

國立勤益科技大學九十八學年度研究所碩士班招生筆試試題卷

所別：化工與材料工程系碩士班

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、

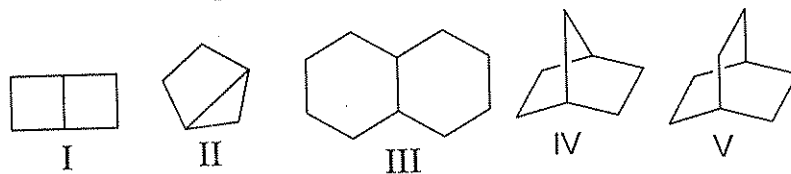
() 1. $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ and $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ are examples of what are now termed: (4)

- A) Structural isomers
- B) Resonance structures
- C) Functional isomers
- D) Empirical isomers
- E) Constitutional isomers

() 2. Which compound would you expect to have the highest boiling point? (4)

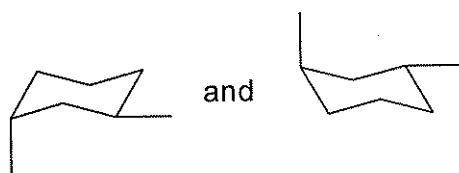
- A) $\text{CH}_3\text{OCH}_2\text{CH}_2\text{OCH}_3$
- B) $\text{CH}_3\text{OCH}_2\text{OCH}_2\text{CH}_3$
- C) $\text{HOCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
- D) $\text{CH}_3\text{OCH}_2\text{CH}_2\text{CH}_2\text{OH}$
- E) $(\text{CH}_3\text{O})_2\text{CHCH}_3$

() 3. Which compound is a bicycloheptane? (4)



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

() 4. The structures



represent: (4)

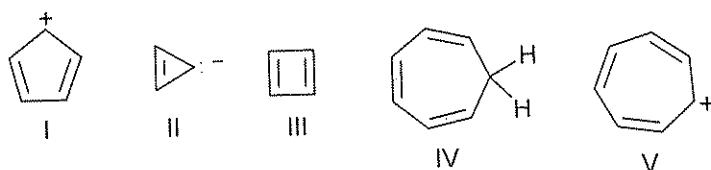
- A) a single compound.
 - B) enantiomers.
 - C) meso forms.
 - D) diastereomers.
 - E) conformational isomers.
- () 5. Elimination reactions are favored over nucleophilic substitution reactions: (4)
- A) at high temperatures.
 - B) when tert-butoxide ion is used.
 - C) when 3° alkyl halides are used as substrates.
 - D) when nucleophiles are used which are strong bases and the substrate is a 2° alkyl halide.
 - E) in all of these cases.
- () 6. Which is the weakest nucleophile in polar aprotic solvents? (4)
- A) I⁻ B) Br⁻ C) Cl⁻ D) F⁻
- () 7. S_N2 reactions of the type, Nu⁻ + R-L → Nu-R + L⁻ are favored: (4)
- A) When tertiary substrates are used.
 - B) When primary substrates are used.
 - C) When the leaving group, L⁻, is a strong base.
 - D) by more than one of the above.
 - E) by none of the above.
- () 8. Rearrangements are likely to occur in which of the following reaction types? (4)
- A) S_N1 reactions
 - B) S_N2 reactions
 - C) E1 reactions
 - D) E2 reactions

E) Both S_N1 and E1 reactions

() 9. The reactions of lithium di-sec-butylcuprate with isopentyl bromide yields: (4)

- A) 2,5-Dimethylheptane
- B) 2,6-Dimethylheptane
- C) 3,5-Dimethylheptane
- D) 3,4-Dimethylheptane
- E) 3,6-Dimethylheptane

() 10. Which of the following would you expect to be aromatic? (4)



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

11. Draw structures corresponding to the following IUPAC names: (20)

(a) 4,4-Dimethylpent-2-ene

(b) *p*-Iodonitrobenzene

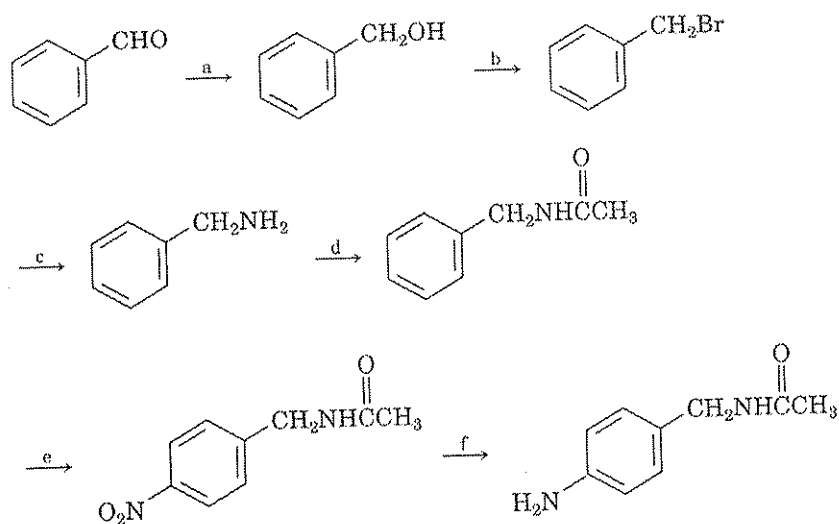
(c) *trans*-3-Ethylcyclohexanol

(d) Ethyl isopropyl ether

(e) 3,5-dinitrobenzaldehyde

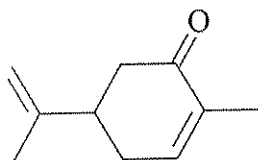
(f) Acetamide

12. Please fill in the missing reagents a-f in the following scheme: (20)



13. Carvone is the major constituent of spearmint oil (綠薄荷油). What products would you expect from the reaction of carvone with the following reagents? (20)

(a) $\text{LiAlH}_4 / \text{H}_3\text{O}^+$ (b) $\text{C}_6\text{H}_5\text{MgBr} / \text{H}_3\text{O}^+$ (c) $\text{H}_2 / \text{Pd catalyst}$ (d) $\text{CH}_3\text{OH} / \text{H}^+$.



Carvone