

Department of Chemistry and Biochemistry

Chemistry 59-230/232

Time: 50 min.

Lab Exam

Nov. 26, 2002

NAME \_\_\_\_\_

ID# \_\_\_\_\_

LAB SECTION (and TA name) \_\_\_\_\_

Note: Read all questions and these instructions CAREFULLY! Answer all questions Answer all questions on the test paper **by indicating in the box beside the question** the letter of the answer you select as the **BEST** answer. **Do any 20.**

MAKE SURE YOUR NAME, STUDENT NUMBER AND LAB SECTION ARE CORRECTLY ENTERED ABOVE. Tests written in pencil will be marked, but cannot be returned for remarking.

3. It was very important to use dry glassware during the Grignard synthesis of triphenylmethanol because-

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- a) Bromobenzene might react with water
- b) The Grignard reagent might react with water
- c) Benzophenone might react with water
- d) None of the above

5. Carbon-carbon double bonds do not undergo rotation as do carbon-carbon single bonds. The reason is that:

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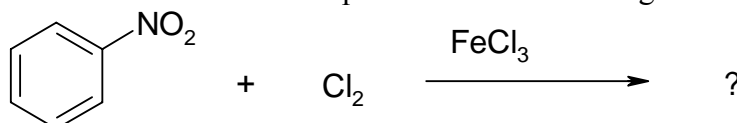
- a) the double bond is much stronger and therefore more difficult to rotate
- b) Overlap of the  $sp^2$  orbitals of the carbon-carbon  $\sigma$ - bond would be lost.
- c) Overlap of the carbon-carbon  $\pi$  bond would be lost.
- d) The shorter bond length of the double bond makes it more difficult for the attached groups to pass one another.

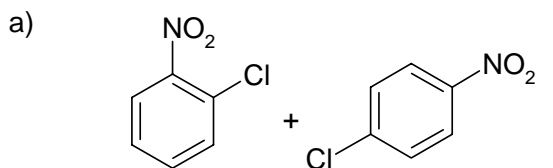
7. What happen if the organic acid and alcohol (and nothing else) were refluxed together in an esterification reaction?

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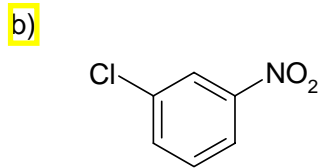
- a. the equilibrium would favour the starting materials
- b. the equilibrium would be reached rapidly
- c. very little ester would be formed and equilibrium would not be reached
- d. none of the above

11. What is the correct product of the following reaction?

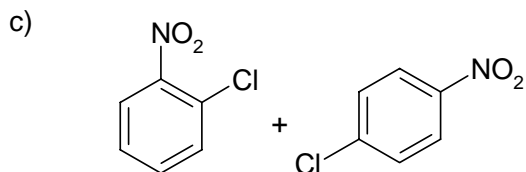




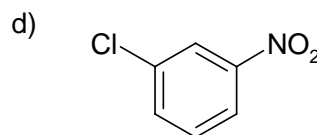
because the NO<sub>2</sub> is ring activating



because the NO<sub>2</sub> is ring deactivating

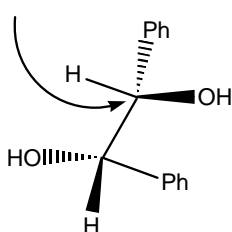


because the NO<sub>2</sub> is ring deactivating

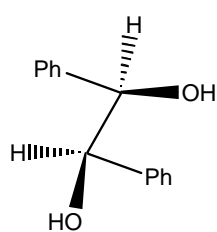


because the NO<sub>2</sub> is ring activating

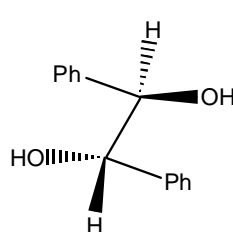
This Carbon



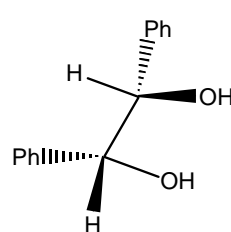
(i)



(ii)



(iii)



(iv)

13. In the above molecules, the relationship between molecule (iii) and (iv) is:

- GEOMETRIC ISOMERS
- STRUCTURAL ISOMERS
- ENANTIOMERS
- THEY ARE THE SAME MOLECULE

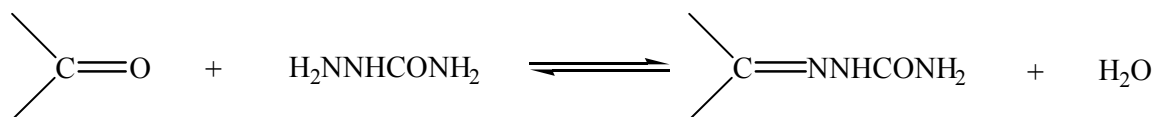


14. In the nitration of aromatic rings, nitrochlorobenzene was recrystallized from 95% ethanol. Why?

- The product is insoluble in 95% ethanol
- The *p*-form crystallizes out of solution while the *o*-form remains soluble in ethanol
- To have more pure crystals
- The *o*-form crystallizes out of solution while the *m*-form and *p*-form remain soluble in ethanol



18. Aldehydes and ketones react with semicarbazide to produce semicarbazones:



From the pairs of reactants listed below which should react more rapidly with semicarbazide:

Benzaldehyde	or	4-nitrobenzaldehyde
3-pentanone	or	cyclohexanone
cyclopentanone	or	2-chlorocyclopentanone



- a) benzaldehyde, cyclohexanone, 2-chlorocyclopentanone
- b) 4-nitrobenzaldehyde, cyclohexanone, 2-chlorocyclopentanone
- c) benzaldehyde, 3-pentanone, cyclopentanone
- d) 4-nitrobenzaldehyde, 3-pentanone, cyclopentanone