Provide a synthesis of the following compounds as requested using ethanol (EtOH) as the source of all carbons in the target molecule. You may use the products of earlier reactions in later reaction even if you were not able to make the earlier target molecule.

a) $\Delta_0$

b) acetylene

c) $\text{hex-3-yn-1-ol}$
Provide a synthesis of the following compounds using EtOH and/or any inorganic as the source of all carbons in the target molecules. You may use the requested products of earlier questions in subsequent questions even if you were not able to make the compound in the earlier questions.

a) ethanoic (acetic) acid
b) 2-butanone
c) 3,4-dimethylhex-3-ene

Propose a mechanism to account for this rearrangement

Following are two reaction sequences for converting 1,2-diphenylethylene into 2,3-diphenyloxiane
Suppose that the starting alkene is trans-1,2-diphenylethylene.

(a) What is the configuration of the oxirane formed in each sequence?
(b) Will the oxirane formed in either sequence rotate the plane of polarized light? Explain.

8 Suppose you attempted to synthesize cyclohexene (density = 0.90 g/mL) from 10.0 g of cyclohexanol and obtained 4.2 g of cyclohexene. What is your % yield? Show your work.

9 Which of the following should react fastest for an E2 dehydrohalogenation?

\[ \text{[Chemical Structures]} \]