



CHEMISTRY

BOOKS - MS CHOUHAN CHEMISTRY (HINGLISH)

ALCOHOLS FROM CARBONYL COMPOUNDS

Solved Problems

1. Using the method just described, assign oxidation states to the carbon atoms of methonal (CH_3OH), formaldehyde (HCHO), and formic acid (HCO_2H) and arrange these compounds along with carbon dioxide and methane in order of increasing oxidation state.



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2. Which reagents would you use to accomplish the following transformations ?



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3. Write an equation for the reaction that would take place when phenyllithium is treated with water. Designate the stronger acid and stronger base.

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4. How would you carry out the following synthesis ?



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5. Using an alcohol of no more than four carbon atoms as your only organic starting material, outline a synthesis of A :



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6. Starting with bromobenzene and any other needed reagents, outline a synthesis of the following aldehyde :



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7. Which of the following tertiary alcohols cannot be prepared by the reaction of an ester with excess of Grignard reagent ?

A. 

B. 

C. 

D. 

Answer: D



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8. For the following compounds, write a retrosynthetic scheme and then synthetic reactions that could be used to prepare each

one. Use hydrocarbons, organic halides, alcohols, aldehydes, ketones, or ester containing six carbon atoms or fewer and any other needed reagents.



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alcohols, aldehydes, ketones, or ester containing six carbon atoms or fewer and any other needed reagents.



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containing six carbon atoms or fewer and any other needed reagents.



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11. Suggest two ways for the preparation of the following alcohols by using Grignard reagent.



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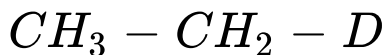
14. Suggest two ways for the preparation of the following alcohols by using Grignard reagent.



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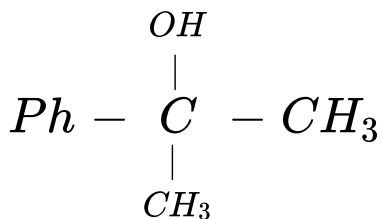
15. Suggest two ways for the preparation of the following alcohols by using Grignard

reagent.



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16. What combination of an ester and a Grignard reagent could you use to prepare the following tertiary alcohols ?



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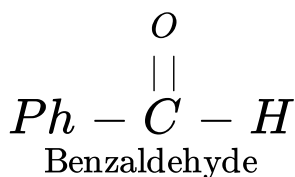
18. Write the structure of the product obtained from the reaction of methylmagnesium bromide with each of the following compounds. Assume that the reactions are worked up by the addition of

dilute aqueous acid.



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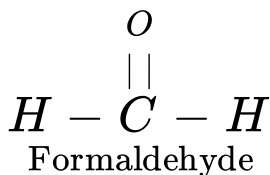
19. Write the structure of the product obtained from the reaction of methylmagnesium bromide with each of the following compounds. Assume that the reactions are worked up by the addition of dilute aqueous acid.





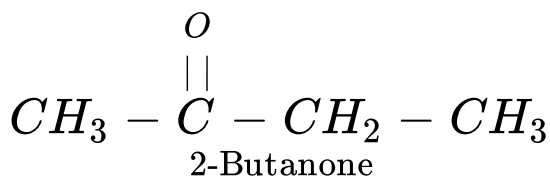
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20. Write the structure of the product obtained from the reaction of methylmagnesium bromide with each of the following compounds. Assume that the reactions are worked up by the addition of dilute aqueous acid.



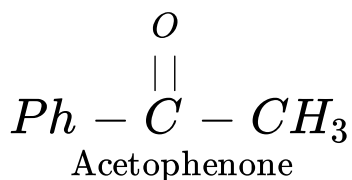
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21. Write the structure of the product obtained from the reaction of methylmagnesium bromide with each of the following compounds. Assume that the reactions are worked up by the addition of dilute aqueous acid.



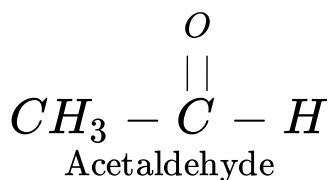
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22. Write the structure of the product obtained from the reaction of methylmagnesium bromide with each of the following compounds. Assume that the reactions are worked up by the addition of dilute aqueous acid.



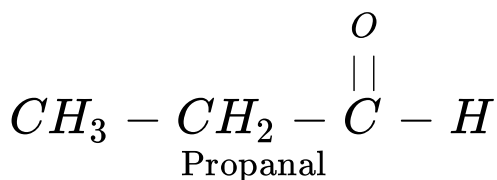
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23. Write the structure of the product obtained from the reaction of methylmagnesium bromide with each of the following compounds. Assume that the reactions are worked up by the addition of dilute aqueous acid.



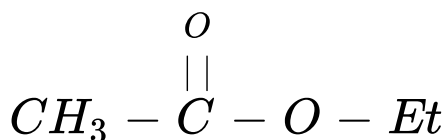
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24. Write the structure of the product obtained from the reaction of methylmagnesium bromide with each of the following compounds. Assume that the reactions are worked up by the addition of dilute aqueous acid.



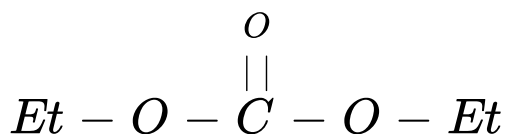
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25. Write the structures of the products obtained from the reactions of phenylmagnesium bromide (excess) with each of the following compounds. Assume that the reactions are worked up by the addition of dilute aqueous acid.



