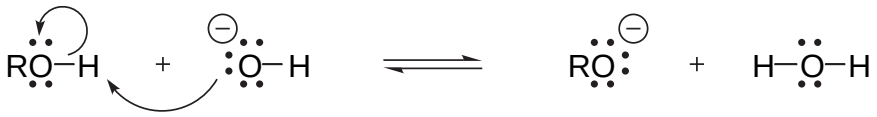
THESE ARE MECHANISMS YOU SHOULD ALL BE INTIMATELY FAMILIAR WITH:

- BASE-CATALYZED HEMIACETAL FORMATION
- BASE-CATALYZED ALDOL CONDENSATION
- ACID-CATALYZED HEMIACETAL/ACETAL FORMATION
- ACID-CATALYZED ENOL ETHER HYDROLYSIS
- ACID-CATALYZED ALDOL CONDENSATION

<u>BASE-CATALYZED HEMIACETAL FORMATION</u>

(1)



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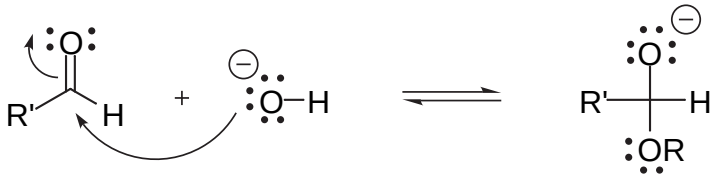

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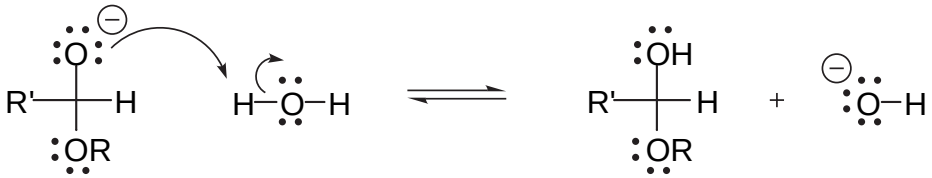
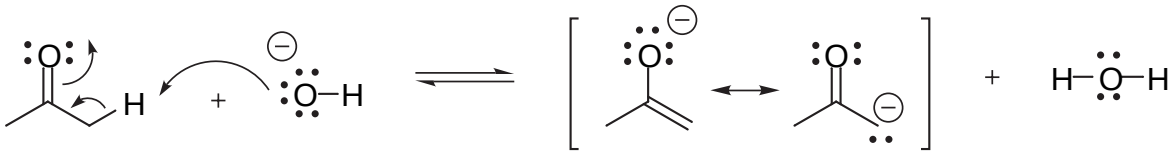


NOTE:
- NEUTRAL CARBONYL IS THE ELECTROPHILE
- RO^- IS THE NUCLEOPHILE

BASE-CATALYZED ALDOL CONDENSATION (AND DEHYDRATION)

(1)



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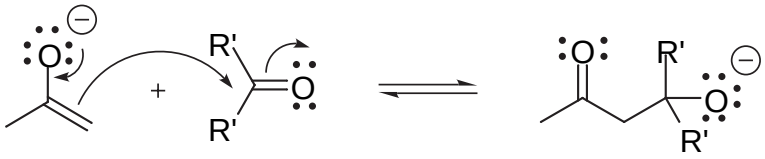
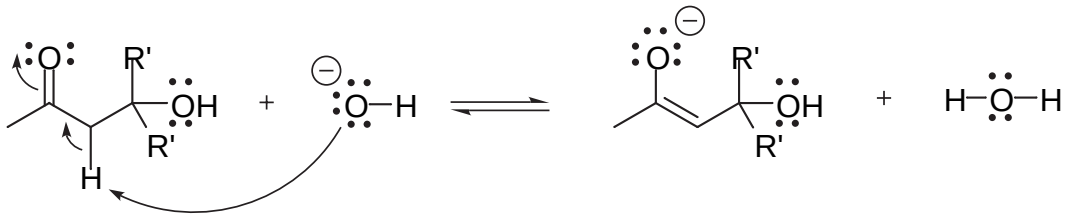


(3)

(4)



