

CH40S

Atomic Structure Unit Review

1. Define the following terms with respect to waves:
 - a. Wavelength
 - b. Amplitude
 - c. Frequency
 - d. Energy
2. List the parts of the electromagnetic spectrum in order of increasing wavelength.
3. List the colours of the visible spectrum in order of increasing wavelength.
4. What is the relationship between wavelength and frequency?
5. Compare and contrast continuous spectra and line spectra.
6. What causes an element like copper to produce a certain colour of light when burned.
7. How does Bohr's model of the atom account for atomic line spectra? Explain why different elements have different line spectra.
8. What does each coloured line in an atomic line spectra represent?
9. Briefly state the contributions the following scientists made to the quantum model of the atom:
 - a. Neils Bohr
 - b. Louis de Broglie
 - c. Werner Heisenberg
 - d. Erwin Shrodinger
10. Briefly describe the quantum model of the atom.
11. Compare and contrast energy levels and orbitals.
12. Describe/draw the shapes of the s, p, and d orbitals. What causes the different shapes?
13. How many orbitals can be found in each of the first 5 energy levels? List the different types (s,p,d,f,g...etc.) of orbitals for each energy level.
14. Briefly explain the following:
 - a. Aufbau Principle
 - b. Pauli Exclusion Principle
 - c. Hund's Rule

15. Draw the electron arrangement for each of the following elements:
- Calcium
 - Helium
 - Nitrogen
 - Iron
 - Silicon
 - Silver
 - Sodium
16. Write the complete and abbreviated electron configuration for each of the elements in #15.
17. Write the complete and abbreviated electron configurations for:
- Zinc
 - Aluminum
 - Bromine
 - Magnesium
 - Boron
 - Gallium
 - Beryllium
18. State the valence electron configuration for the elements in #15, 17.
19. Write the complete electron configurations for the following ions. (Remember that electrons are removed from the highest energy level first)
- Na^+
 - Fe^{2+}
 - Cl^-
 - Cu^+
 - Ni^{4+}
 - Co^{3+}
 - O^{2-}
20. Predict the bond character for compounds formed from the following pairs of elements:
- C-Cl
 - H-H
 - Na-Cl
 - Al-O
 - Ag-S
 - Mg-F
 - CuS

21. State the trends in the periodic table for each of the following. Use your knowledge of atomic structure and the forces acting on electrons to explain the cause of each trend.
- Electronegativity
 - Atomic Radius
 - Ionic Radius
 - First Ionization Energy

22. Sketch the trends on the periodic table:

