# STUDENT WORKSHEET - Aldol and Claisen Condensations

Name _____ Date _____ Section _____

Instructions: Choose the best answer for items 1-6. Show complete reasoning and clear structures for items 7-8. Compare with the separate answer key only after trying each problem.

## Part A. Concept and product prediction

**1. An aldol addition gives a**

(A) beta-hydroxy carbonyl
(B) beta-keto ester exclusively
(C) nitrile

**2. Which reaction features alkoxide leaving-group departure?**

(A) Aldol addition to ketone
(B) Claisen condensation of esters
(C) Keto-enol tautomerism

**3. Dehydration of 3-hydroxybutanal can yield**

(A) But-2-enal
(B) Ethyl acetate
(C) Propane

**4. What is the self-Claisen product of ethyl acetate after workup?**

(A) Ethyl 3-oxobutanoate
(B) Acetone
(C) Ethanal

**5. Which question helps identify aldol versus Claisen?**

(A) What color is the liquid?
(B) Is the electrophile an aldehyde/ketone or ester?
(C) How many oxygen atoms are in water?

**6. Why can uncontrolled crossed aldols give mixtures?**

(A) Both partners may form different enolates and react
(B) All aldehydes are inert
(C) The carbonyl oxygen leaves as chloride

## Part B. Show your reasoning

**7. Show aldol addition between two ethanal molecules. Name the beta-hydroxy product and give the product after dehydration.**

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**8. Predict self-Claisen condensation of ethyl acetate with ethoxide and acidic workup; explain why it differs from aldol.**

Finish: Check atom counts, formal charges, nomenclature, and any reaction conditions.