

Faculty Submitting: James Grinias

Specify here whether “Pre” or “End” of Unit and the Unit #: End Unit 6

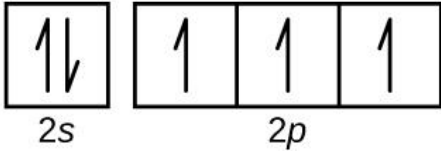
LOs: <i>Describe the implications of wave mechanics and the quantization of electron energies and spin, including quantum numbers, atomic orbital energies, and the shapes of s, p and d orbitals</i> <i>Write full and condensed electron configurations, differentiate between core and valence electrons, draw orbital diagrams</i> <i>Explain the organization of the periodic table, group names, trends in metallic character, atomic radius, ionization energy, electron affinity, and electronegativity</i> <i>Bohr Model, Electromagnetic radiation?</i>	
Unit 6_ Question 1	Canvas Question Type: Formula
	An FM radio station found at [x] on the FM dial broadcasts at a frequency of [x] MHz (Megahertz). What is the wavelength of these radio waves in meters?
	Answer: $300/[x]$ Let [x] range from 87.7 to 106.9, vary by 0.1
Read More	https://openstax.org/books/chemistry-2e/pages/6-1-electromagnetic-energy
Unit 6_ Question 2	Canvas Question Type: Formula
	A bright violet light has a wavelength of [x] nm. What amount of energy, in eV ($1 \text{ eV} = 1.602 \times 10^{-19} \text{ J}$), must be released by an electron in a mercury atom to produce a photon of this light?
	Answer: $1240/[x]$ Let [x] range from 430.0 to 440.0, vary by 0.1
Read More	https://openstax.org/books/chemistry-2e/pages/6-1-electromagnetic-energy
Unit 6_ Question 3	Canvas Question Type: Formula
	One of the radiographic devices used in a dentist's office emits an X-ray with a wavelength of $[x] \times 10^{-11} \text{ m}$. What is the frequency of this X-ray in Petahertz (PHz)?
	Answer: $30000/[x]$

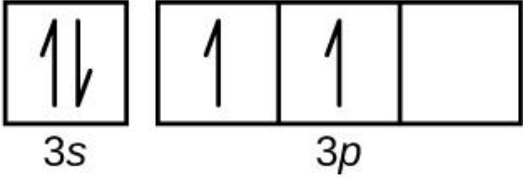
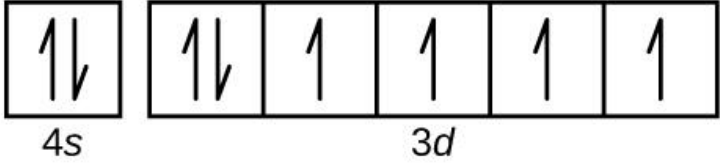
	Let [x] range from 2.00 to 4.00, vary by 0.01.
Read More	https://openstax.org/books/chemistry-2e/pages/6-1-electromagnetic-energy
Unit 6_ Question 4	Canvas Question Type: Formula
	A Blu-ray laser (wavelength of 405 nm) has a power of [x] milliwatts (1 watt = 1 J s ⁻¹). How many photons of light are produced by the laser in 1 hour?
	Answer: [x] × 7.34 × 10 ¹⁸ photons Let [x] range from 3.00 to 7.00, vary by 0.01.
Unit 6_ Question 4 ALTERNATE	A Blu-ray laser (wavelength of 405 nm) releases [energy] J in an hour. How many photons of light are produced by the laser in a 1 hour? (hint: start by finding the energy of a single photon)
	Energy: 10-12, 1 decimal Answer: energy/(((3*10^8)*(6.626*10^-34))/(4.05*10^-7)))
Read More	https://openstax.org/books/chemistry-2e/pages/6-1-electromagnetic-energy
Unit 6_ Question 5	Canvas Question Type: Formula
	Using the Bohr model, determine the energy of an electron with $n = [x]$ in a hydrogen atom. Report your answer in eV (1 eV = 1.602 × 10 ⁻¹⁹ J).
	Answer: -13.6/[x] ² eV Let [x] range from 2 to 9, vary by 1
Read More	https://openstax.org/books/chemistry-2e/pages/6-2-the-bohr-model
Unit 6_ Question 6	Canvas Question Type: Formula
	The electron volt (eV) is a convenient unit of energy for expressing atomic-scale energies. It is the amount of energy that an electron gains when subjected to a potential of 1 volt; (1 eV = 1.602 × 10 ⁻¹⁹ J). Using the Bohr model, determine the energy, in electron volts, of the photon produced when an electron in a hydrogen atom moves from the orbit with $n = [x]$ to the orbit with $n = [y]$.
	Answer: -13.6*((1/(x^2))-(1/(y^2))) eV

