Some Organic Synthesis Practice Problems:

Starting from 1-hexene, 1-butyne, bromoethane, iodomethane and any reagent needed (you do not need to use all of these compounds), synthesize:

1.

2.

1)
$$BH_3$$

2) $NaOH$, H_2O_2
 H_2O
 $H_3CH_2CH_2CH_2C-C\equiv CH$
 $NaNH_2$
 Br_2
 Br

3.

octane
$$\begin{array}{c} \text{H}_2, \, \text{Pd} \\ \hline \\ \text{OCTAME} \\ \end{array} \\ \begin{array}{c} \text{H}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{C} - \text{C} \equiv \text{C} - \text{CH}_2\text{CH}_3 \\ \hline \\ \text{NaNH}_2, \, \text{NH}_3 \\ \text{CH}_3\text{CH}_2\text{Br} \\ \hline \\ \text{H}_3\text{CH}_2\text{CH}_2\text{C} - \text{C} \equiv \text{CH} \\ \hline \\ \text{see above} \\ \end{array}$$

4.

Br
$$Br_2$$
 $H_3CH_2C-C\equiv C-CH_2CH$ $H_3CH_2C-C\equiv C-CH_2CH$ $H_3CH_2C-C\equiv C-CH_2CH$ $H_3CH_2C-C\equiv C-CH_2CH$ $H_3CH_2C-C\equiv CH$ $H_3CH_2C-C\equiv CH$ $H_3CH_2C-C\equiv CH$ $H_3CH_2C-C\equiv CH$ $H_3CH_2C-C\equiv CH$

5. CI CI CHCI₃, KOH
$$\begin{array}{c} \text{Li, NH}_3 \\ \text{NaNH}_2, \\ \text{NH}_3, \text{CH}_3 \text{I} \end{array}$$

6.
$$\begin{array}{c} OH \\ OH \\ 2) \text{ NaHSO}_3 \end{array}$$

$$\begin{array}{c} Li, NH_3 \\ H_3CH_2C-C \equiv C-CH_2CH_3 \end{array}$$

$$\begin{array}{c} NaNH_2, NH_3 \\ CH_3CH_2Br \end{array}$$

$$\begin{array}{c} H_3CH_2C-C \equiv CH \\ H_1 \end{array}$$

$$\begin{array}{c} H_3CH_2C-C \equiv CH \\ 1-butyne \end{array}$$