

Chemistry 135 Semester 01-2012

Homework for Submission #5

Develop your answers in rough before copying them carefully on to these sheets. Submit your answers for marking on or before 2:00 pm on Thursday 29th March in the chemistry drop box. Careful presentation of your answers is very important. If any answers show evidence of copying, the whole exercise will attract zero marks. Do not use concepts that have not been introduced in the course or the textbook.

1) a) What is an *orbital*? (3)

b) State the *Pauli Exclusion Principle* and explain why it means that an orbital can hold no more than two electrons. (4)

c) State Hund's Rule of Maximum Multiplicity. (2)

- 2) Write out the electronic structures of each of the following atoms and ions. You may use symbols such as [Ar] or [Kr] to show the core electrons, but if *p*-orbitals are shown then the occupation of each orbital must be indicated. (12)

Examples: $1s^2 2s^2 2p_x^1 2p_y^1$ and $[\text{Ar}]4s^2 3d^2$ or



a) He

b) Be

c) N

d) Ti

e) Cr

f) Mn

i) Cu

j) Ca^{2+}

k) F^-

l) Cu^{++}

m) Fe^{3+}

n) Fe^{2+}

o) Explain, on the basis of their electronic structures why Fe^{3+} is much more stable than Mn^{3+} .
