Alkyne Reactions & Selective Reduction

STUDENT PRACTICE WORKSHEET

Name: _____ Date: _____

Instructions: Select the best answer for questions 1–8 and briefly justify your choice using substrate, reagents, or reaction conditions. For 9–10, explain your reasoning in complete sentences.

1. **2-Butyne + H_2/Lindlar gives:**

   A. cis-2-Butene B. trans-2-Butene C. Butane D. 2-Butanone

   Reasoning: _____

2. **2-Butyne + Na/NH_3(l) gives:**

   A. trans-2-Butene B. cis-2-Butene C. Butane D. 2-Butanone

   Reasoning: _____

3. **1-Butyne + $HgSO_4$/H_2SO_4/H_2O gives:**

   A. 2-Butanone B. Butanal C. 1-Butanol D. Butanoic acid

   Reasoning: _____

4. **1-Butyne hydroboration–oxidation with bulky borane gives:**

   A. Butanal B. 2-Butanone C. Butane D. 1-Butene

   Reasoning: _____

5. **An alkyne completely hydrogenated with excess H_2/Pd gives:**

   A. An alkane B. A cis alkene only C. A trans alkene only D. An alcohol

   Reasoning: _____

6. **Which reagent stops at a cis alkene?**

   A. Lindlar catalyst + H_2 B. Pd/C + excess H_2 C. Na/NH_3(l) D. $HgSO_4$/H_2O

   Reasoning: _____

7. **What intermediate initially forms on alkyne hydration?**

   A. An enol B. A carboxylate C. A nitrile D. A nitrene

   Reasoning: _____

8. **For a terminal alkyne, mercury-catalyzed hydration commonly gives:**

   A. A methyl ketone B. An aldehyde exclusively C. A carboxylic acid D. An ether

   Reasoning: _____

9. **Give two reagents that convert 2-butyne into different geometric alkene isomers.**

10. **What carbonyl product comes from hydroboration–oxidation of 1-butyne?**