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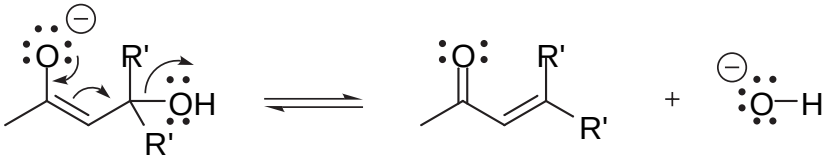
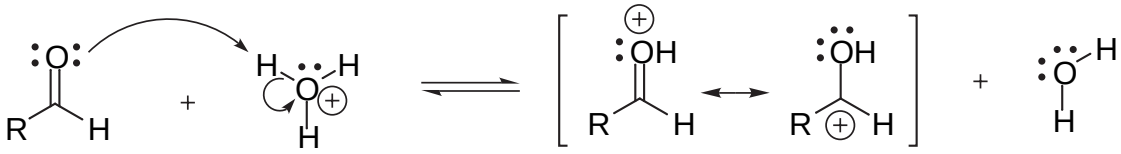


NOTE:
- FIVE STEPS!
- NEUTRAL CARBONYL IS THE ELECTROPHILE
- ENOLATE IS THE NUCLEOPHILE
- LAST TWO STEPS DO **NOT** OCCUR AT ONCE!

ACID-CATALYZED HEMIACETAL/ACETAL FORMATION

(1)



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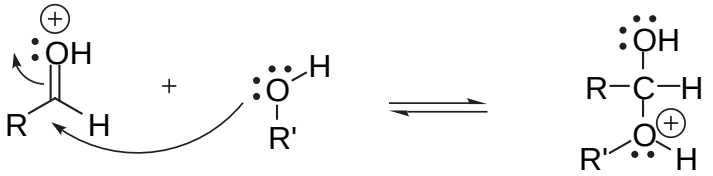

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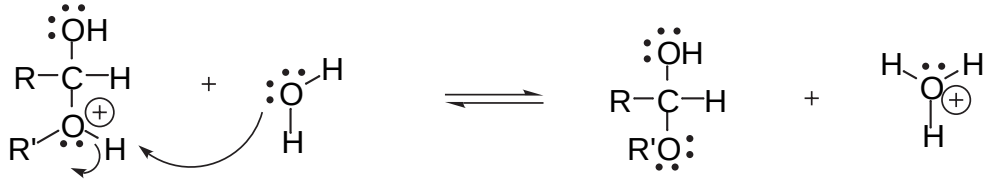

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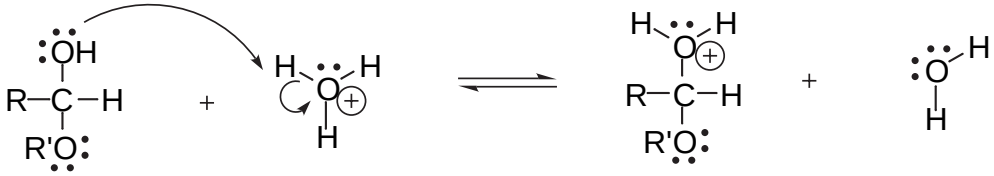

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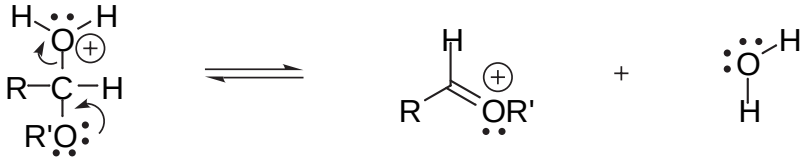

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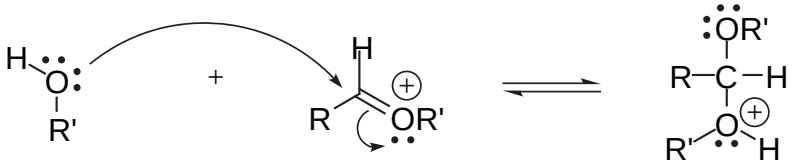

