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國立臺北科技大學九十六學年度碩士班招生考試

系所組別：3711、3712、3713 有機高分子研究所甲組

第一節 有機化學 試題

第一頁 共一頁

注意事項：

1. 本試題共 20 題，每題 5 分，配分共 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. Show how $\text{CH}_3\text{CH}_2\text{CH}=\text{C}(\text{CH}_3)\text{CHO}$ is made from $\text{CH}_3\text{CH}_2\text{CHO}$ within three steps.
2. Give name for $\text{CH}_3\text{NHCH}(\text{CH}_3)_2$.
3. Account for the following order of decreasing basicity: $\text{RNH}_2 > \text{RN}=\text{CHR}' > \text{RC}\equiv\text{N}$.
4. Write a structure for the product of Diels-Alder reaction of *p*-benzoquinone with 1,3-cyclohexadiene.
5. Explain why pyrrole is not basic.
6. How can ^1H NMR spectroscopy distinguish among pyridine and piperidine?
7. What compound $\text{C}_7\text{H}_8\text{O}$ has ^1H NMR signals at δ 7.3, 4.4, and 3.7 ppm, with relative areas 7 : 2.9 : 1.4, respectively?
8. A compound, $\text{C}_3\text{H}_6\text{O}$, contains a $\text{C}=\text{O}$ group. How could IR establish whether this compound is an aldehyde or a ketone by using the range between 2500 cm^{-1} and 3000 cm^{-1} ?
9. Draw the structure of $\text{C}_4\text{H}_{10}\text{O}$ if the compound reacts with Na but fails to react with KMnO_4 .
10. Give a chemical test to distinguish alkane from ether.

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11. Write structure of the organic products for the reaction of $\text{C}_6\text{H}_5\text{COOC}_2\text{H}_5$ and NH_3 .
 12. Show the synthesis of *p*- $\text{BrC}_6\text{H}_4\text{CH}_2\text{Cl}$ from toluene.
 13. Give steps for the conversion $\text{HC}\equiv\text{CCH}_2\text{CH}_2\text{CH}_3 \rightarrow \text{H}_2\text{C}=\text{CH}-\text{CH}=\text{CHCH}_3$.
 14. Explain why E1 always competes with $\text{S}_{\text{N}}1$ reaction?
 15. ROH does not react with NaBr , but adding H_2SO_4 forms RBr . Why?
 16. A compound, **X**, with a formula C_8H_{12} reacts with two moles of H_2 and **X** undergoes ozonolysis to give two moles of $\text{O}=\text{CHCH}_2\text{CH}_2\text{CH}=\text{O}$. What is the structure of **X**?
 17. Draw HOMO for the π system of benzene.
 18. What are the necessary conditions for aromaticity.
 19. $\text{CH}_3\text{CH}_2\text{I}$ undergoes loss of HI with strong base faster than that $\text{CD}_3\text{CH}_2\text{I}$ loses DI . Explain.
 20. Show the tautomers of $\text{C}_6\text{H}_5\text{C}(\text{O})\text{CH}_3$, which one is more stable form.