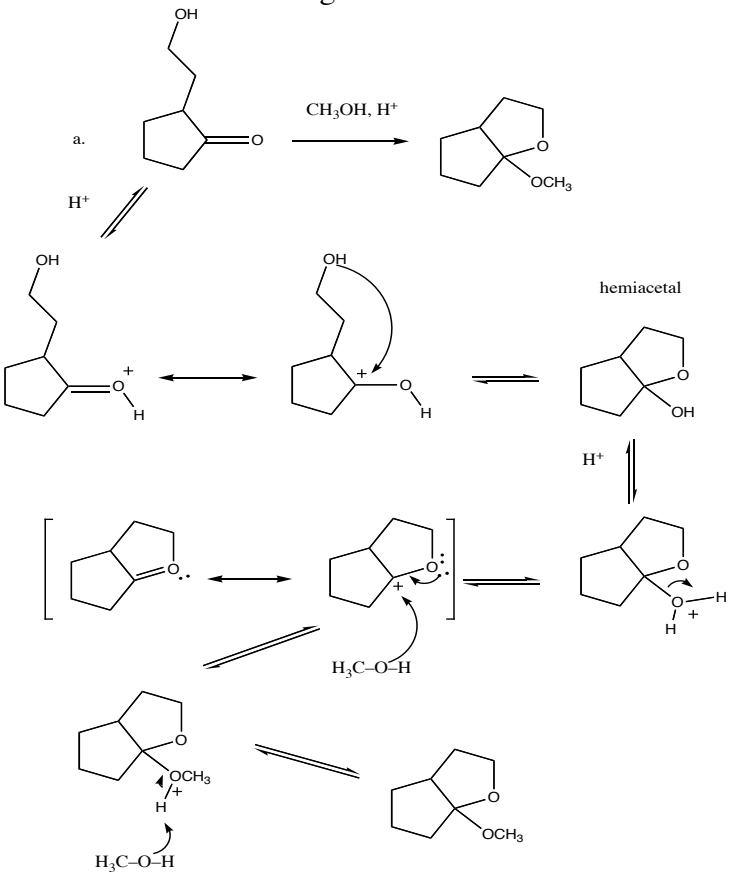
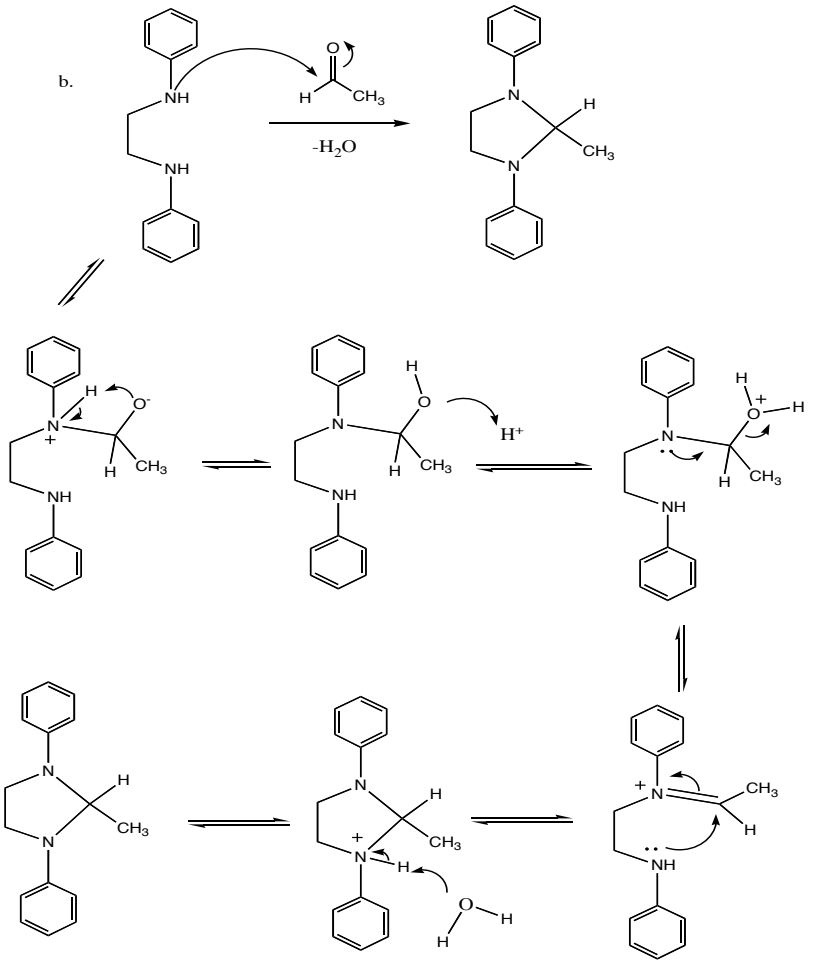
