1. How would you carry out the following transformations? More than one step may be needed.

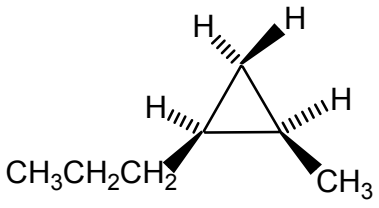
(a) $CH_3CH_2C{\equiv}CH \longrightarrow CH_3CH_2\overset{O}{\overset{\|}{C}}CH_3$

(b) $CH_3CH_2C{\equiv}CH \longrightarrow CH_3CH_2CH_2CHO$

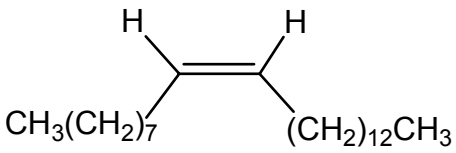
(c) $CH_3CH_2C{\equiv}CH \longrightarrow CH_3CH_2COOH$

(d) $CH_3CH_2CH_2CH_2CH{=}CH_2 \longrightarrow CH_3CH_2CH_2CH_2C{\equiv}CH$

(e) $CH_3CH_2C{\equiv}CCH_3 \longrightarrow$ (E)-$CH_3CH_2CH{=}CHCH_3$

(f) $CH_3CH_2CH_2C{\equiv}CH \longrightarrow$ 

2. Propose a synthesis of muscalure, the sex attractant of the common housefly, starting from acetylene and any alkyl halides.



muscalure

3. Hydrocarbon A has the formula $C_{12}H_8$. It absorbs 8 equivalents of hydrogen upon catalytic reduction using a palladium catalyst. Upon ozonolysis only two products are formed: oxalic acid (HOOC-COOH) and succinic acid ($HOOCCH_2CH_2COOH$). What is A? Explain concisely.

4. Compounds B and C have the formula C_7H_{14}. They are optically inactive; they are not resolvable, and they are diastereomers of each other. Catalytic hydrogenation of B or C yields D. D is optically inactive, but it could be resolved into separate enantiomers. Identify B, C, and D. Explain concisely.