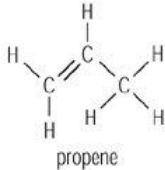


Chemistry 121
Test 3
Spring 2007

You have 75 minutes to complete this 100 point test. Please mark each answer clearly and show all work. You may use a simple scientific calculator. NO GAPHING CALCULATORS.

I. Fill in the blank

1. (1 pt) _____ are small packets of energy that have specific frequency.
2. (1 pt) _____ are solutions to the Schrödinger equation and describe the delocalization of electrons in an atom.
3. (1 pt) The _____ is the expectation that atoms tend to lose or gain electrons until they achieve a noble gas-type configuration.
4. (1 pt) _____ states that no two electrons can have the same set of four quantum numbers.
5. (1 pt) In a _____, electrons are shared between two atoms.
6. (2 pts) There are eight _____ bonds and one _____ bond in propene.

7. (2 pts) A sp^3d hybrid orbital is formed from a combination of one s orbital, _____ orbital(s) and _____ orbital(s).
8. (1 pt) The _____ Principle states that the “the more accurately we know position, the more uncertain we are about motion, and vice versa”.

II. Trends and Calculations: Clearly show all work for full credit.

1. (10 pts) Calculate the energy of a mole of photons of light that have a wavelength of 488 nm.

2. (10 pts) Rank the following wavelengths in order from lowest energy to highest energy: 500 nm, 190 nm, 250 mm and 320 μm . (Hint: For comparison, units should be the same.)

3. (10 pts) Rank the following atoms from smallest to largest atomic radii: P, As, Cl, O, and C.

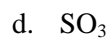
III. Quantum Numbers, Electron Configurations and Lewis Dot Structures:

1. (5 pts) Write all possible quantum numbers for $n = 6$.

2. (15 pts) Write the NOBLE GAS electron configuration for the following atoms and ions, indicate the number of valence electrons (VE) and determine if they are paramagnetic (P) or diamagnetic (D).

		<u>VE</u>	<u>Circle</u>
a.	Te^{2-} _____	___	P or D
b.	As _____	___	P or D
c.	Mo _____	___	P or D
d.	Ti^{2+} _____	___	P or D
e.	Cu _____	___	P or D

3. (40 pts) For each of the following: (i) Draw the correct Lewis Dot Structure, including all resonance structures, (ii) Give the AXE notation, (iii) Determine the molecular geometry, (iv) Give the hybridization of the central atom, and (v) Indicate if each molecule/ion is polar or nonpolar.
- a. OCl_2



IV. Essay Question: (10 pts) Describe screening in atoms, define effective nuclear charge, and explain how the two are related.