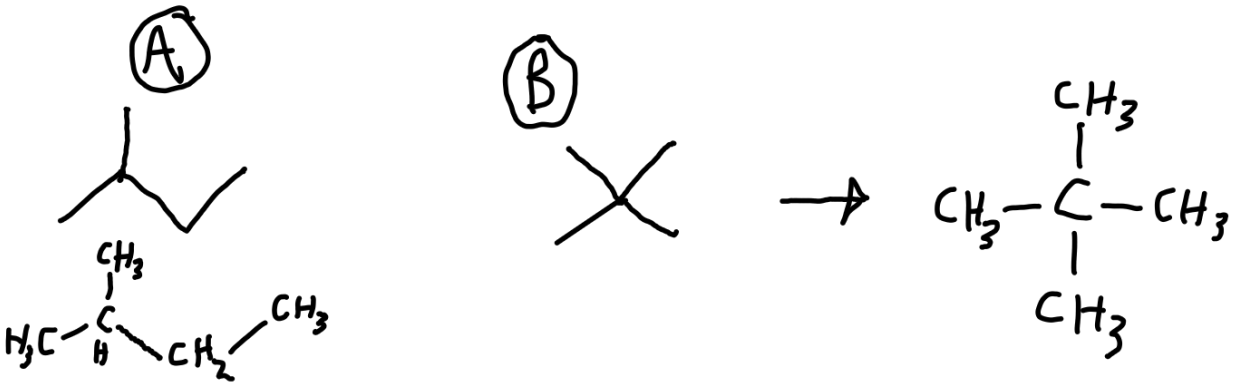
1. How many hydrogens does an alkane with 17 carbons have? How many carbons does an alkane with 74 hydrogens have?

$C_n H_{2n+2}$

36H and 36C

2. Draw the structure of octane and 2-methylheptane.

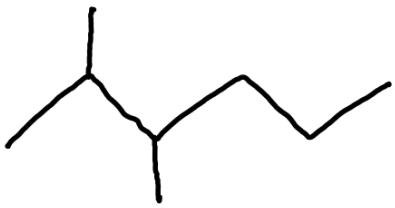
3. Draw the structure of C_5H_{12} that has a) one tertiary carbon b) no secondary carbons.



4. Draw the structures and name the four constitutional isomers for C_4H_9Br.

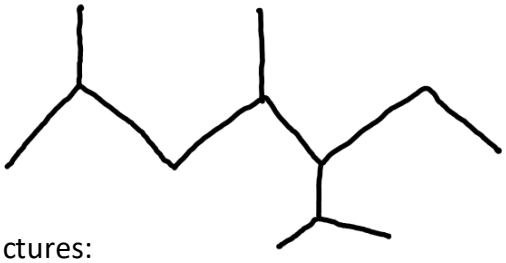
N-butyl Bromide sec-butyl Bromide Tert-butyl Bromide Iso-butyl Bromide

5. Draw the structure for each of the following:
   a) 2,3-dimethylhexane



   b) 4,4-diethyldecane

c) 2,4,5-trimethyl-4-(1-methylethyl) heptane



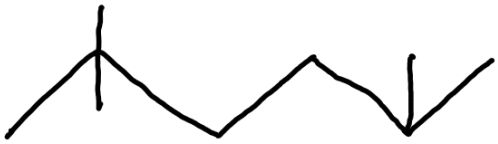
6. Convert the following structures to skeletal structures:
   a) $CH_3CH_2CH_2CH_2CH_2CH_2OH$

   b) $CH_3CH_2CH_2CH_2CH_2CH_3$

   c) $CH_3CH_2CH_2CH_2OCH_3$

   d) 3,4-diethyl-2-methylheptane

   e) 2,2,5-trimethylhexane



7. Give the IUPAC name and indicate whether each is a primary, secondary or tertiary alcohol.

a. $CH_3CH_2CH_2CH_2CH_2OH$

primary. 1-pentanol

b. $CH_3\underset{\displaystyle OH}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}CH_2CH_2CH_2Cl$

5-chloro-2-methyl-2-pentanol

Tertiary.

c. $CH_3\underset{\displaystyle CH_3}{\overset{|}{C}}HCH_2\underset{\displaystyle OH}{\overset{|}{C}}HCH_2CH_3$

Secondary. 5-methyl-3-hexanol

d. $CH_3\underset{\displaystyle CH_3}{\overset{|}{C}}HCH_2\underset{\displaystyle OH}{\overset{|}{C}}HCH_2\underset{\displaystyle OH}{\overset{|}{C}}HCH_2CH_3$

7-methyl-3,5-octandiol

Secondary

8. Are the following compounds primary, secondary or teritary?

a. $CH_3-\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}-Br$ (with CH_3)

b. $CH_3-\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}-NH_2$ (with CH_3)

c. $CH_3\underset{\displaystyle OH}{\overset{|}{C}}HCH_2CH_3$

d. $CH_3NHCH_2CH_3$

(A) Tertiary alkyl halide. (B) Primary amine.

