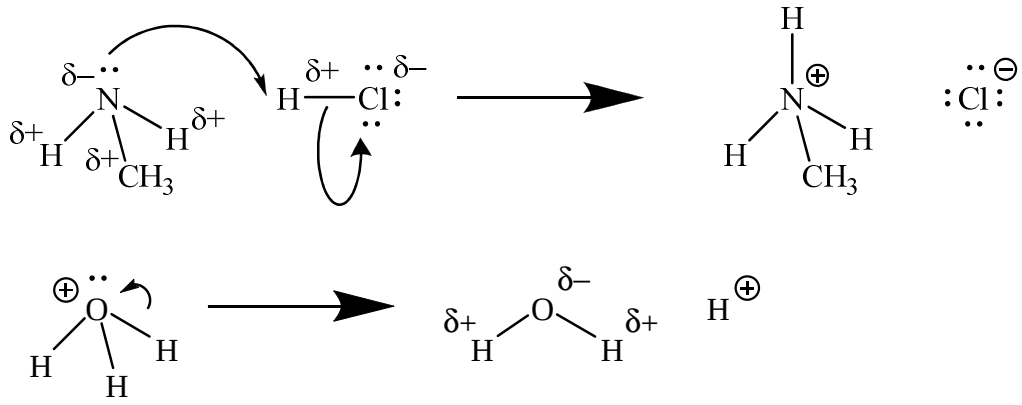
School of Chemistry

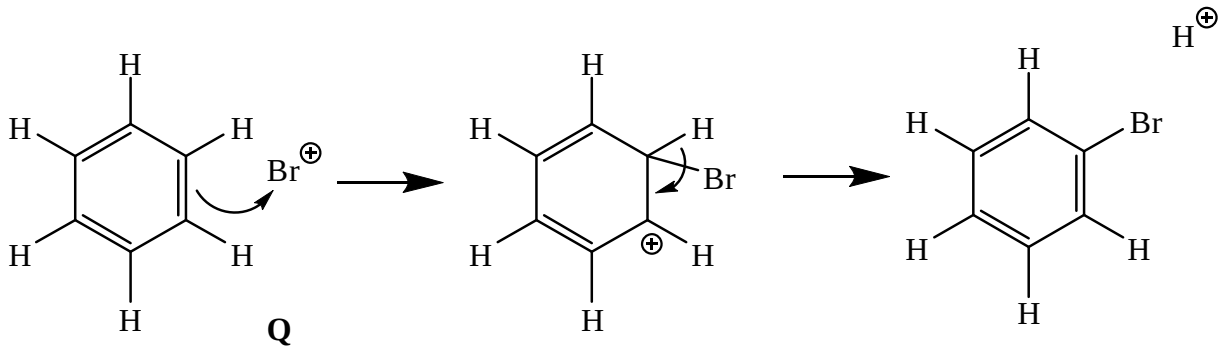
Chemistry 1B Advanced and SSP (CHEM1902/1904)

Answers to Problem Sheet 3

1.



2. Consider the reaction below:



P **Q** **R**

(a) **The Br^+ ion, Q, is attracted to the π electrons of the benzene ring.**

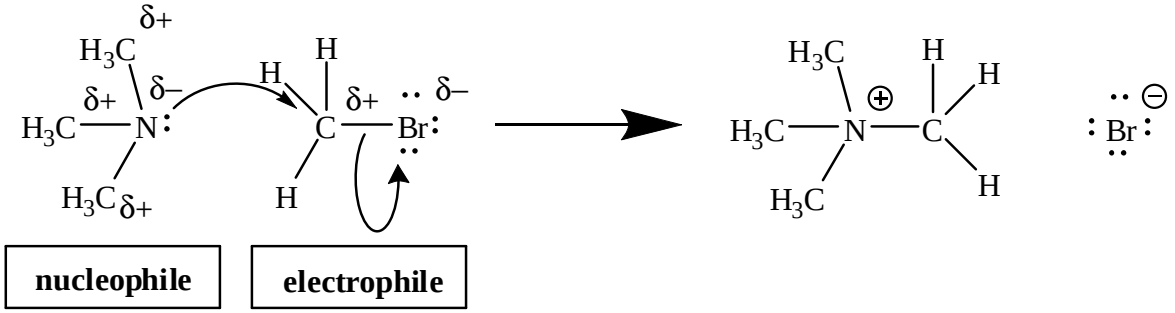
(b) P is aromatic. The aromaticity is lost in R.

