

銘傳大學 96 學年度轉學生招生考試

生物科技學系

7 月 26 日 第三節

有機化學試題

(第一頁共三頁)

(限用答案本作答)



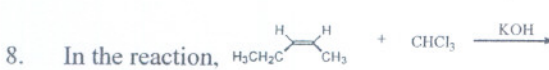
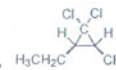
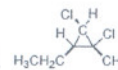

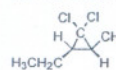
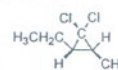



可使用計算機

Organic Chemistry Exam for Students Transferring to Ming Chuan University

Summer 2007

Please feel free to use your calculator (可以使用計算機)

4 pts each

- Carbon dioxide, CO_2 , has zero dipole moment even though carbon-oxygen bonds are strongly polarized. This is because: **A.** $\text{C}=\text{O}$ bonds are very short, **B.** the three atoms are all very small, **C.** the whole molecule is linear and symmetrical, *i.e.*, $\text{O}=\text{C}=\text{O}$, so that the polarity on either side cancels each other, **D.** none of the above.
- What is the formal charge on the nitrogen of "[N]" in the following molecule, $[\text{N}=\text{N}=\text{N}]$, where " | " or " _ " represents nonbonding lone pair electrons? **A.** +2, **B.** +1, **C.** 0, **D.** -1. [Hint: formal charge = (# of valence e^-) - (# of bonding $e^-/2$) - (# of nonbonding e^-)]
- How can two isomers with different CONFIGURATIONS be converted to each other? **A.** By rotation of a single bond, **B.** By excitation of valence e^- , **C.** IMPOSSIBLE, unless some chemical bonds are broken, **D.** By solvent interaction.
- Why in halogen, F_2 , Cl_2 , Br_2 , and I_2 , the melting point and boiling point are increased along with their molecular weights? In other words, at room temperature, F_2 and Cl_2 are gases, Br_2 is liquid, whereas I_2 is solid. This is due to: **A.** temporary induced dipole interactions, **B.** strong covalent interactions, **C.** electrostatic interactions, **D.** hydrogen bonding interactions.
- The stability of carbocations is tertiary (R_3C^+) > secondary (HR_2C^+) > primary (H_2RC^+) > methyl (H_3C^+), where R represents a generalized organic group. This is due to the effects of: **A.** hyperconjugation, **B.** R groups donating electrons and neutralize the positive charge, **C.** all of the above, **D.** none of the above.
- For a reaction with decreased entropy, *i.e.*, ΔS is negative, can a reaction occur spontaneously (*i.e.*, ΔG is negative), given that $\Delta G = \Delta H - T\Delta S$? **A.** That's impossible! **B.** Only when the temperature is very low, **C.** The reaction must be exothermic, **D.** None of the above.
- Why in the addition reaction between an alkene (containing $\text{C}=\text{C}$) and Br_2 the added Br is always in a *trans* position, *i.e.*, ? This is because: **A.** Br_2 is very reactive, **B.** alkene is very reactive, **C.** Br atoms are too large to be attached on the same side, **D.** the intermediate is a bromonium ion, .
- In the reaction, , the product is: **A.** , **B.** , **C.** , **D.** , .
- In the reaction between  and O_3 in the presence of Zn and H_3O^+ , the product is: **A.** , **B.** , **C.** all of the above, **D.** none of the above.

本試題兩面印刷

銘傳大學 96 學年度轉學生招生考試

生物科技學系

7 月 26 日 第三節

有機化學試題

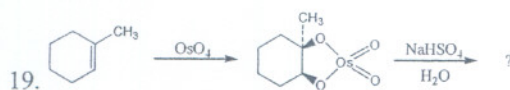
(第二頁共三頁)

(限用答案本作答)

可使用計算機

不可使用計算機

10. For the two isomers, and , which one is the more favored form under normal conditions? **A.** The enol form, **B.** The keto form, **C.** It depends on the solvent polarity, **D.** It depends on the temperature.
11. The interconversion between enol and keto constitutional isomers with the movement of only one hydrogen, H, is called: **A.** Hyperconjugation, **B.** Anchimeric assistance, **C.** Pericyclization, **D.** Tautomerism.
13. What is a meso compound? **A.** A compound containing an internal symmetry plane. **B.** An achiral compound. **C.** A compound containing chiral centers. **D.** All of the above.
14. Please assign *R* or *S* configuration to the chirality center in this compound, . **A.** *R*, **B.** *S*, **C.** cannot be determined, **D.** none of the above.
15. What is a racemic mixture? **A.** Mixture of compounds that are mirror image to each other, **B.** 50:50 mixture of two enantiomers, **C.** Mixture of compounds with internal symmetry planes, **D.** None of the above.
16. Why does the absorption of β -carotene occur at longer wavelengths (*i.e.*, taking less energy)? **A.** β -carotene contains many conjugated double bonds, **B.** there is no electron-withdrawing group within this molecule, **C.** β -carotene is an aromatic compound, **D.** β -carotene is generally considered an acid.
17. What are the four requirements for a molecule to be aromatic? 1. Flat (Planar), 2. Cyclic, 3. $4n+2 \pi e^-$, 4. **A.** Excited states, **B.** Conjugated species, **C.** Dipolar, **D.** Acidic.
18. Which of the following statement is true for a kinetic control reaction? **A.** mild condition, **B.** irreversible, **C.** the product depends on the relative rates, **D.** all of the above.



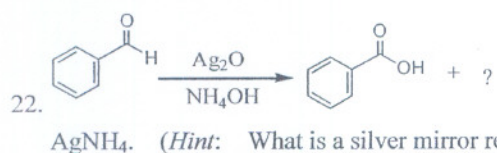
- What is the product in this reaction? **A.** , **B.** , **C.** , **D.**



本試題兩面印刷

21. Which of the following statement is true about an S_N2 reaction? **A.** Second-order kinetics (Rate = $k \times [RX] \times [Nu:]$), **B.** Inversion of stereochemistry, **C.** Substitution reaction, **D.** All of the above.

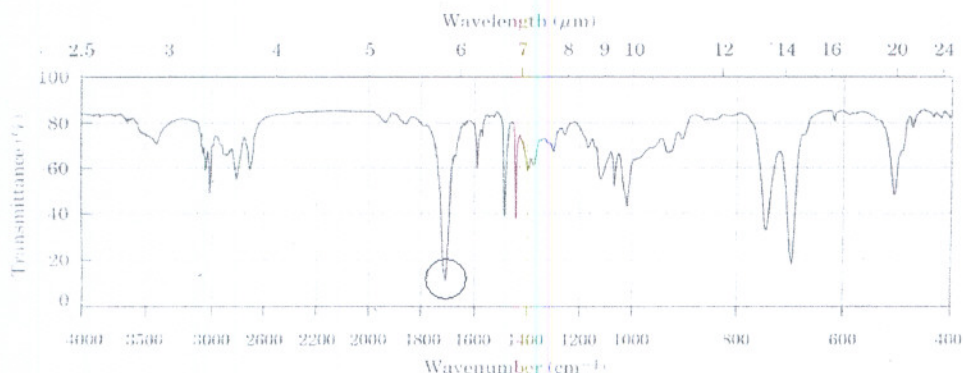
銘 傳 大 學
 轉 學 考 試
 第 三 頁



What is the product, “?”? A. AgO. B. Ag⁺. C. Ag. D.

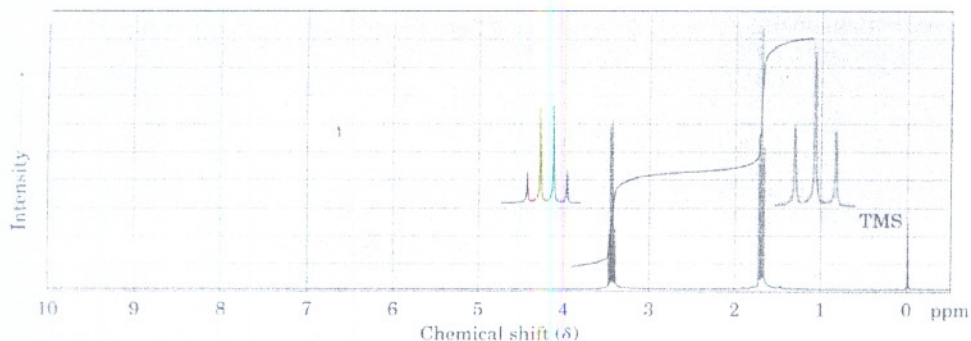


24. In the IR spectrum shown below, what is the functional group that can be identified by the peak circled at ~1,700cm⁻¹? A. An alcohol, -OH, B. An alkyl halide, RCl, C. An ether, R-O-R', D. A carbonyl group, R₂C=O.



© 2004 ThomsonBrooks/Cole

25. In the NMR spectrum shown below, what is the most likely molecular structure of this organic compound? A. CH₃Br, B. CH₃CH₂CH₂Br, C. CH₃CH₂Br, D. (C₂H₅)₂O. Notice that these peaks were shifted to upfield during absorption.



©2004 Thomson - Brooks/Cole

試題完

請依下列格式於答案本上作答

1. ___ 2. ___ 3. ___ 4. ___ 5. ___ 6. ___ 7. ___ 8. ___ 9. ___ 10. ___
 11. ___ 12. **X** 13. ___ 14. ___ 15. ___ 16. ___ 17. ___ 18. ___ 19. ___ 20. ___
 21. ___ 22. ___ 23. ___ 24. ___ 25. ___