

1. Predict the major products of the following reactions.

a) (R) – 2- butanol + TsCl in pyridine

b) (S) – 2-butyl tosylate + NaBr

c) Cyclooctanol + CrO₃/H₂SO₄

d) Cyclopentylmethanol + CrO₃.pyridine.HCl

e) Cyclopentylmethanol + Na₂Cr₂O₇/H₂SO₄

f) Cyclopentanol + HCl

g) Cyclopentanol + H₂SO₄/heat

h) Product from above + OsO₄/H₂O₂ followed by HIO₄

i) Sodium methoxide + t-butyl iodide

j) Sodium ethoxide + 1-bromobutane

2. Predict the major products of dehydration by acid catalysis.

a) 1-hexanol

b) 2-hexanol

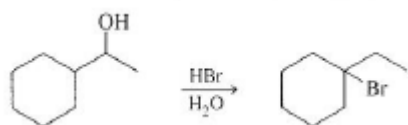
c) 3-pentanol

d) 1-methylcyclopentanol

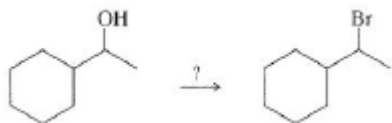
e) Cyclopentylmethanol

f) 2-methylcyclopentanol

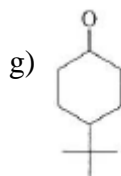
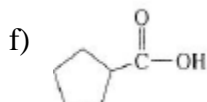
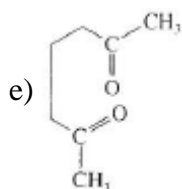
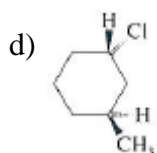
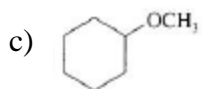
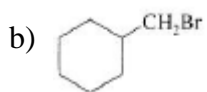
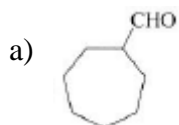
3. When 1-cyclohexylethanol is treated with aqueous HBr, the major product is 1-bromo-1-ethylcyclohexane. Give a mechanism for the reaction.



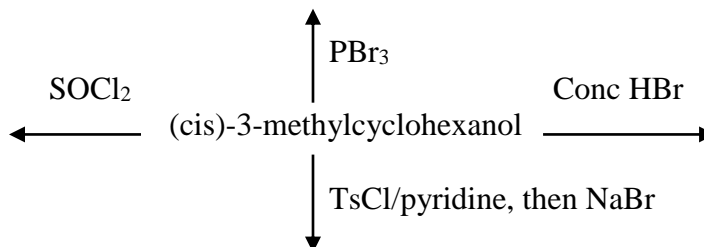
How would you convert 1-cyclohexylethanol to (1-bromoethyl)-cyclohexane in a good yield?



4. Show how you will make each of the following compounds from an alcohol of your choice.



5. Predict the major products (including stereochemistry) when (cis)-3-methylcyclohexanol reacts with the following reagents.



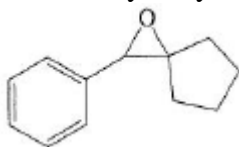
6. What simple chemical test can you use to distinguish between the following pairs of compounds? Write the test and the observation.

a) 1-butanol and 2-butanol

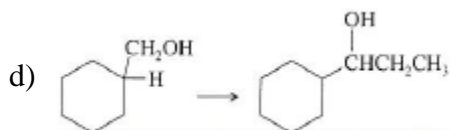
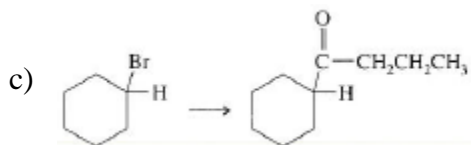
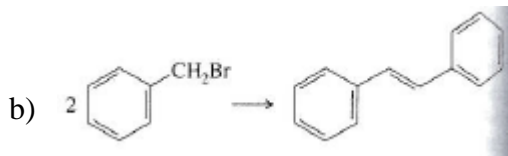
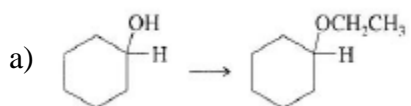
b) 2-butanol and 2-methyl-2-butanol

c) Cyclohexanol and cyclohexene

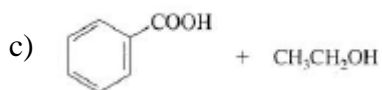
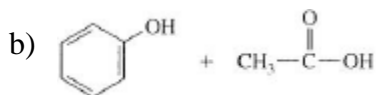
7. How will you synthesize the following compound from compounds of 6 carbons or less?