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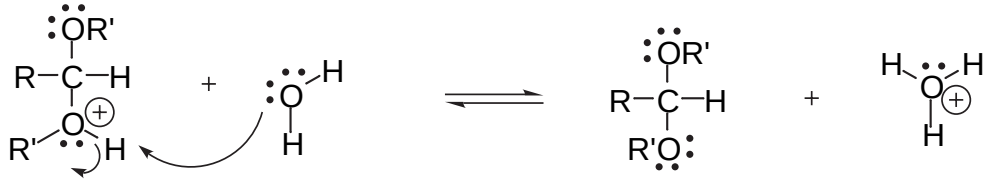
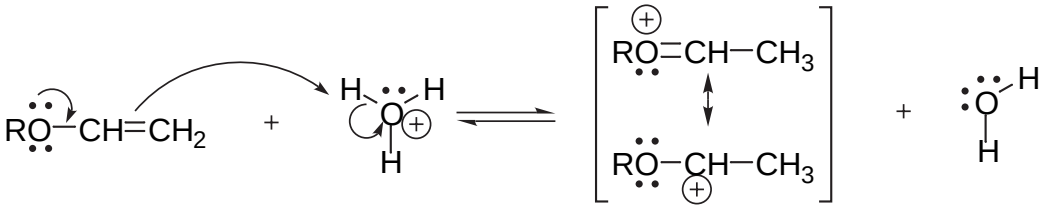


NOTE:

- STEPS ARE PROTONATION, ATTACK, DEPROTONATION, PROTONATION, LOSS OF H_2O, ATTACK, DEPROTONATION
- OXYGEN-STABILIZED CARBOCATION IS THE KEY ELECTROPHILE:

ACID-CATALYZED ENOL-ETHER HYDROLYSIS

(1)



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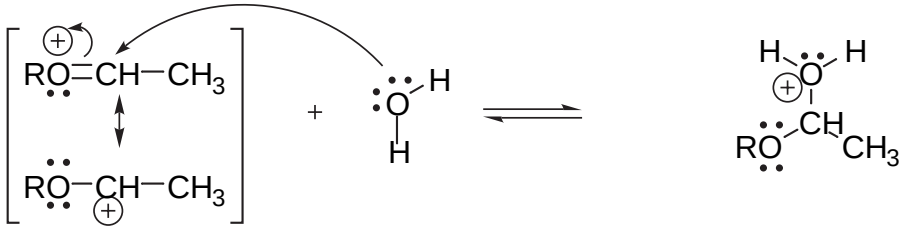
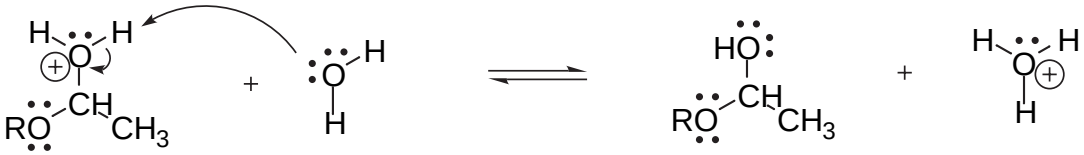
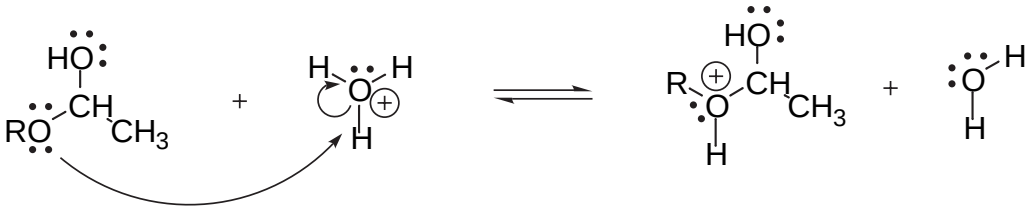


(3)



A HEMIACETAL

(4)



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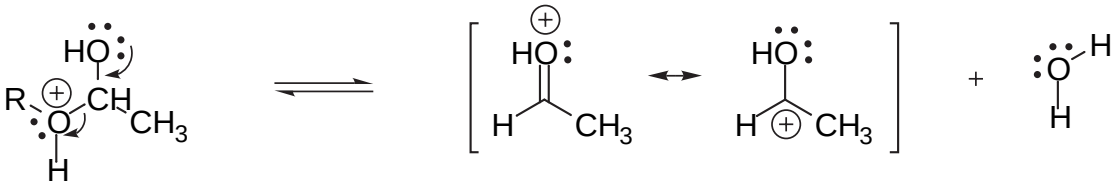