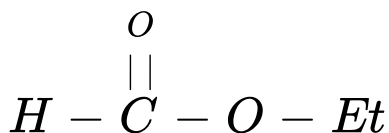
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26. Write the structures of the products obtained from the reactions of phenylmagnesium bromide (excess) with each of the following compounds. Assume that the reactions are worked up by the addition of dilute aqueous acid.



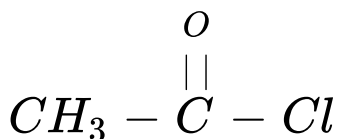
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27. Write the structures of the products obtained from the reactions of phenylmagnesium bromide (excess) with each of the following compounds. Assume that the reactions are worked up by the addition of dilute aqueous acid.



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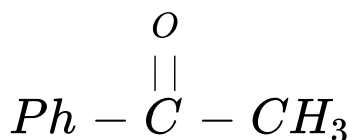
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30. Write the structures of the products obtained from the reactions of phenylmagnesium bromide (excess) with each of the following compounds. Assume that the reactions are worked up by the addition of dilute aqueous acid.



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31. Write the structures of the products obtained from the reactions of phenylmagnesium bromide (excess) with each of the following compounds. Assume that the reactions are worked up by the addition of dilute aqueous acid.



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32. What is the maximum number of moles of Grignard reagent consumed when it reacts in excess with each of the following compounds ?



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47. Give the products of the following reactions



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50. Give the products of the following reactions



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51. The following reactions involve the combination of a Grignard reagent of general formula RMgX with a carbonyl compound and an ester. This is to form carbon-carbon bond.



Define "organometallic compound".

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52. The following reactions involve the combination of a Grignard reagent of general

formula RMgX with a carbonyl compound and an ester. This is to form carbon-carbon bond.



How do organometallic reagents provide a source of nucleophilic carbon ?



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53. The following reactions involve the combination of a Grignard reagent of general formula RMgX with a carbonyl compound and an ester. This is to form carbon-carbon bond.



Provide the mechanism for both above-mentioned reactions.



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54. The following reactions involve the combination of a Grignard reagent of general formula RMgX with a carbonyl compound and an ester. This is to form carbon-carbon bond.



Although carbon and magnesium are both

common elements in the human body, Grignard reactions do not occur in cells. Why is this so ?



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55. Consider the following reaction



Write a complete and detailed curved arrow mechanism for the formation of the major product. Briefly explain choice of the major product.



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56. Complete the following reactions providing mechanism of the formation of product.



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57. Complete the following reactions providing mechanism of the formation of product.



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58. Complete the following reactions providing mechanism of the formation of product.



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59. Suggest the appropriate reagent (s) to carry out the following reactions.

(a) 

(b) 



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60. Nitriles undergo nucleophilic attack by Grignard reagents to afford ketones after a hydrolysis step with aqueous acid.



(a) Why is nitrile group subject to nucleophilic attack ?

(b) Draw a detailed curved arrow mechanism for this reaction.

(c) Nucleophilic addition of a Grignard reagent to the carbonyl group results in replacement

of the $\text{C}=\text{O}$ π bond by a $\text{C}-\text{C}$ σ bond. A nitrile group has two $\text{C}-\text{N}$ π bonds, yet there is replacement of only one π bond, not of two, even in the presence of a large excess of the Grignard reagent. Explain.



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61. Select the faster reaction of each of the following pairs, briefly explain to support your choice.





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62. Select the faster reaction of each of the following pairs, briefly explain to support your choice.



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63. Write a mechanism for the hydrolysis of the model imine shown below.





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Additional Objective Questions Single Correct Choice Type

1. Which of the following alcohols forms a ketone when oxidized ?

A. 1-propanol

B. Methanol

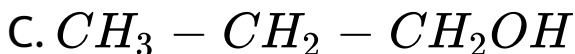
C. 2-methyl-2-propanol

D. 2-propanol

Answer: D

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2. When $CH_3 = CH - COOH$ is reduced with $LiAlH_4$, the compound obtained will be

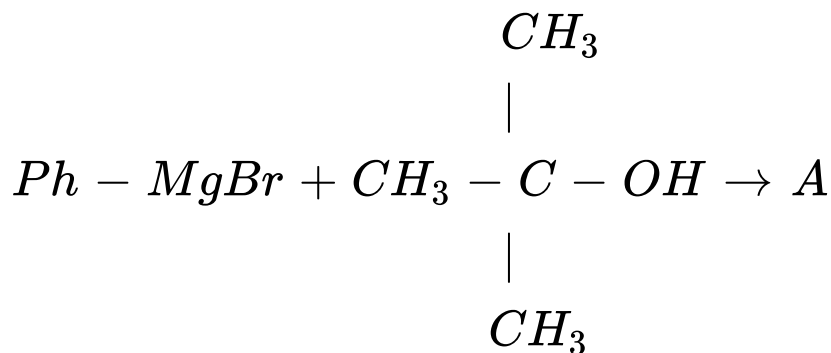




Answer: B

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3. For the following reaction, A is



A. 

B. 

C. 

D. 

Answer: A

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4. Which method would produce 2-pentanone as the major product ?

A. 

B. 

C. 

D. All

Answer: D

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5. How many isomers (excluding stereoisomer) of $C_4H_{10}O$ react with CH_3MgBr to evolve CH_4 gas

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Additional Objective Questions Multiple Correct Choice Type

1. In which of the following reactions, tertiary alcohol will be obtained as a product ?

A. 

B. 

C. 

D. 

Answer: B::C::D



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