Hemiacetals & Acetals — Practice Worksheet

Name: _____ Date: _____

Directions: Select the best answer for Questions 1–8. For Questions 9–10, explain your reasoning using chemical structures, reagents or electron-flow ideas where useful.

1. A hemiacetal carbon has which substituents?

A. Two OR groups
B. One OH and one OR
C. Two carbonyl oxygens
D. One Cl and one Br

Answer: _____

2. An acetal carbon contains:

A. Two OR groups
B. One OH and one OR
C. A C=O bond
D. An amide nitrogen

Answer: _____

3. Typical acid-catalyzed acetal formation requires:

A. Aldehyde/ketone, alcohol and acid
B. Alkene and bromine
C. Acid chloride and NaCl
D. Alkane and O_2

Answer: _____

4. Which condition commonly hydrolyzes an acetal back to a carbonyl?

A. Dry basic conditions
B. Aqueous acid
C. $NaBH_4$
D. PCC

Answer: _____

5. Acetal formation is best described as:

A. Irreversible
B. An equilibrium process
C. A radical substitution
D. A redox step

Answer: _____

6. Why remove water during acetal protection?

A. It lowers mass balance
B. It shifts equilibrium toward acetal
C. It makes OH a strong base
D. It converts ketones to acids

Answer: _____

7. Which structure represents acetaldehyde dimethyl acetal?

A. $CH_3CH(OCH_3)_2$
B. $CH_3CH(OH)(OCH_3)$
C. CH_3CHO
D. CH_3COOH

Answer: _____

8. Hemiacetal formation from many simple aldehydes and alcohols is:

A. Typically reversible
B. Always radical
C. Impossible
D. A direct E2

Answer: _____

9. How many OR substituents are on a simple acetal carbon?

_____

_____

_____

10. What conditions commonly remove an acetal protecting group?

_____

_____

_____