Chapter 5 Review
“Electrons in Atoms”

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Chapter 5 Review

What is the next atomic orbital in the series: 1s, 2s, 2p, 3s, 3p?
In Bohr’s model of the atom, where are the electrons and protons located?
What is the basis for exceptions to the aufbau diagram?
How does the energy of an electron change when the electron moves closer to the nucleus?

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If the spin of one electron in an orbital is “clockwise”, what is the spin of the other electron in that orbital?
What is the approximate energy of a photon having a frequency of 4 x 10¹⁷ Hz? ($h = 6.6 x 10^{-34}$ J · s)
Which of the following would be most stable: a) $4d^5s^1$, or b) $4d^4s^2$

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How many unpaired electrons are in a sulfur atom (Z = 16)?
According to the Heisenberg uncertainty principle, if the position of a moving particle is known, what other quantity CANNOT be known?
Which of the following has the highest frequency: a) x-rays, or b) gamma rays

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What is the electron configuration of potassium?
What is the number of electrons in the outermost energy level of an oxygen atom?
How does the speed of visible light compare with the speed of gamma rays, when both speeds are measured in a vacuum?

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The principal quantum number indicates what property of an electron?
Which scientist developed the quantum mechanical model of the atom?
In the Bohr model of the atom, an electron in an orbit has a fixed ___.
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- What is the maximum number of electrons in the second principal energy level?
- If three electrons are available to fill three empty 2p atomic orbitals, how will the electrons be distributed?
- What is the wavelength of a wave that has a frequency of 60 MHz?

Chapter 5 Review
- When an electron moves from a lower to a higher energy level, the electron ______.
- According to the aufbau principle, electrons enter orbitals of ___ first.
- What is the maximum number of “f” orbitals in any single energy level of an atom?

Chapter 5 Review
- What is the frequency of a photon having an energy 5 × 10^4 J? \( (h = 6.6 \times 10^{-34} \text{ J} \cdot \text{s}) \)
- What types of atomic orbitals (s, p, d, or f) are in the third principal energy level?
- How would the atomic emission spectra of a sodium atom on Earth compare with sodium in the sun?

Chapter 5 Review
- How many energy sublevels are in the second principal energy level?
- Emission of light from an atom occurs when an electron ______.
- Who predicted that all matter can behave as waves as well as particles?
- What are quanta of light called?

Chapter 5 Review
- Stable electron configurations are likely to contain _____.
- What is the maximum number of “d” orbitals in a principal energy level?
- How are frequency and wavelength of light related?
- What is the maximum number of orbitals in the p sublevel?

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- Which electron configuration would be more stable: a) 4f^-, or b) 4f^4
- Which variable is directly proportional to frequency: a) energy, or b) wavelength?
- Which color of visible light has the shortest wavelength?
- The quantum mechanical model of the atom involves the _____.
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How many electrons are in the highest occupied energy level of a neutral atom of each of the following: a) chlorine atom; b) copper atom; c) strontium atom?

End of Chapter 5 Review