Name: _____ **Period:** ____ **Date:** _____
Review: Chapters Four and Ten

Test Covers: Electromagnetic Radiation, Waves, Scientists, Electron Configuration, Orbital Notation, Quantum Numbers and Periodic Trends

Answer the following fill in the blank.

1. The speed of light is _____ meters per second.

2. All waves can be described by their wavelength, amplitude and _____.

3. _____ proposed that the energy emitted or absorbed by any object is restricted to quanta of particle sizes.

4. Einstein proposed that light consists of _____, which are quanta of energy that behave like tiny particles.

5. _____ showed that light in the form of a photon can collide with an electron.

6. The dual nature of light means that light has the properties of a _____ and a wave.

7. Every element has a characteristic atomic line _____.

8. Heisenberg's uncertainty principle states that the position and _____ of a moving object cannot be simultaneously be measured and known exactly.

9. Bohr labeled each _____ _____ in his atomic model by a quantum number.

10. An electron is in an _____ _____ when it absorbs the energy from a photon it jumps to a higher energy level.

Choose the best answer for the following multiple choice questions and record your answer on the line provided.

____ 11. Given a particle mass of *m* and velocity *v*, DeBroglies hypothesis allows you to predict the:

a. position of the particle.
b. diameter of the particle.
c. wavelength of the particle.
d. charge of the particle.

____ 12. Which of the following is a possible value for an electron spin?

a. 0 b. +1/2 c. 1 d. –1 ½

____ 13. Quantum mechanics would be used to predict the behavior of which of the following?

a. a collision between a photon and an electron
b. a projectile fired from a cannon
c. a ball from a roof
d. a rocket launched from earth

____ 14. As the speed of an electron increases, the wavelength of the electron will:
a. increase b. decrease c. remain the same d. vary at random

____ 15. Which of the following orbitals is spherical?
a. 3*p* b. 2*s* c. 4*d* d. 5*f*

____ 16. The principal quantum number best describes which of the following characteristics?
a. the shape of the electron cloud
b. the size of the electron cloud
c. spin of the electron
d. intensity of charge of the electron cloud

____ 17. In the wave-mechanical view of atomic structure, the pathway or position of an electron is best represented as:
a. a circular orbit with a specific diameter
b. an elliptical orbit with the nucleus at one focal point of the ellipse
c. a series of most probable positions represented by a cloud
d. a straight line that radiates out from the center like a spoke in a wheel

____ 18. Which of the following elements has the electron configuration, [Xe] $6s^2$ $4f^{14}$ $5d^{10}$ $6p^2$?
a. silver b. copper c. lead d. beryllium

____ 19. Which of the following quantum numbers indicates the direction of the orbital in space?
a. *n* b. *l* c. *m* d. *s*

____ 20. Which of the following describes an atoms attraction to the electrons in a bond?
a. ionization b. radius c. affinity d. electronegativity

Complete the following wavelength problems.

21. What is the frequency of light if the wavelength is 495nm?

22. What is the wavelength of light if the frequency is 1.98×10^6 hz?

23. What is the frequency of light if the wavelength is 5.43×10^{-4}m?

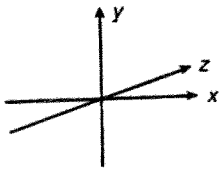
Fill in the following chart.

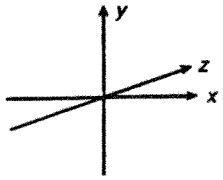
	Sublevel	Maximum No. of Orbitals	Maximum No. of Electrons
24.	*s*		
25.	*p*		
26.	*d*		
27.	*f*		

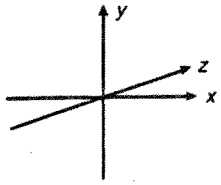
Complete the following short answer questions.

28. List and describe each of the four quantum numbers.

29. Draw the three spatial orientations of the *p* orbitals.







30. Write the electron configurations, and Lewis dot diagram for the following elements.
    a. He

    b. C

    c. Ni

31. Complete the orbital notations for the following using the short hand method.
    a. Be

    b. Au

    c. Ra

32. Illustrate the periodic trends for atomic radius, ionization energy and electronegativity on the periodic table below. (please use labeled arrows)