注意：背面尚有試題

5. For the following molecules, draw its enantiomer as well as one of its diastereomers. Designate the (R) or (S) configuration at each chirality center. (8 pts)



6. Propose syntheses of the following substances from benzene. (12 pts)
   (a) *m*-Chloronitrobenzene
   (b) *m*-Chloroethylnitrobenzene
   (c) *p*- Chloropropylnitrobenzene