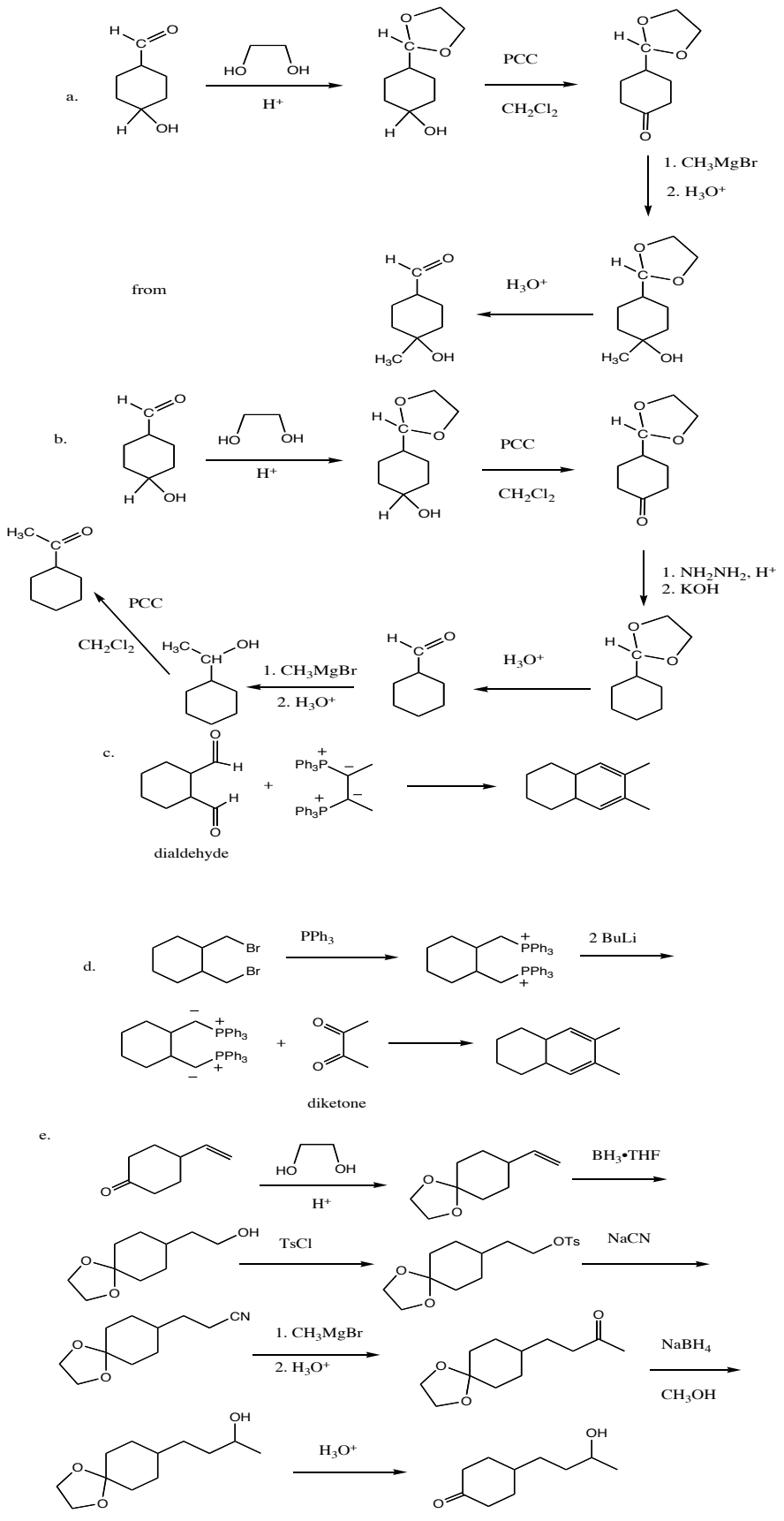
Additional Problems for Practice:

1. Show a mechanism for the following reactions:

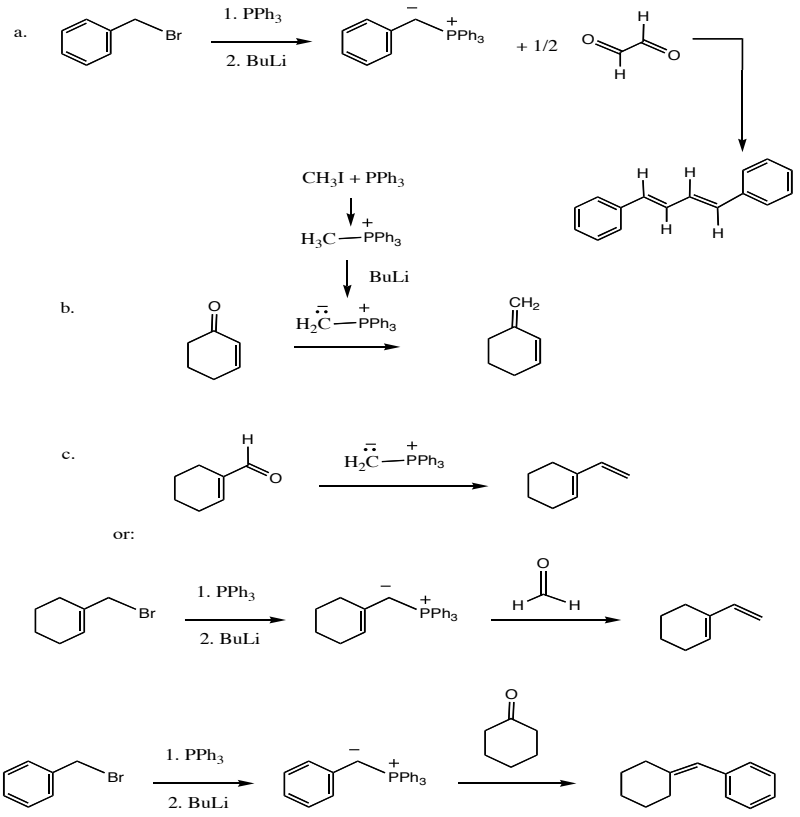




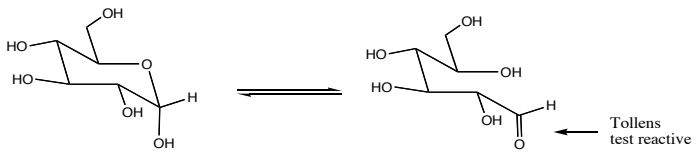
2. Propose efficient syntheses of each of the following molecules, beginning with the indicated starting materials:


a.
HO OH
H+
PCC
CH2Cl2
1. CH3MgBr
2. H3O+
from
H3O+
b.
HO OH
H+
PCC
CH2Cl2
1. NH2NH2, H+
2. KOH
PCC
CH2Cl2
1. CH3MgBr
2. H3O+
H3O+
c.
Ph3P
Ph3P
dialdehyde
d.
PPh3
2 BuLi
PPh3
PPh3
diketone
e.
HO OH
H+
BH3•THF
TsCl
NaCN
1. CH3MgBr
2. H3O+
NaBH4
CH3OH
H3O+

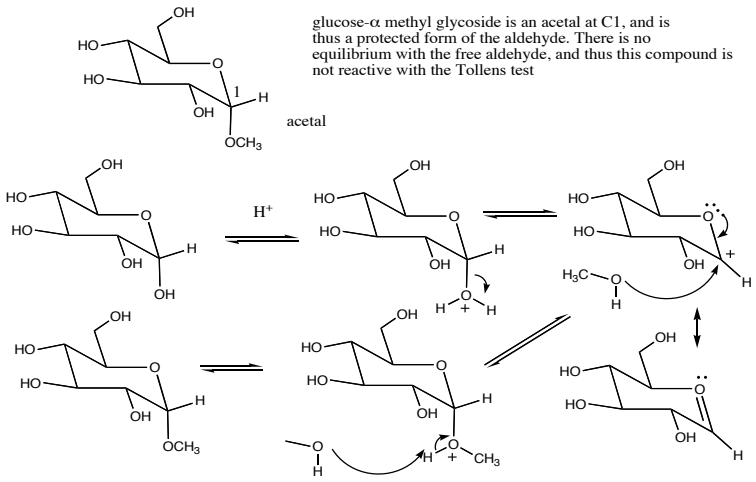
3. Show how the Wittig reaction might be used to prepare these alkenes. Identify the alkyl halides and carbonyl components that would be used.



4. Why does glucose react with the Tollens reagent while glucose α–methyl glycoside does not? Draw a mechanism for the transformation of glucose into its α-methyl glycoside in acidic methanol.



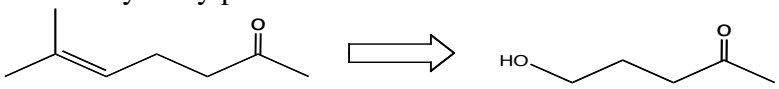
glucose exists as the hemiacetal, which is a cyclic form of a hydroxy aldehyde. The aldehyde can react by the Tollen's test.



glucose-α methyl glycoside is an acetal at C1, and is thus a protected form of the aldehyde. There is no equilibrium with the free aldehyde, and thus this compound is not reactive with the Tollens test

acetal

5. 6-methyl-5-hepten-2-one is a common constituent of many essential oils, particularly the lemongrass species. How could you synthesize this natural product from 5-hydroxy pentan-2-one:



6-methyl-5-hepten-2-one