(c) R has a positive charge on carbon and so is a carbocation.

(d) **See diagram.**

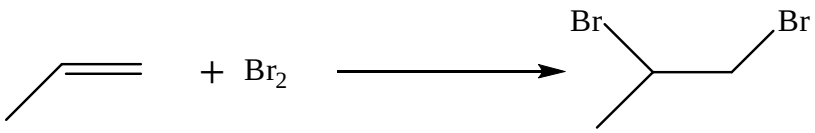
(e) **The reaction involves *electrophilic* attack on carbon resulting in *substitution* of H^+ by Br^+: the reaction is an electrophilic substitution.**

2. **The reaction involves *nucleophilic* attach on carbon leading to *substituton* of bromine by amine. It is a nucleophilic substitution reaction (S_N).**

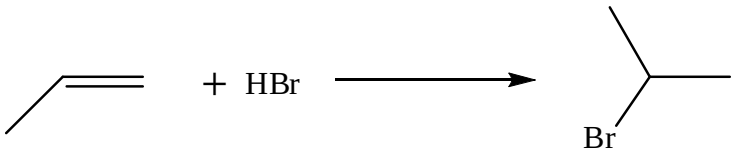


3.

(a)

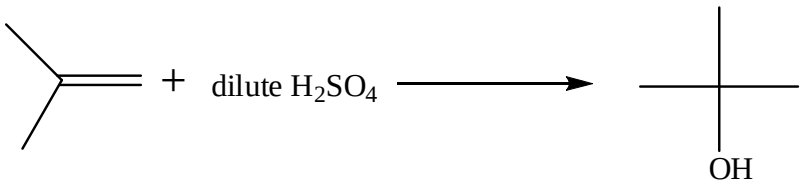


(b)



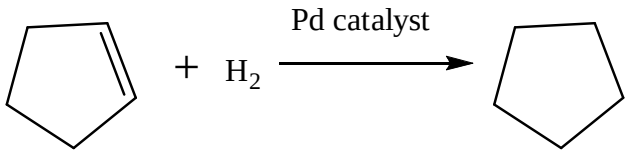
Markovnikov addition - H becomes attached to carbon with fewer alkyl groups attached.

(c)

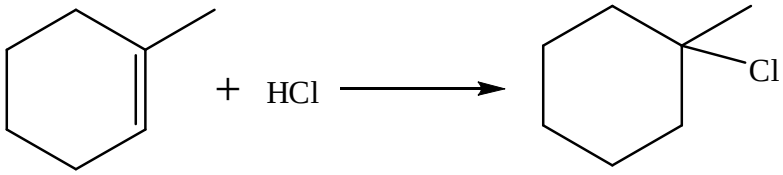


Markovnikov addition - H becomes attached to carbon with fewer alkyl groups attached.

(d)

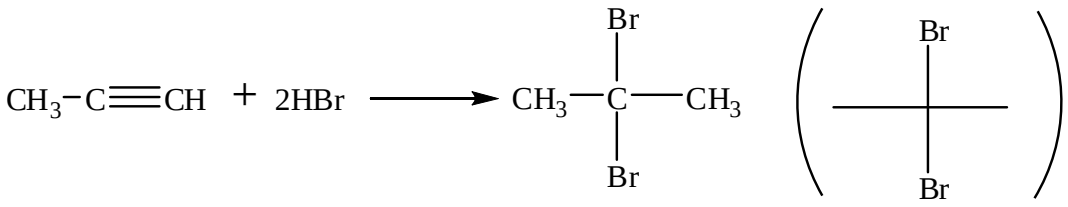


(e)



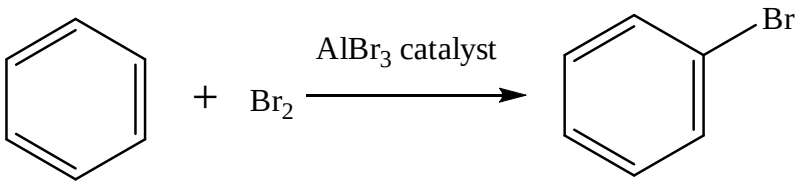
Markovnikov addition - H becomes attached to carbon with fewer alkyl groups attached.

