國立勤益科技大學九十七學年度研究所碩士班招生筆試試題卷
所別：化學與材料工程系碩士班
組別：
科目：有機化學
准考證號碼：□□□□□□□□□（考生自填）

考生注意事項：
一．考試時間100分鐘。
二．
三．

一：〈10分〉
假設你有任何所需無機試劑及乙醇，請寫出你將如何由乙醇開始製備乙醚之反應方程式。

二：〈10分〉
用苯開始，提出間-氯苯甲酸的合成計畫？

三：〈10分〉
畫出化學式C₆H₅COOH可能的異構物（忽略立體異構物）。
四：(10 分)
以 Benzoyl peroxide 為起始劑，寫出乙烯的自由基聚合作用成聚乙烯的反應步驟。

五：(10 分)
Give products for each of the following reactions.

(1) CH₃CH₂CH=CH₂ + HCl →

(2) 1,2-二甲基環己烯 + 酸性 KMnO₄ 水溶液 →

(3) H₂C=CH-CH=CH₂ + HBr →

六：(5 分)
Rearrangements are likely to occur in which of the following reaction types?
A) S₃N1 reactions
B) S₃N2 reactions
C) E1 reactions
D) E2 reactions
E) Both S₃N1 and E1 reactions

七：(5 分)
Which of the following reagents might serve as the basis for a simple chemical test that would distinguish between pure 1-hexene and pure hexane?
A) Bromine in carbon tetrachloride
B) Dilute aqueous potassium permanganate
C) Concentrated sulfuric acid
D) All of the above
E) Answers A) and B) only

八：( 5 分)
Consider the addition of HCl to 3-methyl-1-butene. The major product of the reaction would be:
A) 1-Chloro-2-methylbutane
B) 1-Chloro-3-methylbutane
C) 2-Chloro-2-methylbutane
D) 2-Chloro-3-methylbutane
E) 1-Chloropentane

九：( 5 分)
trans-3-methylcyclopentanol is treated with CH$_3$SO$_2$Cl in the presence of base. The product of this reaction is then heated with KI in methanol. What is the final product?
A) trans-1-Iodo-3-methylcyclopentane
B) cis-1-Iodo-3-methylcyclopentane
C) 1-methylcyclopentene
D) 2-methylcyclopentene
E) 3-methylcyclopentene

十：( 5 分)
Which of the following would you expect to be aromatic?

A) I  B) II  C) III  D) IV  E) V

十一：( 5 分)
Which is the most stable conformation of cyclohexane?
A) Chair
B) Twist
C) Boat
D) Half chair  
E) Staggered

十二：〈 5 分 〉

Hexane and 3-methylpentane are examples of:
   A) enantiomers.  
   B) stereoisomers.  
   C) diastereomers.  
   D) constitutional isomers  
   E) None of these

十三：〈 5 分 〉

Which one of the following can exist in optically active forms?
   A) cis-1, 3-Dichlorocyclohexane  
   B) trans-1, 3- Dichlorocyclohexane  
   C) cis-1, 4-Dichlorocyclohexane  
   D) trans-1, 4- Dichlorocyclohexane  
   E) cis-1, 2-Dichlorocyclohexane

十四：〈 5 分 〉

Enantiomers are:
   A) molecules that have a mirror image.  
   B) molecules that have at least one stereogenic center.  
   C) non-superposable molecules.  
   D) non-superposable constitutional isomers.  
   E) non-superposable molecules that are mirror images of each other.

十五：〈 5 分 〉

$S_{N2}$ reactions of the type, $\text{Nu}^- + \text{R-L} \rightarrow \text{Nu-R} + \text{L}^-$ are favored:

   A) When tertiary substrates are used.  
   B) When primary substrates are used.  
   C) When the leaving group, $\text{L}^-$, is a strong base.  
   D) by more than one of the above.  
   E) by none of the above.