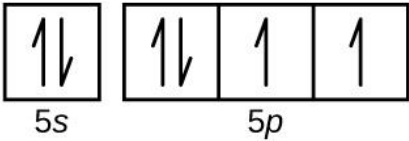
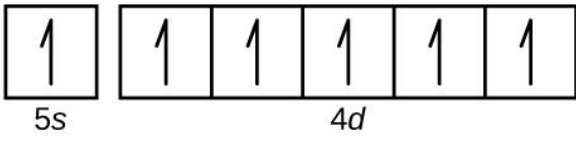
	Let [x] range from 6 to 9 (vary by 1) and let [y] range from 2 to 5 (vary by 1).
Read More	https://openstax.org/books/chemistry-2e/pages/6-2-the-bohr-model
Unit 6_ Question 7	Canvas Question Type: Fill in the Blank
	Identify the subshell in which electrons with the following quantum numbers are found: $n = 2, l = 1$ [answer]
	2p
Read More	https://openstax.org/books/chemistry-2e/pages/6-3-development-of-quantum-theory
Unit 6_ Question 8	Canvas Question Type: Fill in the Blank
	Identify the subshell in which electrons with the following quantum numbers are found: $n = 4, l = 2$ [answer]
	4d
Read More	https://openstax.org/books/chemistry-2e/pages/6-3-development-of-quantum-theory
Unit 6_ Question 9	Canvas Question Type: Fill in the Blank
	Identify the subshell in which electrons with the following quantum numbers are found: $n = 3, l = 0$ [answer]
	3s
Read More	https://openstax.org/books/chemistry-2e/pages/6-3-development-of-quantum-theory
Unit 6_ Question 10	Canvas Question Type: Fill in the Blank
	Which element has the following electron configuration? $1s^2 2s^2 2p^3$ [answer]
	N, Nitrogen
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations

Unit 6_ Question 11	Canvas Question Type: Fill in the Blank
	Which element has the following electron configuration? $1s^2 2s^2 2p^6 3s^2 3p^2$
	[answer]
	Si, Silicon
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations
Unit 6_ Question 12	Canvas Question Type: Fill in the Blank
	Which element has the following electron configuration? $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$
	[answer]
	Fe, iron
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations
Unit 6_ Question 13	Canvas Question Type: Fill in the Blank
	Which element has the following electron configuration? $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^4$
	[answer]
	Te, tellurium
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations
Unit 6_ Question 14	Canvas Question Type: Fill in the Blank
	Which element has the following electron configuration? $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^9$
	[answer]
	Tb, Terbium
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations

Unit 6_ Question 15	Canvas Question Type: Fill in the Blank
	Which element would be expected to have a half-filled $2p$ subshell? [answer]
	N, nitrogen
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations
Unit 6_ Question 16	Canvas Question Type: Fill in the Blank
	Which element would be expected to have a half-filled $3p$ subshell? [answer]
	P, phosphorus
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations
Unit 6_ Question 17	Canvas Question Type: Fill in the Blank
	Which element would be expected to have a half-filled $4p$ subshell? [answer]
	As, Arsenic
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations
Unit 6_ Question 18	Canvas Question Type: Fill in the Blank
	Which element would be expected to have a half-filled $5p$ subshell? [answer]
	Sb, antimony
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations

