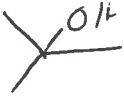
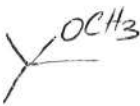
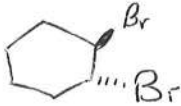
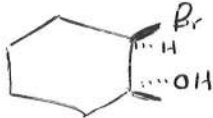
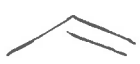
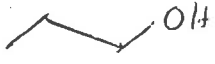


| Starting Material                                                                  | Reagent                                                              | Product(s)                                                                           | notes                                          |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------|
|    | $\xrightarrow{\text{HBr}}$                                           |     | Markovnikov                                    |
|    | $\xrightarrow[\text{H}_2\text{O}]{\text{H}_2\text{SO}_4}$            |     |                                                |
|    | $\xrightarrow[\text{CH}_3\text{OH}]{\text{H}_2\text{SO}_4}$          |     |                                                |
|    | $\xrightarrow{\text{Br}_2}$                                          |     | Anti addition                                  |
|   | $\xrightarrow[\text{H}_2\text{O}]{\text{Br}_2}$                      |   | Anti addition of<br>$\text{Br} \neq \text{OH}$ |
|  | $\xrightarrow[2) \text{H}_2\text{O}_2, \text{OH}^-]{1) \text{BH}_3}$ |  | Anti-Markovnikov                               |

| Starting Material                       | Reagent                                                                          | Products                                                      | notes                                                                                                                                                       |
|-----------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $\text{CH}_3\text{C}\equiv\text{CH}$    | $\xrightarrow[\text{(2 eq)}]{\text{HBr}}$                                        | $\text{CH}_3\text{C}(\text{Br})_2\text{CH}_3$                 |                                                                                                                                                             |
| $\text{CH}_3\text{C}\equiv\text{CH}$    | $\xrightarrow[\text{(2 eq)}]{\text{Br}_2}$                                       | $\text{CH}_3\text{C}(\text{Br})_2\text{CH}_2\text{Br}$        |                                                                                                                                                             |
| $\text{CH}_3\text{C}\equiv\text{CH}$    | $\xrightarrow[\text{H}_2\text{SO}_4]{\text{H}_2\text{O}}$                        | $\text{CH}_3\text{COCH}_3$                                    | via $\text{CH}_3\text{C}(\text{OH})=\text{CH}_2$<br>Terminal alkynes <del>can't</del> need $\text{H}_2\text{SO}_4$<br>Internal alkynes can get away w/o it. |
| $\text{CH}_3\text{C}\equiv\text{CH}$    | $\xrightarrow[\text{2) H}_2\text{O}_2, \text{KOH, H}_2\text{O}]{\text{1) BH}_3}$ | $\text{CH}_3\text{CH}_2\text{CHO}$                            | via $\text{CH}_3\text{C}(\text{H})=\text{CH}\text{OH}$<br>anti markovnikov.                                                                                 |
| $\text{CH}_3\text{C}\equiv\text{CCH}_3$ | $\longrightarrow$                                                                | $\text{CH}_3\text{COCH}_2\text{CH}_3$                         | via $\text{CH}_3\text{C}(\text{OH})=\text{C}(\text{OH})\text{CH}_3$                                                                                         |
| $\text{CH}_3\text{CH}=\text{CH}_2$      | $\xrightarrow[\text{2) Me}_2\text{S}]{\text{1) O}_3}$                            | $\text{CH}_3\text{CHO} + \text{HCHO}$                         | or $\xrightarrow[\text{2) Zn}]{\text{1) O}_3}$                                                                                                              |
| $\text{CH}_3\text{C}\equiv\text{CCH}_3$ | $\xrightarrow[\text{2) H}_2\text{O}]{\text{1) O}_3}$                             | $2 \text{CH}_3\text{COOH}$                                    |                                                                                                                                                             |
| $\text{CH}_3\text{C}\equiv\text{CCH}_3$ | $\xrightarrow[\text{NH}_3]{\text{Na}}$                                           | $\text{CH}_3\text{C}(\text{H})=\text{C}(\text{H})\text{CH}_3$ |                                                                                                                                                             |
| $\text{CH}_3\text{C}\equiv\text{CCH}_3$ | $\xrightarrow[\text{Lindlar}]{\text{H}_2}$                                       | $\text{CH}_3\text{C}(\text{H})=\text{C}(\text{H})\text{CH}_3$ |                                                                                                                                                             |
| $\text{CH}_3\text{C}\equiv\text{CCH}_3$ | $\xrightarrow[\text{Pd/C}]{\text{H}_2}$                                          | $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$                |                                                                                                                                                             |