Waldron Test Bank Ch 2

1. A negatively charged particle located in the cloud like smear of negative charge of an atom is called a(n):
   a. Proton b. nucleus c. electron d. neutron

2. Although the nucleus takes up a very small portion of the volume of an atom, each particle in the nucleus is about _____ times more massive than an electron.
   a. 10 b. 100 c. 2000 d. 5 million

3. A neutral atom containing 8 protons will contain how many electrons?
   a. 2 b. 4 c. 8 d. 16

4. An element is defined by the number of _____ it contains.
   a. Electrons b. protons c. neutrons d. nuclei

5. The atomic number of an element is equal to the number of _____ that element contains.
   a. Electrons b. protons c. neutrons d. isotopes

6. The name of the element whose atomic number is 22 is:
   a. Titanium b. sodium c. neon d. tin

7. What is the name of the element that contains 31 protons?
   a. Antimony b. gallium c. phosphorus d. germanium

8. A neutral atom of sulfur will contain how many electrons?
   a. 32 b. 6 c. 15 d. 16

9. Write the name and symbol for the element with each atomic number:
   a. 51: Sb, antimony
   b. 46: Pd, palladium
   c. 58: Ce, cerium
   d. 12: Mg, magnesium

10. All of the elements after atomic number_____ are artificial and do not exist in nature.
    a. 57 b. 89 c. 92 d. 104

11. Isotopes of an element differ in the number of _____ that they contain.
    a. Electrons b. neutrons c. protons d. atoms

12. Identify the element that contains the following number of protons and neutrons:
    a. 36 protons and 48 neutrons. Kr
    b. 16 protons and 16 neutrons: S
    c. 8 protons and 8 neutrons: O
    d. 29 protons and 35 neutrons: Cu

13. Identify the number of protons and neutrons in an atom of chromium: 24 protons, 28 neutrons

14. Complete the table by filling in appropriate numbers and symbols into each empty box.

Symbol	^{35}Cl		
Number of protons	17	56	82
Number of neutrons	18	82	
Number of electrons	17		
Mass number	35		208

15. A forensic scientist is given a sample of soil to analyze. The scientist analyzes the isotopic ratio of various elements in the sample. How could isotopic ratios of certain elements help the scientist gather information about a crime?
    a. Since isotopic ratios of various elements change from one geographic location to another, the isotopic ratios could help the scientist determine the origin of the sample, perhaps leading to clues about how or where the crime was committed.

16. Explain how isotopic ratios were used to determine the origin of the marble used in the construction of the Parthenon.
    a. Marble contains Ca, O and C. The relative amount of the different isotopes of each of these elements varies from one location to another, depending on where the marble was mined. Knowing the isotopic ratios of each element, it was possible to determine that the marble used to create the Parthenon was mined from quarries near the top of Mount Pendelikon.
17. Isotopes of which element were used to determine the source of the marble used in the Parthenon?
    a. Isotopes of oxygen were used to determine the course of the marble used in the Parthenon.
18. In an atom, which electrons are most likely to participate in chemical reactions and why? The electrons close to the nucleus or the electrons further away from the nucleus?
    a. The valence electrons are most likely to participate in chemical reactions because they are the furthest from the nucleus and most easily lost or gained by an atom.

19. How many electrons does a neutral atom of phosphorus contain?
    a. 15
20. What is the maximum number of electrons that can exist in each of the energy levels listed below?
    a. The first energy level: 2
    b. The second energy level: 10

21. Explain how lamps such as the sodium or mercury vapor lamps emit light of certain colors.
    a. Lamps such as the sodium vapor lamp are filled with atoms of gaseous sodium. When electricity is applied, electrons of the sodium atoms are promoted to higher energy levels. These electrons then relax back to a lower energy level and emit light of a characteristic wavelength.
22. What determines how far from the ground state an electron will jump when energy is added to an atom?
    a. The size of the atom
    b. The number of electrons in the atom
    c. The amount of energy added to the atom
    d. The number of atoms in a certain sample

23. Which of the following types of electromagnetic radiation is the most energetic?
    a. Radio waves
    b. Visible light
    c. Ultraviolet light
    d. Infrared light

24. List at least three reasons discussed in the Nature Box portion of the chapter that explain why it might be beneficial to reduce nighttime light pollution.
    a. Reduced electricity use
    b. Reduced greenhouse gas emissions
    c. Increased ability to see the stars
    d. Negative effects on the mating, feeding and migration behaviors of nocturnal animals.
    e. Negative effects on the sleep-wake cycle for humans

25. Which type of visible light would have the shortest wavelength light?
    a. Yellow
    b. Blue
    c. Red

26. Would an atom of copper produce blue light if a sample of copper were held in a flame? Why or why not?
    a. Copper emits a characteristic green light when submitted to a flame test. This is due to the energy level transitions that exist in copper. Copper is unlikely to produce yellow light since its dominant energy level transitions will instead produce green light.

27. The Energy Independence and Security Act of 2007 stated that:
    a. Cars produced after 2007 must get at least 35 mpg.

b. Incandescent bulbs that do not meet certain energy efficiency requirements must be phased out by 2014.
c. The U.S. must import less than 50% of its oil by the year 2020.
d. Each state must produce at least 40% of its electricity from renewable sources by the year 2015.

28. Rank the following from shortest to longest wavelength: microwaves, yellow light, X-rays, gamma rays
    a. Gamma, X-rays, yellow light, microwaves
29. How many neutrons, protons and electrons are in an atom of Eu-153?
    a. 63 protons, 63 electrons, 90 neutrons
30. How is the light emitted in a line spectrum different from the light emitted from a rainbow?
    a. A line spectrum generally emits one or a few very specific wavelengths of light while a rainbow emits a more continuous spectrum of light of many wavelengths.
31. True/false: When light is absorbed by an atom, electrons move from a higher energy to a lower energy level.
    a. False, electrons move from a lower to a higher energy level.
32. Yellow light has a wavelength of about 655 nm. Would light whose wavelength is 455 nm be more or less energetic than the yellow light? What color would you expect to have this wavelength of light?
    a. Light of 455 nm would be more energetic than yellow light. This would be violet light.
33. If humans are exposed to excessive levels of nighttime light, production of what chemical in the body would be affected?
    a. Serotonin
    b. Melatonin
    c. DNA
    d. Salivary amylase
    e. testosterone