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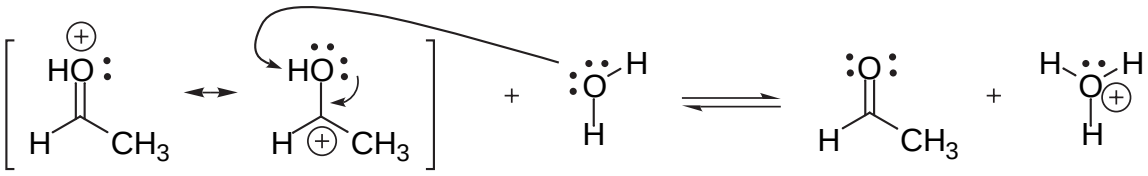
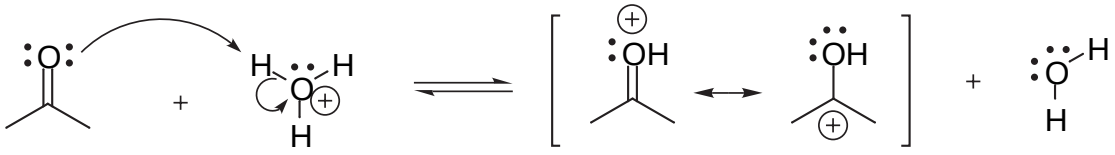


NOTE:
- EXTREMELY SIMILAR TO ACID-CATALYZED ACETAL DEGRADATION

ACID-CATALYZED ALDOL CONDENSATION (AND DEHYDRATION)

(1)



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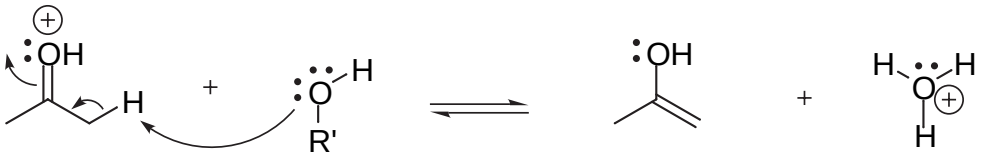

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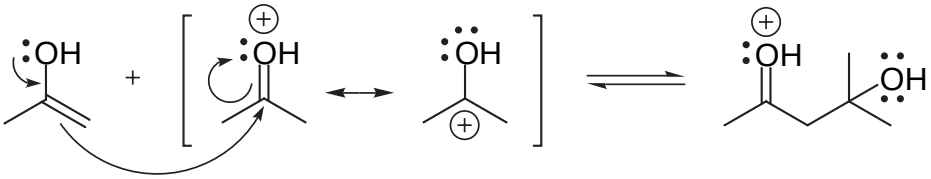

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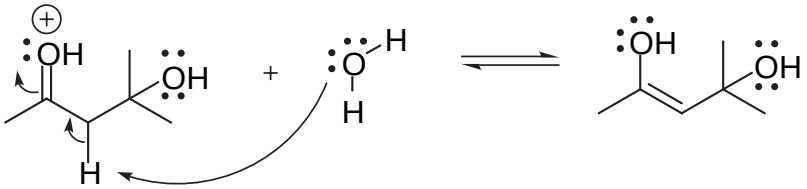

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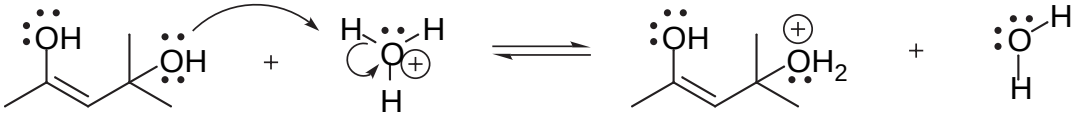

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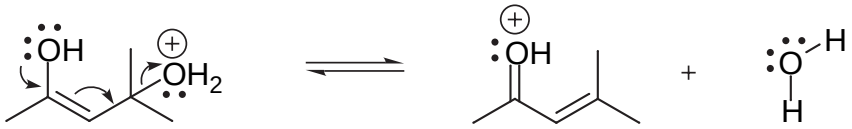

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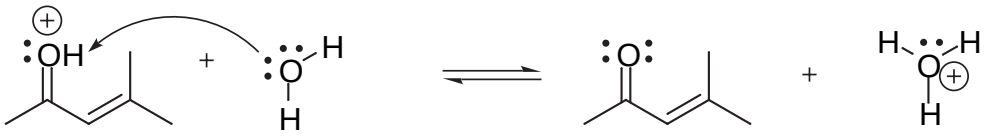

NOTE:
- SEVEN STEPS!
- PROTONATED CARBONYL IS THE ELECTROPHILE
- NEUTRAL ENOL IS THE NUCLEOPHILE