**Chem 3514: Organic I Exam 1 REVIEW SHEET FALL 2013**

**Snapshots of Exam section titles, point distributions, sample problems and relevant class document references**

* 1. **Lewis Model Bonding Part 1 ( 9 pts total/3 pts each) See exercise 1**

Sketch the most stable Lewis structures that obey the octet rule for the compounds below:

*(include formal charges , lone pairs & indicate if symmetric resonances are present when necessary)*

**CO**

* 1. **Lewis Model Bonding Part 2 (9 pts total/ 3 pts each) See exercise 1**

Draw the best structure for POF2 that strictly obeys the octet rule and indicate where the formal charges are likely to be. *(Structure may have a net charge. Include all formal charges , lone pairs. P is central atom*)

* 1. **Lewis Model Bonding Part 3 ( 15 pts total) See homework 2, supplement 2**

1. Consider the 4 compounds below: (4 pts)

A B C D

.... .. .. ..

H-C=N=O: H-C≡N-O: H-C≡N-O: H-C=N-O:

**.. ..**

1. which contain positively charged C \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. which contains positively charged O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. which contains negatively charged N \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. which contains negatively charged O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. which is more stable: NO or NO+
   1. **Pauling’s Localized Hybrid Bonding Model (6 pts total/1 pt each) See homework 2**

Identify the hybridization on the **bolded** elements in the compounds below

..

H2 C=**O**:

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* 1. **MO Theory (4 pts) see homework 3.1**
  2. **Nomenclature of Alkanes (20 pts total) see exercise 4,5, homework 4, supplement 4**

Using just IUPAC rules, name the compounds below: (2 pts each**)**



**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Provide common names for the compounds below (4 pts total/1 pt each)



* 1. **Functional groups (10 pts) see homework 3.5, supplement 3 and functional group round robin handout**

Supply the name or chemical equivalent for the functional group designations below:

R-COOH = \_\_\_\_\_\_\_\_\_\_\_\_ amino= \_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. **ring and rotational isomer Language: see Supplement 5, exercise 6 (10 pts)**

1)Which is more stable on cyclohexane: equatorial methyls axial methyls

**2)** If you place a 3rd methyl at C-3 in the compound shown



Provide a complete name for the most stable result

3

3) which is more stable: gauche butane or anti butane ?

**1.8 Free Radical Chemistry of Alkanes : see supplement 6,homework 5, powerpoint roundrobin ~12 points**

**a)Key Facts for Methane ( 1 point each/5 points total)**

Write down 5 facts that characterize the reaction behavior of methane under free radical halogenations

**b)Mechanism of Free Radical Methane Bromination (6 pts)**

Write down the mechanism forwarded to explain the overall reaction:

hυ

*xs*  X2 + CH4 CH4-mX + m HX, m =1,2,3,4

c)Sketch the equivalent ***Activated Complex’ = Energy Diagram Picture (=Eyring-Polanyi diagram)*** for the mechanism above. Make sure to identify all relevant positions on diagram. (activation energy, metastable state, step 2, step 3…etc

d) draw the activated complex for above for both fast and slow case of the above

1. which is faster : F2 + methane or Br2 + methane

which is more selective: I2 + isopentane or F2 + isopentane

* 1. **Miscellaneous multiple choice, fill-in and T/F ~ 5 pts**

Ex. Pauling’s theory provides a way to predict the paramagnetism in O2 T F

Ex. Recrystallization relies on the target compound being \_\_\_\_\_\_\_\_concentrated

Than the impurities in the selected solvent