Study Guide - Chapter 5 – Quantum Theory and the Atom

Section 5.1 Light and Quantized Energy

1. energy
2. wave
3. Light
4. speed
5. wavelength
6. amplitude
7. Frequency
8. hertz
9. both A and C
10. B
11. The frequency is 2 waves/s or 2 Hz
12. c
13. b
14. c
15. b
16. false
17. true
18. true
19. true
20. false
21. false
22. true

Section 5.2 Quantum Theory and the Atom

1. ground state
2. frequencies
3. lower
4. higher
5. electron
6. energy levels
7. atomic emission spectrum
8. No; the wavelength is far too small to be seen or measured even with the most sensitive scientific instrument.
9. The proton would have the larger wavelength because wavelength increases with decreasing mass and velocity.
10. c
11. a
12. d
13. b
14. The quantum mechanical model treats electrons as waves and does not describe the electrons' path around the nucleus. The Bohr model treats electrons as particles traveling in specific circular orbits.
15. do not
16. two
17. spherically shaped
18. *n*
19. electrons
20. three
21. 2s and 2p
22. nine

Section 5.3 Electron Configurations

1. electron configuration
2. lowest
3. stable
4. ground-state electron configuration
5. Aufbau principle
6. Pauli exclusion principle
7. spins
8. Hund's rule
9. 2; $\boxed{\uparrow\downarrow}$
10. Nitrogen; $\boxed{\uparrow\downarrow}\ \boxed{\uparrow\downarrow}\ \boxed{\uparrow}\ \boxed{\uparrow}\ \boxed{\uparrow}$ $1s^2 2s^2 2p^3$
11. 10; $1s^2 2s^2 2p^6$
12. 32; 32
13. Noble-gas notation uses the bracketed symbol of the nearest preceding noble-gas atom in the periodic table in the electron configurations of an atom. Using noble-gas notation allows you to represent the complete electron configuration of an atom with many electrons in a shorthand form.
14. $[Ar]4s^2 3d^{10} 4p^2$
15. c
16. b
17. d
18. b
19. a
20. a