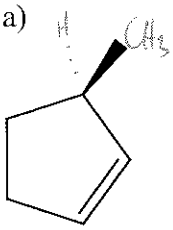
Chem 141
Problem-Set
Wednesday 11th October 2006.

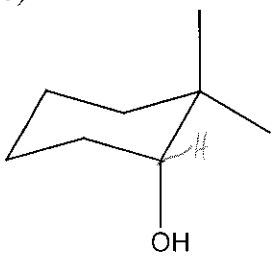
1. Name the following compounds. Including R/S where appropriate.

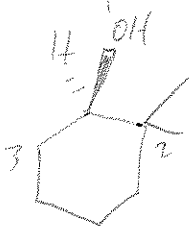
a)



(3R) - 3-methyl cyclopentene

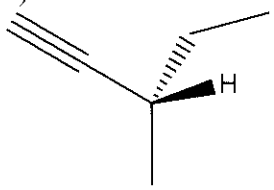
b)





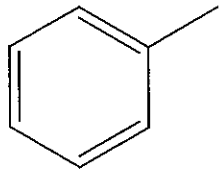
(1R) - 2,2-dimethylcyclohexanol

c)



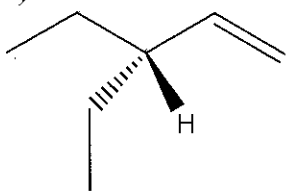
(3S)-3-methyl-pentyne.

d)



methyl benzene.

e)



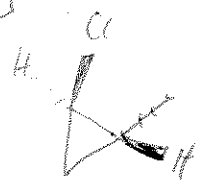
ethyl-pentene.

2. Draw the following structures illustrating the chirality of the stereogenic carbons.

a) (S)-2-chloropentane

b) (R)-3-methylcyclohexene

c) (R)-2-chloro-1-methylcyclopropane

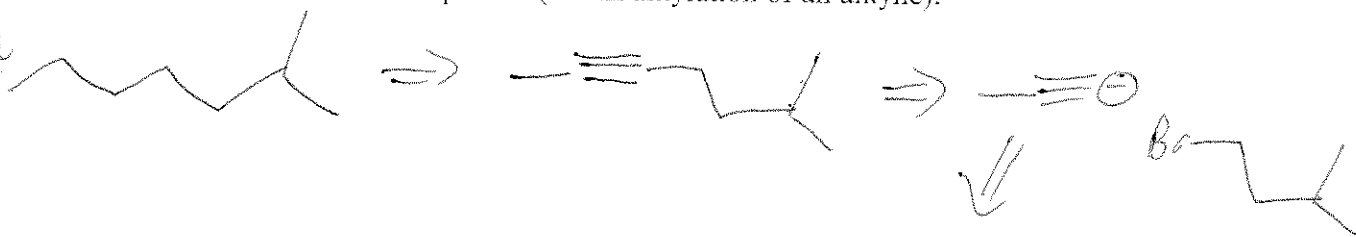


(R)-2-chloro-(R)-2-methylcyclopropane.

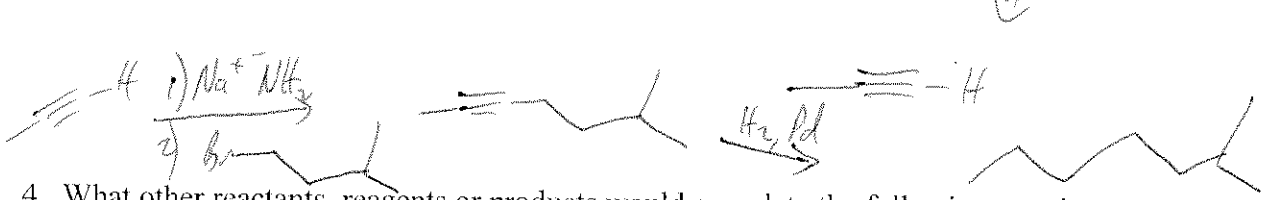
heptane

3. Design a synthesis of 2-methyl-~~hexane~~ using propyne, a strong base and any other starting materials that would be required. (Think alkylation of an alkyne).

Retrosynthetic Analysis

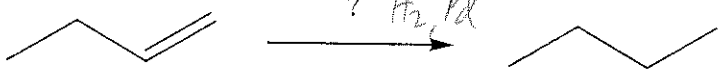


Forward Synthesis

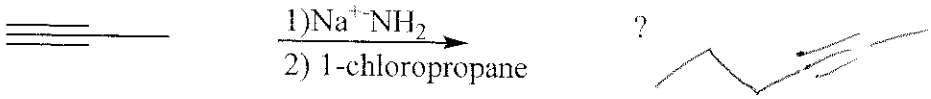


4. What other reactants, reagents or products would complete the following reactions.

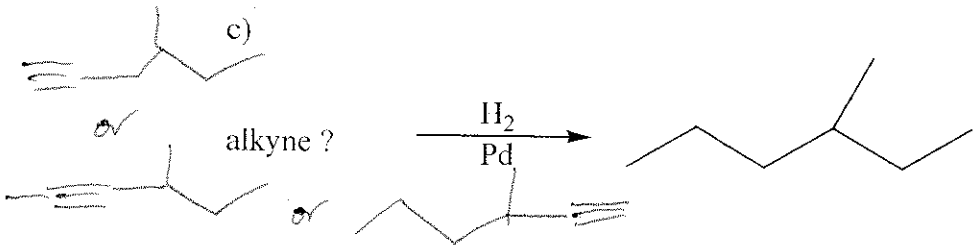
a)



b)

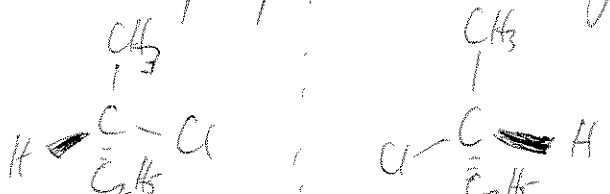


c)



5. Define the term enantiomer and draw two molecules that are enantiomeric.

An enantiomer has a non-superimposable mirror image.



6. You have a mixture of enantiomers of with an optical rotation of –3.3°. The specific optical rotation $[\alpha]_D^{25}$ of a pure sample of R (-) is -13.4°. What is the enantiomeric excess of your sample and the absolute concentrations of the R and S enantiomers.

$EE = \frac{3.3}{13.4} \times 100 = 25\%$ (R) over racemate.

25% (R) + 37.5% (R) (from racemate) = 62.5% R

37.5% S (from racemate)