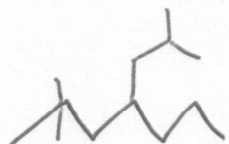


EXAM 1

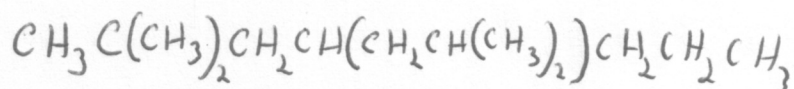
1) Draw the structure (condensed) for this compound:

4-(2-methylpropyl)-2,2-dimethylheptane

SKELETAL



CONDENSED



2) (a) How many primary carbons (1°) in the structure from question 1?

7

(b) How many tertiary carbons (3°) in the structure from question 1?

2

3) Draw skeletal formulas for three isomers of C_8H_{18} , AND name them.



n - OCTANE

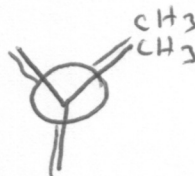


2 - METHYLOCTANE

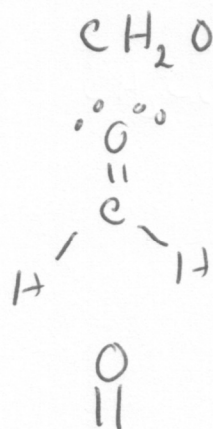


3 - METHYLOCTANE

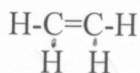
- 7) Draw a Newman projection of the least stable conformer of butane, looking down the C2-C3 bond.



- 8) Draw a Lewis structure, a condensed structure and a line-angle structure for the compound: CH_2O . Indicate the polarity of the molecule, if any



- 9) Ethylene (C_2H_4) has the Lewis structure shown below. Draw the molecule showing the orbital structure of the double bond. Indicate the hybridization and geometry of each carbon.

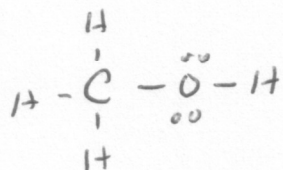


sp^2 HYBRIDIZED
TRIGONAL PLANAR

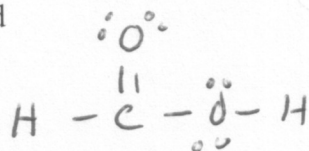


10) Draw Lewis structures for each of the following;

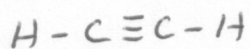
An alcohol



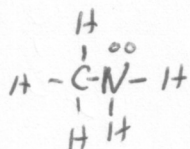
A carboxylic acid



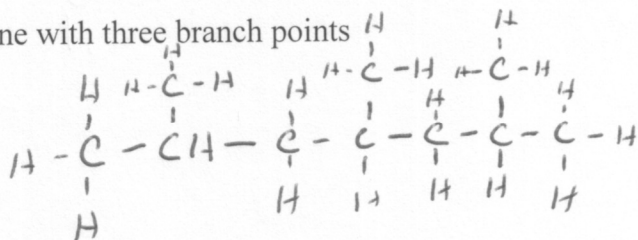
An alkyne



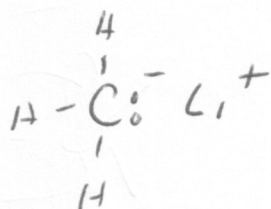
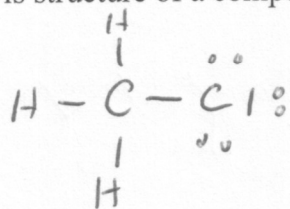
An amine



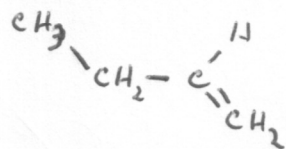
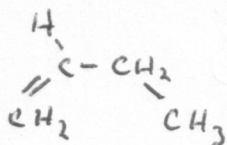
An alkane with three branch points



11) Draw a Lewis structure of a compound that has an electron rich carbon. Draw a Lewis structure of a compound that has an electron poor carbon.

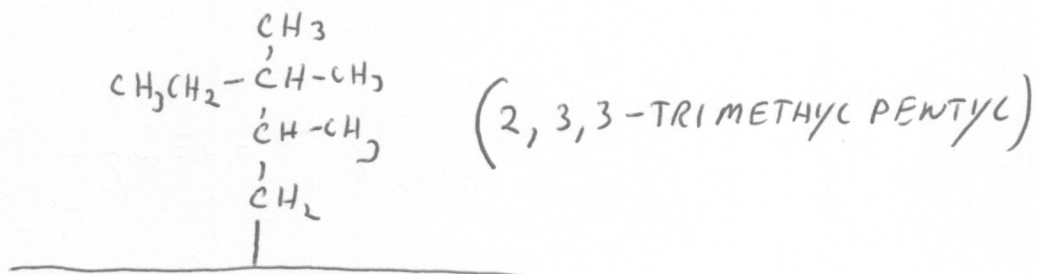


- 12) Are the two compounds below best described as constitutional (structural) isomers, or not isomers?