(f)



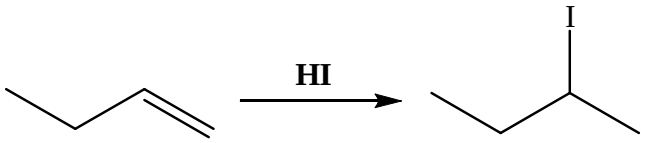
Markovnikov addition *twice* - each time H becomes attached to carbon with fewer alkyl groups attached.

(g)

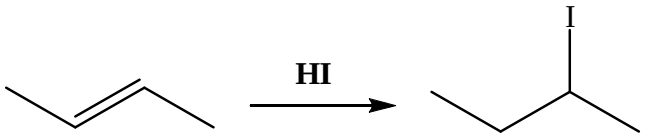


4.

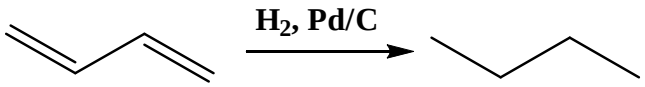
(a)



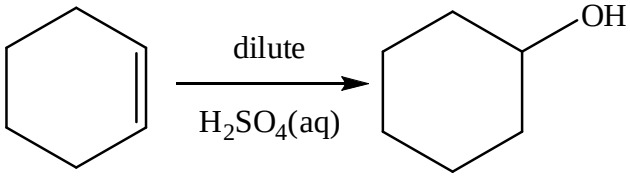
(b)



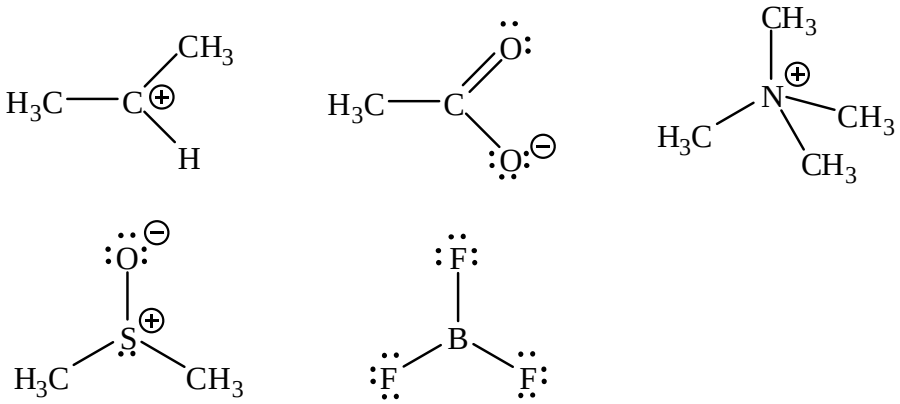
(c)



(d)

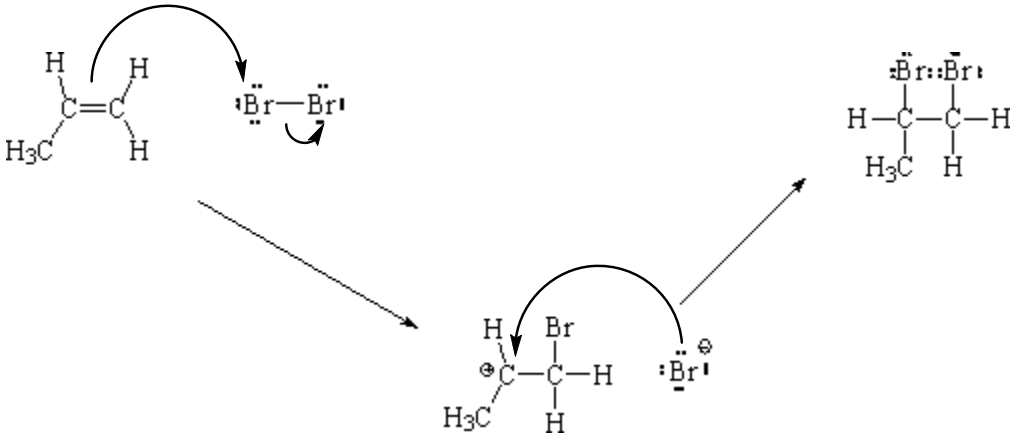


5.



(no charges - does not obey 'octet rule')

6. a.



b.