(C) Secondary alcohol. (D) Secondary amine.

9. Predict the approximate size of the following bond angles?

For Halogens and alcohols count the number of C attached to the next C IE, secondary C secondary alcohol for amines it only matters the amount of C the amine is directly attached too IE, nitrogen is attached to 3 C then it's a tertiary amine.

a) the C-O-C bond angle in an ether

b) The C-O-H bond angle in an alcohol

c) the C-N-C bond angle in a secondary amine

(A) The bond angle would be similar to the bond angle in water (104.5º)
(B) The bond angle would be similar to the bond angle in ammonia (107.3º)
(C) The bond angle would be similar to the bond angle in water (104.5º)

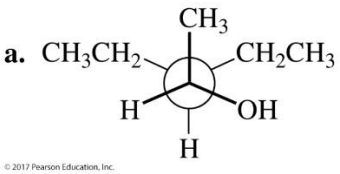
10. Which of the following compounds form hydrogen bonds between the molecules?

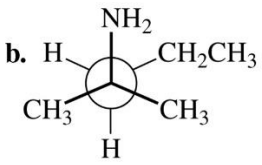
a) $CH_3CH_3CH_2OH$ b) $CH_3CH_2CH_2F$ c) $CH_3OCH_2CH_3$

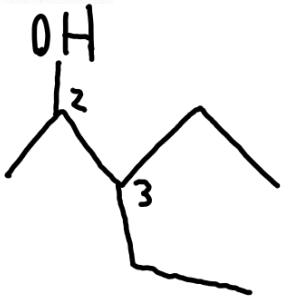
A only

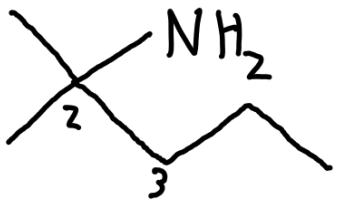
The atom in question must have a direct contact with a hydrogen. Only A has this bond

11. Convert the following Newman projections to skeletal structures and name them





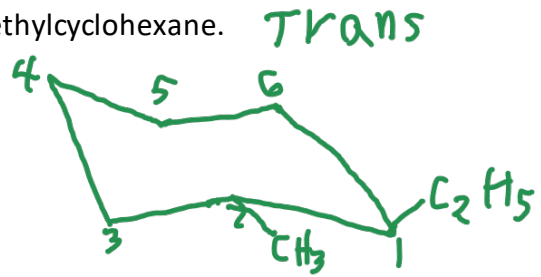


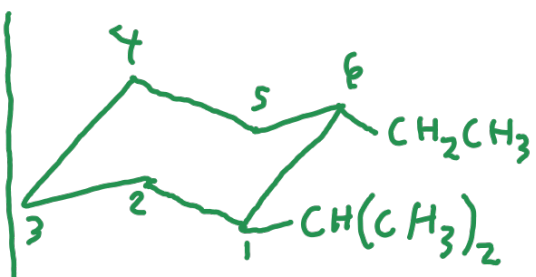


3-ethyl-2-pentanol

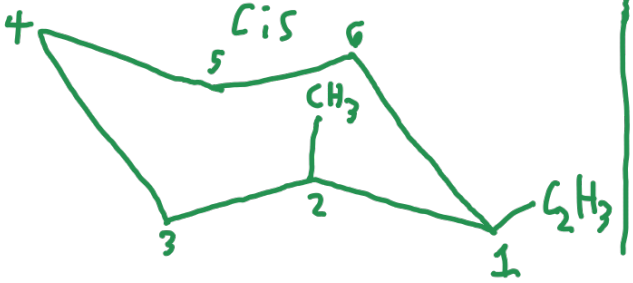
2-methyl-2-pentanamine

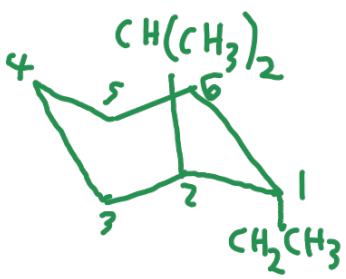
12. Draw the more stable conformer of cis-1-ethyl-2-methylcyclohexane and trans-1-ethyl-2-methylcyclohexane.





More stable





Less stable

13. Which is more stable:cis-1-ethyl-2-methylcyclohexane or trans-1-ethyl-2-methylcyclohexane?

Overall the trans conformer is more stable that the cis one since there is less steric hindrance (electrons and big groups are further apart).