



CHEMISTRY

BOOKS - MS CHOUHAN CHEMISTRY (HINGLISH)

ALDEHYDES AND KETONES II. ALDOL REACTIONS

Solved Problem

1. Write bond-line structures for the keto and enol forms of 3-pentanone.



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2. Treating racemic 2-methyl-phenylbutan-1-one with NaOD in the presence of D_2O produces a deuterium-labeled compound as a racemic form. Write a mechanism that explains this result.





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3. The carbon-carbon bond cleavage step in a retro-aldol reaction involves, under basic conditions, a leaving group that is an enolate, or under acidic conditions, an enol. Write a mechanism for the retro-aldol reaction of 4-hydroxy-4-methyl 2-pentanone under basic conditions (shown above).



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4. One industrial process for the synthesis of 1-butanol begins with ethanol. Show how this synthesis might be carried out.



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5. Show how each of the four products shown at the beginning of this section is formed in the crossed aldol addition between ethanol and propanal.



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6. outlined below is a practical crossed aldol reaction that can be used for the synthesis of cinnamaldehyde (the essence of cinnamon, used in cooking). Provide the missing ingredients for this recipe.



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Additional Objective Questions Single Correct
Choice Type

1. Mixed aldol reactions require

A. only one of the reactants to be able to form an enolate.

B. one of the reactants to be more reactive towards the nucleophile.

C. much stronger bases.

D. (b) and (c).

Answer: D



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2. If formaldehyde and potassium hydroxide are heated, then we get

A. acetylene.

B. methane

C. methyl alcohol

D. ethyl formate.

Answer: C



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3. Cyclohexane on ozonolysis followed by reaction with zinc dust and water gives compound E, on further treatment with aqueous KOH followed by heating yields compound F. The compound F is

A. 

B. 

C. 

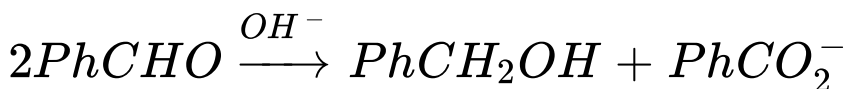
D. 

Answer: A





4. In Cannizzaro reaction given below, the slowest step is



- A. the abstraction of proton from the carboxylic group.
- B. the deprotonation of $PhCH_2OH$.
- C. the attack of OH^- at the carboxyl group.

D. the transfer of hydride to the carbonyl group.

Answer: D



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5. Which of the following compounds give $^{14}\text{CHI}_3$ as a product when treated with I_2 in presence of NaOH ?

A. 

B. 

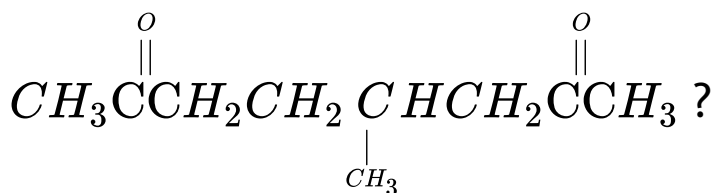
C. 

D. all of these

Answer: C

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6. What compounds results from the aldol cyclization of



A. 

B. 

C. 

D. 

Answer: C



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7. The Cannizzaro reaction is not given by

A. trimethyl acetaldehyde

B. acetaldehyde

C. benzaldehyde.

D. fromaldehyde.

Answer: B



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8. Benzyl alcohol is obtained from benzaldehyde by

A. Fittig's reaction

B. Cannizaro.s reaction.

C. Kolbe.s reaction

D. Wurtz.s reaction.

Answer: B



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9. A mixture of benzaldehyde and formaldehyde on heating with aqueous NaOH solution gives

A. benzyl alcohol and sodium formate.

B. sodium benzoate and methyl alcohol.

C. sodium benzoate and sodium formate.

D. benzyl alcohol and methyl alcohol.

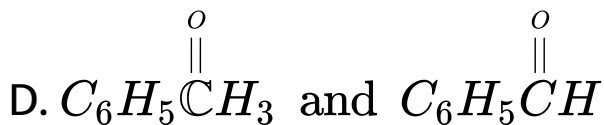
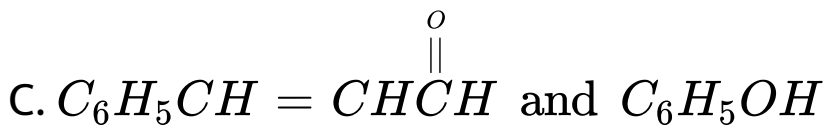
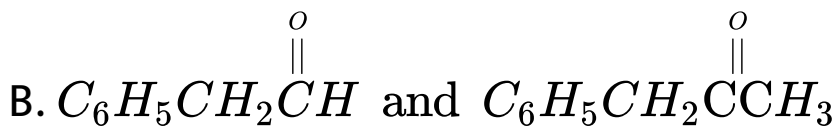
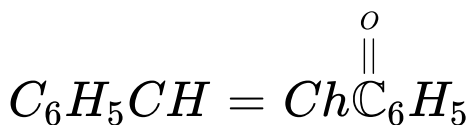
Answer: A



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10. Which reagents would you see to synthesize this compound by an aldol

condensation ?

