

Carbonyl Addition — 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. NaBH_4 followed by aqueous workup converts propanone to:

- A. Propanal
- B. 2-Propanol
- C. Propanoic acid
- D. Propene

Answer: _____

2. NaBH_4 followed by workup converts ethanal to:

- A. Ethanol
- B. Ethene
- C. Ethanoic acid
- D. Ethyl ethanoate

Answer: _____

3. During nucleophilic attack on $\text{C}=\text{O}$, π electrons move to:

- A. Carbonyl oxygen
- B. An alpha carbon
- C. A leaving chloride
- D. A proton on carbon

Answer: _____

4. After CH_3MgBr addition to formaldehyde and aqueous workup, product is:

- A. Methanol
- B. Ethanol
- C. Propan-2-ol
- D. Acetic acid

Answer: _____

5. CH_3MgBr plus ethanal, then H_3O^+ , gives:

- A. Ethanol
- B. Propan-2-ol
- C. Propanal
- D. Propan-1-ol

Answer: _____

6. NaBH_4 commonly reduces which functional group directly under standard conditions?

- A. An ester efficiently
- B. An amide efficiently
- C. An aldehyde
- D. An alkene

Answer: _____

7. What initially forms after strong nucleophilic addition to a neutral ketone?

- A. An alkoxide
- B. An ester
- C. An acyl chloride
- D. An imine

Answer: _____

8. Why is water excluded from a typical Grignard addition before workup?

- A. It oxidizes oxygen
- B. It protonates and destroys the Grignard reagent
- C. It freezes the carbonyl
- D. It cleaves esters only

Answer: _____

9. What happens to the $\text{C}=\text{O}$ π bond during nucleophilic attack?

10. What alcohol class forms when a ketone is reduced with NaBH_4 ?