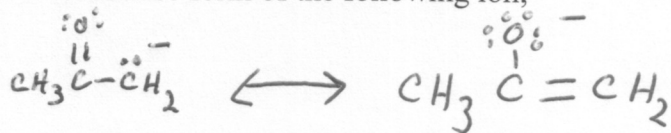


NOT ISOMERS

- 13) Draw and name any 8-carbon complex alkyl group.

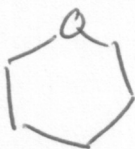


- 14) Draw a resonance form of the following ion:

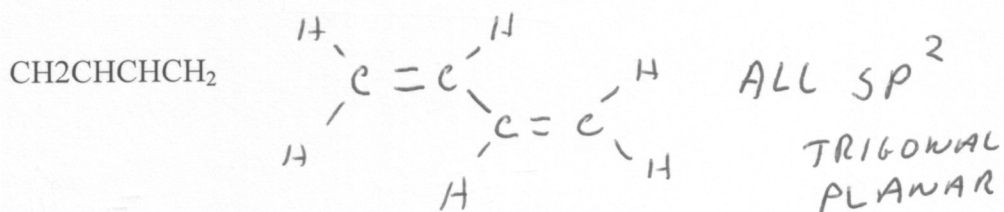
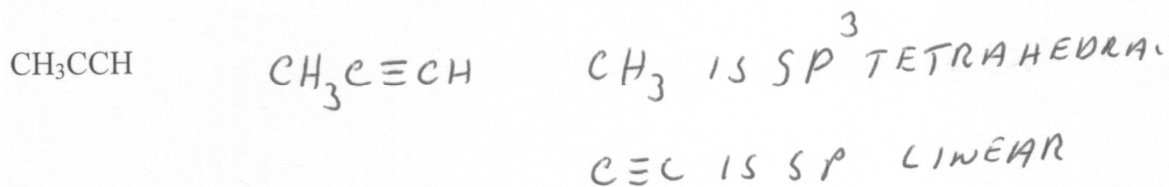
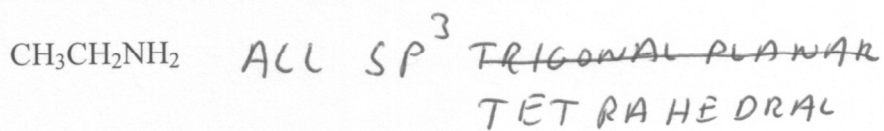


- 15) A compound has the formula $\text{C}_5\text{H}_{10}\text{O}$. It has no double bonds. Draw a structure for it. (there are a few options).

NO DOUBLE BONDS, BUT 1 D.O. = RING

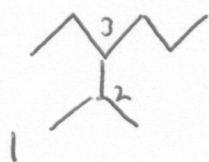


16) Identify the hybridization and geometry of every atom (except H): (a Lewis structure might be helpful)



17) The following name is incorrect, but does represent a real compound. Draw the compound and name it correctly.

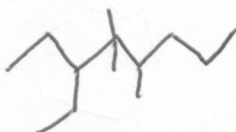
3-isopropylohexane



3-ETHYL-2-METHYL HEXANE

18) Draw a skeletal structure;

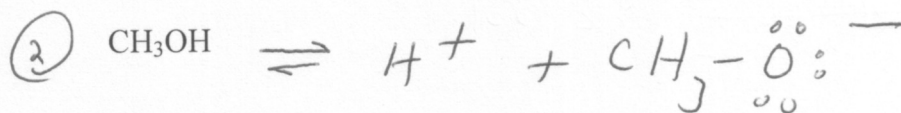
3-ethyl-4,4,5-trimethyloctane



pKa

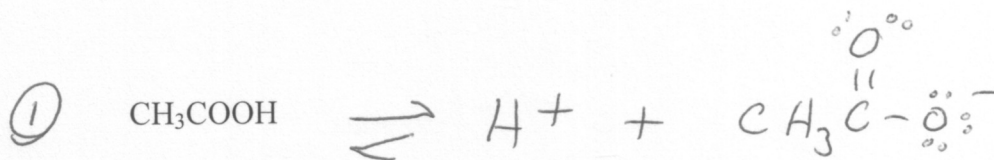
19) Write a chemical equation representing the ionization of each compound when they act as acids. Rank these in order of acid strength and explain your choices.

16



EXPLAIN:
MINUS CHARGE
ON:

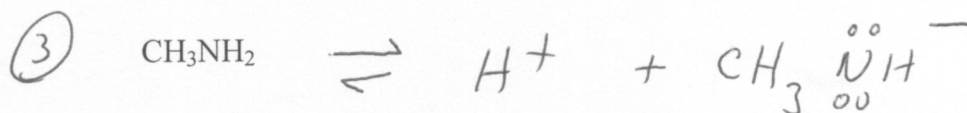
5



① = 2 0

2 = 1 0

30



3 = N

4 = C

50



EXPLAIN: ACID STRENGTH DEPENDS ON STABILITY OF THE ANION. THE MOST ELECTRONEGATIVE ATOM IS BEST FOR ANION

20) Alcohols have a pKa of about 16. What pKa would an acid need if the acid is to be able to protonate an alcohol?

LESS THAN 16

21) What pKa would an acid have to have if it is to be able to deprotonate an alcohol?

GREATER THAN 16