

Chemistry 1B
Homework #2 (#14-#23, S4-S5)

Required (submit via [WebAssign](#))

14. Zumdahl 12.60
15. Draw the following orbitals on the axes indicated. Be sure to show the relative sign of the orbitals in the various regions:
 - a. $2p_z$ (in xz plane)
 - b. $3d_{xy}$ (in xy plane)
 - c. $4d_{xy}$ (in xy plane)
 - d. $3d_{x^2-y^2}$ (in xy plane)
16. Write the ground state configurations for the following atoms and ions
 - a. Be
 - b. N
 - c. S
 - d. Na^+
 - e. Ni
 - f. Ni^{2+}
 - g. Br
 - h. Ti^{2+}
17. Which of the atoms in 16 above would be:
 - a. Diamagnetic
 - b. Paramagnetic
18. Give a reason why each of the following have electronic configurations that do not follow the usual orbital ordering rules:
 - a. Mo $[\text{Kr}] 5s^1 4d^5$
 - b. Pd $[\text{Kr}] 4d^{10}$
19. Zumdahl 12.75
20. Zumdahl 12.78
21. Zumdahl 12.90
22. Zumdahl 12.91
23. Zumdahl 12.92

Section

- S4. Zumdahl ~12.59
How do $2p$ orbitals differ from each other? How do $2p$ and $3p$ orbitals differ from each other? What is a nodal surface in an atomic orbital? What is wrong with $1p$, $1d$, $2d$, $1f$, $2f$, and $3f$ orbitals?
- S5. Explain what we mean when we say that a $4s$ electron “exhibits more penetration” than does a $3d$ electron?