1. What is electromagnetic radiation? Give 3 examples.

2. Sketch a representation of a wave and indicate on your drawing one wavelength of the wave.

3. a. At what speed does electromagnetic radiation move through space?
   b. How is this speed related to wavelength and frequency?
   c. What is frequency?

4. Explain what it means for an atom to be in an *excited state* and what it means for an atom to be in its *ground state*.

5. How does an excited atom *return* to its ground state?

6. What is a photon?

7. a. How is the wavelength (color) of light related to the energy of the photons being emitted by an atom?
   b. How is the energy of the photons being emitted by an atom related to the energy changes taking place *within* the atom?

8. a. Describe Bohr's model of the hydrogen atom.
   b. How did Bohr envision the relationship between the electron and the nucleus of the hydrogen atom?
   c. How did Bohr's model explain the emission of only discrete wavelengths of light by excited hydrogen atoms?
   d. Why did Bohr's model not stand up as more experiments were preformed using elements other than hydrogen?

9. Explain what is meant by quantized.

10. Explain what is meant by the term *orbital*.

11. a. How do wave mechanical orbitals differ from Bohr's orbits?
    b. What does it mean to say that an orbital represents a probability map for an electron?

12. Define the terms *ionization energy* and *atomic radius*.

13. How do the ionization energies and atomic sizes of elements vary, both within a vertical group (family) of the periodic table and within a horizontal row (period)?

14. Arrange the following atoms from largest to smallest atomic radius, and from highest to lowest ionization energy. a. Na, K, Rb b. C, O, F c. Na, Si, O

15. Arrange the following atoms from largest to smallest atomic radius, and from highest to lowest ionization energy. a. Na, K, P b. Rb, N, Al c. Cs, I, O

16. If we had a sample of Ni metal, a. could it be stored in a solution of $AgNO_3$?
    b. could it be stored in a solution of $MgSO_4$?

c. Explain your answer.

17. Which of the following elements would be the most active? Which would be the least active?
    Li Co Cu Ag

18. A piece of Zn is put in a solution of KCl. Describe and explain what happens.