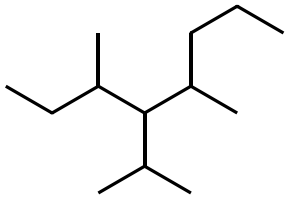
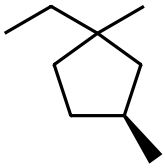
Chemistry 221: ASC Practice Exam 1

1) Name the following compounds

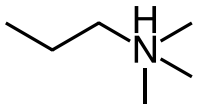
a) 

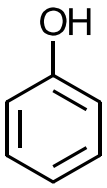
b) 

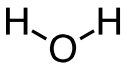
2) Draw the following compounds
   a) (R)- 4-isobutylhexane

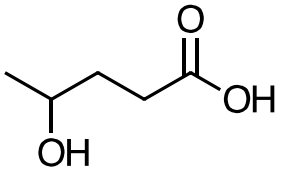
   b) (1R, 2S, 4R)- 4-ethyl-1,2-dimethylcycloheptane

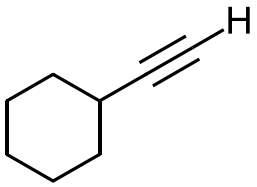
3) For each compound state the pKa of the ***most*** acidic hydrogen

a) 

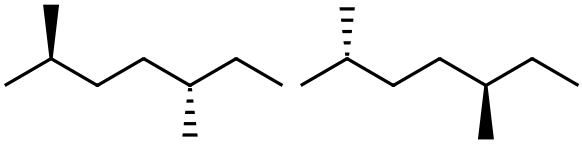
b) 

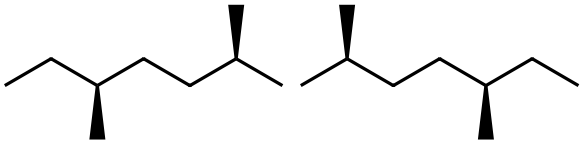
c) 

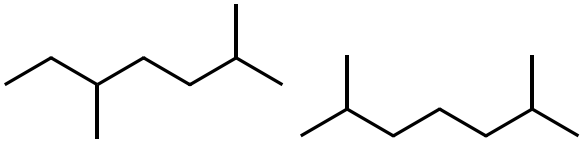
d) 

e) 

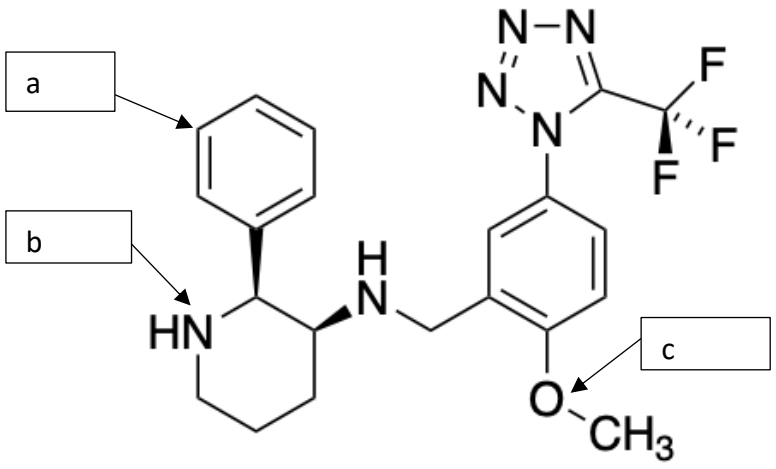
4) Identify the relationship between the pairs of compounds (same compound, constitutional isomers, enantiomers, diastereomers)

a)  _____

b)  _____

c)  _____

5) Provide the following information about the indicated atom. For the functional group give the name of the functional group that contains the specific atoms:



a. Hybridization____. Functional Group _____
b. Hybridization_____ Functional Group _____
c. Hybridization_____. Functional Group _____