Unit 6_ Question 19	Canvas Question Type: Fill in the Blank
	Which element would be expected to have a half-filled 6 <i>p</i> subshell? [answer]
	Bi, bismuth
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations
Unit 6_ Question 20	Canvas Question Type: Fill in the Blank
	Which element would be expected to have a half-filled 7 <i>p</i> subshell? [answer]
	Mc, Moscovium
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations
Unit 6_ Question 21	Canvas Question Type: Fill in the Blank
	Which element is represented by the following valence shell electron configuration? <div style="text-align: center;">  <p style="margin-left: 100px;">2s 2p</p> </div> <p style="color: green;">ALT TEXT: The figure shows four boxes. The first box is labelled 2s and has an up and down arrow in it. The last three boxes are labelled 2p and each has a single up arrow in it.</p> [answer]
	N, nitrogen
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations
Unit 6_ Question 22	Canvas Question Type: Fill in the Blank

	<p>Which element is represented by the following valence shell electron configuration?</p> <div style="text-align: center;">  </div> <p>ALT TEXT: The figure shows four boxes. The first box is labelled 3s and has an up and down arrow in it. The last three boxes are labelled 3p, the first two each have an up arrow, the last is empty.</p> <p>[answer]</p>
	Si, silicon
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations
Unit 6_ Question 23	Canvas Question Type: Fill in the Blank
	<p>Which element is represented by the following valence shell electron configuration?</p> <div style="text-align: center;">  </div> <p>ALT TEXT: The figure shows six boxes. The first box is labelled 4s and has an up and down arrow in it. The last five boxes are labelled 3d, the first has an up and down arrow, the other four each have a single up arrow in them.</p> <p>[answer]</p>
	Fe, iron
Read More	https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations
Unit 6_ Question 24	Canvas Question Type: Fill in the Blank

	<p>Which element is represented by the following valence shell electron configuration?</p> <div style="text-align: center;">  </div> <p>ALT TEXT: The figure shows four boxes. The first box is labelled 5s and has an up and down arrow in it. The last three boxes are labelled 5p, the first box has an up and down arrow, the last two each have a single up arrow.</p> <p>[answer]</p>
	Te, Tellurium
<p>Read More</p>	<p>https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations</p>
<p>Unit 6_ Question 25</p>	<p>Canvas Question Type: Fill in the Blank</p>
	<p>Which element is represented by the following valence shell electron configuration?</p> <div style="text-align: center;">  </div> <p>ALT TEXT: The figure shows six boxes. The first box is labelled 5s and has a single up arrow in it. The last five boxes are labelled 4d, and each has a single up arrow in it.</p> <p>[answer]</p>
	Mo, molybdenum
<p>Read More</p>	<p>https://openstax.org/books/chemistry-2e/pages/6-4-electronic-structure-of-atoms-electron-configurations</p>
<p>Unit 6_ Question 26</p>	<p>Canvas Question Type: Multiple Choice</p>
	<p>Based on their positions in the periodic table, predict which has the largest atomic radius: Mg, Sr, Si, Cl, I</p>
	<p>Correct Answer: Sr</p>

	Wrong Answers: Si, Mg, Cl, I
Read More	https://openstax.org/books/chemistry-2e/pages/6-5-periodic-variations-in-element-properties
Unit 6_ Question 27	Canvas Question Type: Multiple Choice
	Based on their positions in the periodic table, predict which has the smallest atomic radius: Li, Rb, N, F, I.
	Correct Answer: F Wrong Answers: I, Li, Rb, N
Read More	https://openstax.org/books/chemistry-2e/pages/6-5-periodic-variations-in-element-properties
Unit 6_ Question 28	Canvas Question Type: Multiple Choice
	Based on their positions in the periodic table, predict which has the largest first ionization energy: Mg, Ba, B, O, Te
	Correct Answer: O Wrong Answers: Ba, Mg, B, Te
Read More	https://openstax.org/books/chemistry-2e/pages/6-5-periodic-variations-in-element-properties
Unit 6_ Question 29	Canvas Question Type: Multiple Choice
	Based on their positions in the periodic table, predict which has the largest first ionization energy: Li, Cs, N, F, I
	Correct Answer: F Wrong Answer: Li, Cs, N and I
Read More	https://openstax.org/books/chemistry-2e/pages/6-5-periodic-variations-in-element-properties