HOMEWORK ASSIGNMENT #3 ORGANIC CHEMISTRY I (22 pts)

Non-mathematical MO theory; drawing and naming alkanes

**(due Wednesday 21 September 2016)**

**Your name:\_\_\_\_\_\_\_\_answers\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1 pt**

3.1 Despite its’ incomprehensible mathematical complexity, the general MO theory developed by

Pople now dominates modern chemical thinking. What is the main advantage of the approach?

Pople managed to efficiently solve the quantum `secular’ equations for small to medium sized molecules and in so doing enabled chemists to compute energy levels, spectra detailed bond length and bond angle values. Succinctly, Pople’s work provides **numerical estimation** of most of the molecular properties of compounds

(1 pt)

3.3 Draw the abbreviated bondline forms for the alkanes drawn, written or named below

a) b) CH3CH(CH3)(CH2)4CH3









c) 2,3,3-trimethylhexane d)





3.4. Draw out all the possible structural isomers of C5H12 and name them according to IUPAC rules

(6 pts)

pentane 2-methylbutane 2,2-dimethylpropane



3.5. Identify the functional group family drawn or supply an example of the functional group requested:





2-hex**ene**



\_ketone\_\_\_\_\_\_ alkene \_\_alcohol\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Propanoic acid





Ethyl amine

carboxylic acid \_\_alkyl halide or haloalkane amine

**4.1 Name (using IUPAC rules) or draw us: (1 pt each. Spelling counts) 9 pts total**

1







1

2,2-dimethyloctane **\_4-(1methylethyl)-2,5-dimethylheptane** \_\_**3-ethyl-2-methylhexane**\_\_\_\_

(selected parent produces lowest locant count)







1

1

Cyclobutylcyclohexane \_\_\_\_\_**3-ethyl-2,5-dimethylhexane 3-chloro-4-(1-methylethyl)-3,6-**

**dimethyloctane**









1

1

1-chloro-2-ethyl-3-(1-methylethyl)cyclohexane **7-(1-bromo-1-methylethyl)-2-methyl 4-(1-methylethyl)-5-(1,1-dimethylethyl)**

**\_\_\_4-propyldecane -5-fluoro-3-methylundecane**