CHM 227 Summer 2011

EXAM 1

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

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

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

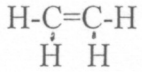
(b) How many tertiary carbons (3°) in the structure from question 1?

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

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.



10) Draw Lewis structures for each of the following;
An alcohol

A carboxylic acid

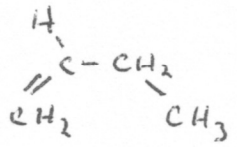
An alkyne

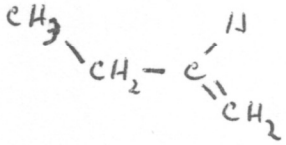
An amine

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.

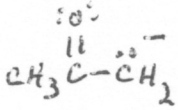
12) Are the two compounds below best described as constitutional (structural) isomers, or not isomers?





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 $C_5H_{10}O$. It has no double bonds. Draw a structure for it. (there are a few options).

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

$CH_3CH_2NH_2$

CH_3CCH

$CH2CHCHCH_2$

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

3-isopropylhexane

18) Draw a skeletal structure;

3-ethyl-4,4,5-trimethyloctane

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.

CH_3OH

CH_3COOH

CH_3NH_2

CH_3CH_3

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?

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