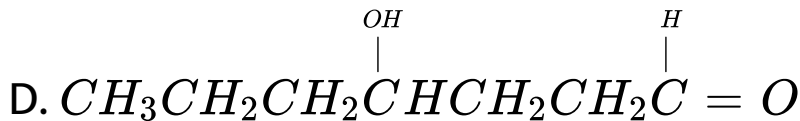
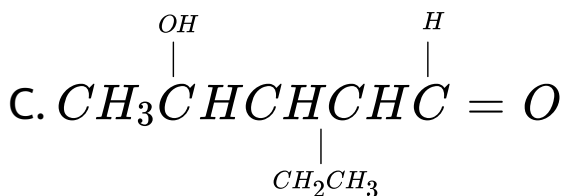
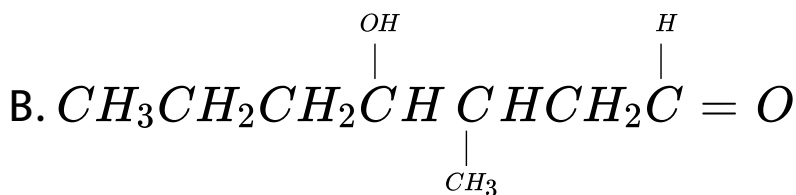


Answer: D



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11. Which of these is not among the reaction products when a crossed aldol addition occurs between ethanol and butanal ?



Answer: B





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12. Acid catalyzed aldol condensation involves

- A. carbanion.
- B. enolate ion.
- C. enol.
- D. both (a) and (b)

Answer: C



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13. Which is the only of these compounds which cannot self-condense in the presence of dilute aqueous alkali ?

A. Phenylethanal

B. Propanal

C. 3-Methylpentanal

D. 2,2-Dimethylpropanal

Answer: D



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1. A carbonyl compound P, which gives positive iodoform test, undergoes reaction with MgBr followed by dehydration to give an Olefin Q. Ozonolysis of Q leads to a dicarbonyl compound R, which undergoes intramolecular aldol reaction to give predominantly S.

The structure of the carbonyl compound P is



C. 

D. 

Answer: B

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2. A carbonyl compound P, which gives positive iodoform test, undergoes reaction with MeMgBr followed by dehydration to give an Olefin Q. Ozonolysis of Q leads to a dicarbonyl compound R, which undergoes intramolecular

aldol reaction to give predominantly S.

The structure of the products Q and R, respectively, are

A. 

B. 

C. 

D. 

Answer: A



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3. A carbonyl compound P, which gives positive iodoform test, undergoes reaction with MgBr followed by dehydration to give an Olefin Q. Ozonolysis of Q leads to a dicarbonyl compound R, which undergoes intramolecular aldol reaction to give predominantly S.

The structure of the product S is



Answer: B



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4. An organic compound A ($C_{12}H_{20}$) decolorizes bromine water, and on reductive ozonolysis produces two molecules of B ($C_6H_{10}O$). Compound B on aldol condensation followed by dehydration of product gives C ($C_{12}H_{18}O$), which on reduction with N_2H_4/OH_2 regenerates A. Compound B on reduction with $Zn(Hg)HCl$

produces D (C_6H_{12}), which on monochlorination gives E ($C_6H_{11}Cl$) as the sole product.

Structure of compound is

A. 

B. 

C. 

D. 

Answer: D



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5. An organic compound A ($C_{12}H_{20}$) decolorizes bromine water, and on reductive ozonolysis produces two molecules of B ($C_6H_{10}O$). Compound B on aldol condensation followed by dehydration of product gives C ($C_{12}H_{18}O$), which on reduction with N_2H_4/OH_2 regenerates A. Compound B on reduction with $Zn(Hg)HCl$ produces D (C_6H_{12}), which on monochlorination gives E ($C_6H_{11}Cl$) as the sole product.

A. 

B. 

C. 

D. 

Answer: B

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6. An organic compound A ($C_{12}H_{20}$) decolorizes bromine water, and on reductive ozonolysis produces two molecules of B

$(C_6H_{10}O)$. Compound B on aldol condensation followed by dehydration of product gives C ($C_{12}H_{18}O$), which on reduction with N_2H_4/OH_2 regenerates A. Compound B on reduction with $Zn(Hg)HCl$ produces D (C_6H_{12}), which on monochlorination gives E ($C_6H_{11}Cl$) as the sole product.

A. 

B. 

C. 

D. 

Answer: D



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