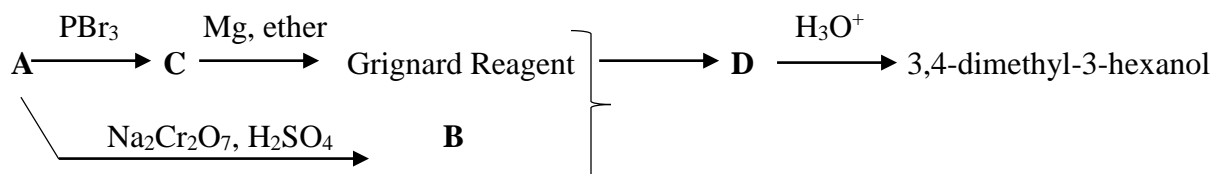
8. Show how you would carry out the following conversions.



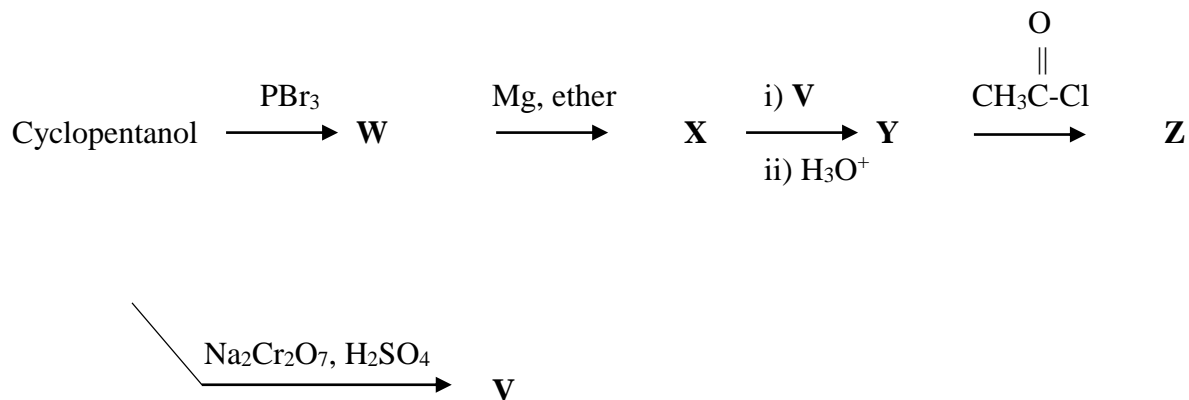
9. Predict the esterification products of the following acid/alcohol pairs.



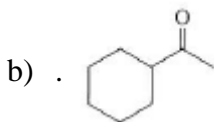
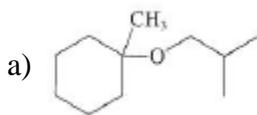
10. Compound A is an optically active alcohol. Treatment with chromic acid converts A to a ketone B. In a separate reaction A is treated with PBr_3 , converting A to C. Compound C is purified and reacted with magnesium and ether. Compound B is added to the resulting solution of the Grignard reagent. After hydrolysis, this solution is found to have 3,4-dimethyl-3-hexanol. Propose the structures for A, B and C.

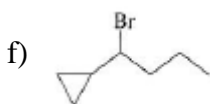
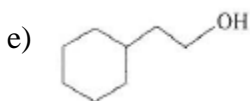
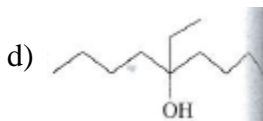
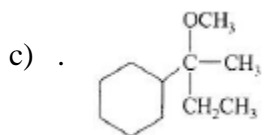


11. Give the structures of the following products V through Z.



12. Show how you would synthesize the following compounds using alcohols of 4 or less carbons and any other reagents of your choice.





13. Determine the structures A through G in the following scheme.

