

國立勤益科技大學九十九學年度研究所碩士班招生筆試試題卷

所別：化工與材料工程系

組別：材料科技組

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、

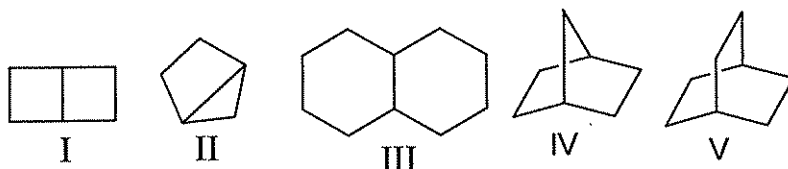
() 1. Which principle(s) or rule must be used to determine the correct electronic configuration for carbon in its ground state? (5 分)

- A) Aufbau Principle
- B) Hund's Rule
- C) Pauli Exclusion Principle
- D) (A) and (B) only
- E) All three

() 2. Which compound would you expect to have the highest boiling point? (5 分)

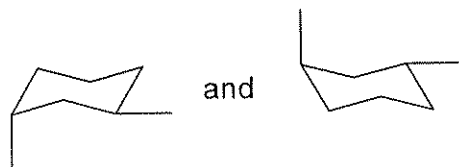
- A) $\text{CH}_3\text{OCH}_2\text{CH}_2\text{OCH}_3$
- B) $\text{CH}_3\text{OCH}_2\text{OCH}_2\text{CH}_3$
- C) $\text{HOCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
- D) $\text{CH}_3\text{OCH}_2\text{CH}_2\text{CH}_2\text{OH}$
- E) $(\text{CH}_3\text{O})_2\text{CHCH}_3$

() 3. Which compound is a bicycloheptane? (5 分)



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

() 4. The structures



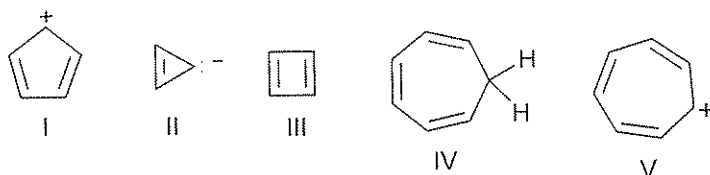
represent: (5 分)

- A) a single compound.
 - B) enantiomers.
 - C) meso forms.
 - D) diastereomers.
 - E) conformational isomers.
- () 5. You want to synthesize 2-methyl-1-butene from 2-chloro-2-methylbutane.
Which reagent would you use? (5 分)
- A) NaOH/H₂O
 - B) KOH/H₂O
 - C) CH₃ONa/CH₃OH
 - D) CH₃CH₂ONa/CH₃CH₂OH
 - E) (CH₃)₃COK/(CH₃)₃COH
- () 6. Reaction of sodium ethoxide with 1-bromopentane at 50 °C yields primarily:
(5 分)
- A) CH₃CH₂CH₂CH=CH₂
 - B) CH₃CH₂CH=CHCH₃
 - C) CH₃CH₂CH₂CH₂CH₃
 - D) CH₃CH₂CH₂CH₂CH₂OH
 - E) CH₃CH₂CH₂CH₂CH₂OCH₂CH₃
- () 7. Which of the following statements is true when used to compare the reaction of chlorine with isobutane and the reaction of bromine with isobutane? (5 分)
- A) Bromine is the less reactive and the more selective
 - B) Chlorine is the less reactive and the more selective
 - C) Chlorine is the more reactive and the more selective
 - D) Bromine is the more reactive and the more selective
 - E) None of the above

() 8. trans-3-methylcyclopentanol is treated with $\text{CH}_3\text{SO}_2\text{Cl}$ in the presence of base. The product of this reaction is then heated with KI in methanol. What is the final product? (5 分)

- A) trans-1-Iodo-3-methylcyclopentane
- B) cis-1-Iodo-3-methylcyclopentane
- C) 1-methylcyclopentene
- D) 2-methylcyclopentene
- E) 3-methylcyclopentene

() 9. Which of the following would you expect to be aromatic? (5 分)



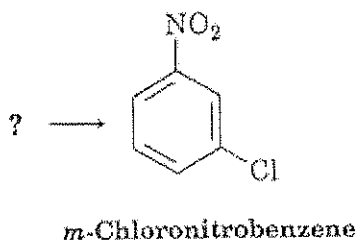
- A) I B) II C) III D) IV E) V

() 10. Toluene is the name commonly assigned to: (5 分)

- A) Hydroxybenzene
- B) Aminobenzene
- C) Methylbenzene
- D) Ethylbenzene
- E) Methoxybenzene

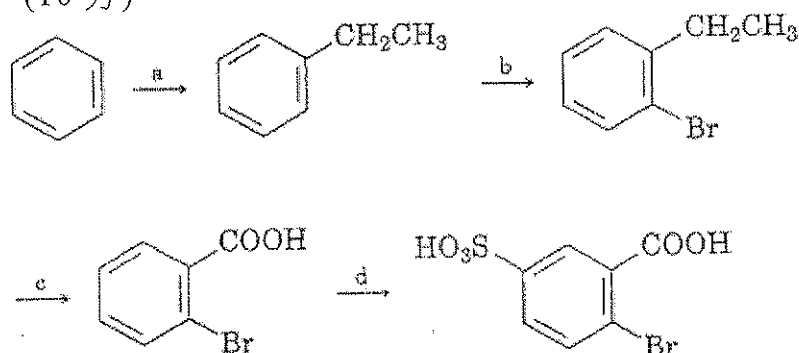
11. Synthesize *m*-chloronitrobenzene starting from benzene.

Work backward by first asking, "What is an immediate precursor of *m*-chloronitrobenzene?" (10 分)



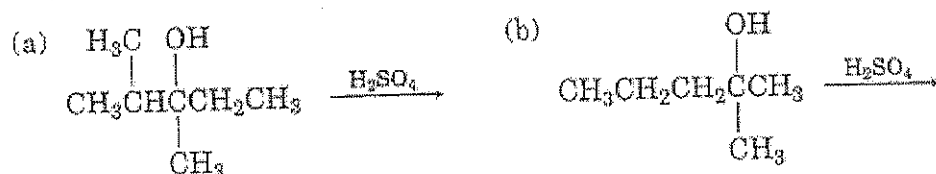
12.

Identify the reagents represented by the letters a through d in the following scheme: (10 分)



13.

Predict the products you would expect from the following reactions. Indicate the major product in each case. (15 分)



14. Fill in the missing reagents a-f in the following scheme: (15 分)

