STUDENT WORKSHEET - Enolates and Keto-Enol Tautomerism

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. What is an alpha carbon of a ketone?

(A) The carbonyl carbon itself
(B) Any carbon directly adjacent to the carbonyl carbon
(C) The carbon furthest from oxygen

2. Are keto and enol structures resonance contributors?

(A) Yes
(B) No; they are tautomers
(C) Only in water

3. What type of reagent typically forms a ketone enolate almost quantitatively?

(A) LDA in suitable conditions
(B) Dilute neutral water
(C) NaCl(s)

4. Which statement about an enolate is correct?

(A) Negative charge is delocalized over alpha carbon and oxygen
(B) It has two independent negative charges
(C) It cannot make carbon-carbon bonds

5. What mechanism often creates a C-C bond between an enolate and methyl iodide?

(A) SN2
(B) SN1 at methyl carbon
(C) E1

6. Benzaldehyde is typically non-enolizable because

(A) Its oxygen has no lone pairs
(B) It lacks an alpha hydrogen on an adjacent carbon
(C) Its ring is not conjugated

Part B. Show your reasoning

7. Draw the acetone enolate and two resonance contributors after removal of an alpha hydrogen. Identify where charge is delocalized.

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8. Compare acetone and benzaldehyde for normal enolate formation. Explain which has an alpha hydrogen.

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