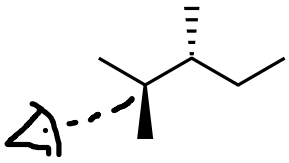
6) Use the standard shapes of the s and p orbitals to draw examples of each type of orbital interaction listed below:
   a) 2 s orbitals, sigma* interaction

   b) 2 p orbitals, pi bonding interaction

   c) 2 p orbitals, pi* antibonding

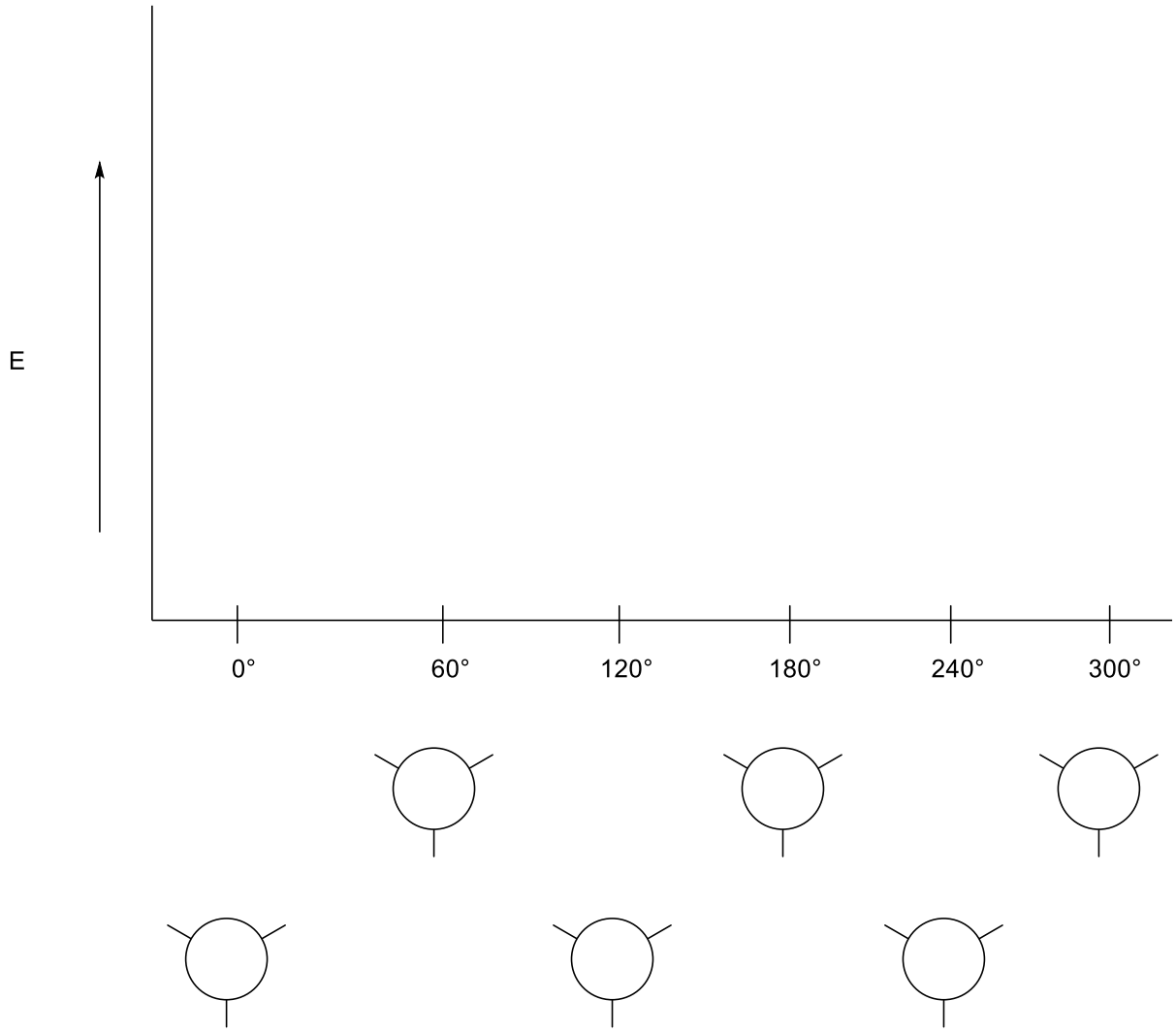
7) Draw 5 unique constitutional isomers with the formula C_4H_{10}.

8) a. Draw the following structure's Newman projection looking down the indicated carbon-carbon bond (This will be your starting point at 0).



b. Draw the conformations obtained by spinning the <u>front carbon</u> of the above Newman projection. Make sure to rotate clockwise. ***On the next page***

c. Draw the corresponding energy coordinate diagram for the Newman projections. ***On the next page***


E
0°
60°
120°
180°
240°
300°