CH 222 Exam Prep I Worksheet   Name: _____

Worksheet due dates: **Mon, 2/3, 1:10 PM** *(01)* , **Wed, 2/5, 1:10 PM** *(H1)* ***or* 11:59 PM** *(W1, email).* To complete, show ***detailed*** *steps* on how to get the given answer for each problem. *Failure to use this form for work and answers will result in a point penalty.*

Problem 1: Using the bond energies in the table below, estimate ΔH for the reaction: **H_2O_2 + CH_3OH → H_2CO + 2 H_2O**

Bond:	C-C	C=C	C-O	C=O	C-H	O-H	O-O
Energy (kJ/mol)	347	614	358	799	413	463	146

Answer to Problem #1: **-345 kJ**

Problem 2:   One of the following species could probably not exist as a stable molecule as predicted by Lewis structures. Draw the structures and **explain why one of them is an improbable structure**.

NH_3, N_2H_2, N_2H_4, N_2H_6, N_2O_4

Hint to Problem #2: **Look for too many bonds around the central atom.**

Problem 3: What is the molecular geometry for the following structure: **BeF₃⁻¹** (draw the structure to get credit!)

Answer to Problem #3: **trigonal planar**

Problem 4: Draw the molecular orbital description of the NO⁻¹ anion. Is NO⁻¹ paramagnetic? What is the bond order for NO⁻¹? Is NO⁻¹ isoelectronic with CO? **Define isoelectronic to receive credit.**

Partial answer to Problem #4: **NO⁻¹ is paramagnetic, has a bond order = 2 and it is not isoelectronic with CO.**

Problem 5: A teacher gave a molecule the following name: **2-ethyl-3-methyl-5-isopropylhexane** (note that "isopropyl" is a propyl group where the connection is made at the center carbon.) However, an alert student recognized that although the molecule can be correctly drawn from this name, the name violates the systematic rules for organic chemistry. **What is the correct (systematic) name for the molecule**? Draw the structure and circle the longest chain to get credit.

Hint to Problem #5: **"isopropyl" is also known as "2-propyl"**