Review: Chapter 7

SNC1D 05 - 06

Fill in the following spaces

1. A common test for carbon dioxide gas is to put the gas in _____ _____ which will turn _____.

2. The law that explains the fact that water always consists of 2 H and 1 O (i.e. H_2O) is: _____.

3. The process of splitting water into its elements by passing electricity through it is called _____.

4. In the electrolysis of water, the ratio of oxygen– to– hydrogen produced is _____.

5. A cathode ray will travel in a straight line away from the_____ toward the _____ unless it is influenced by a magnetic field or an electric field.

6. Rutherford suggested that the atom was mainly _____ space.

7. A neutron is a subatomic particle having _____ charge and a mass about the same as the _____.

8. The Bohr model says that there is a small_____ containing the positive charge and _____ in shells around the nucleus.

9. An atom of $^{14}_{6}C$ contains _____ electrons, _____ protons, and _____ neutrons.

10. The mass number of an element tells the number of_____ and _____ in the nucleus.

11. An atom with a mass number of 22 and an atomic number of 12 will have10 neutrons, 12 electrons, and 12 protons. An isotope of this element will have _____neutrons, _____ electrons, and _____ protons.

12. The cathode of a cathode ray tube has a _____ charge.

13. Rutherford named the three types of radiation: _____ , _____ , and _____ .

14. Isotopes are atoms of the same element that differ in number of _____ , but are similar in number of _____ and _____ .

15. Electrons account for more than _____ % of the volume of an atom and less than _____ % of the mass.

16. An atom that contains 22 electrons, 22 protons, and 26 neutrons will have a mass of about _____ atomic mass units.

17. Rutherford's "gold foil scattering experiment" suggested that the nucleus was _____ , _____ , and _____

1. **Match the definitions in Column A with the correct description in Column B:**

A	B
____ i. Was the first to suggest a nucleus.	a Thomson
____ ii. Invented the term "radioactivity."	b Rutherford
____ iii. Developed the "raisin bun" atomic model.	c Moseley
____ iv. Placed electrons in shells.	d Roentgen
____ v. Discovered X-rays.	e Bohr
	f Curie

Ans: i. b; ii. f; iii. a; iv. e; v. d

2. By using a specific element as an example, describe the difference among the following terms: **atomic mass, atomic number,** and **mass number.**

Ans:
Atomic mass: average atomic mass for the naturally occurring element, expressed in atomic mass units (u).
Atomic number — number of protons (or electrons).
Mass number— number of protons and neutrons in nucleus.

3. Hydrogen has three isotopes: H-1, H-2, and H-3. Show the number of electrons, protons, and neutrons in these isotopes.

Ans: H-1 -- 1 electron, 1 proton, and 0 neutrons
H-2 -- 1 electron, 1 proton, and 1 neutron
H-3 -- 1 electron, 1 proton, and 2 neutrons

4. a) What did Bohr mean when he said that electrons are found in shells?
b) What determines which shell an electron is found in?

Ans: a) Electrons are located in three-dimensional and spherical regions around the nucleus.
b) The amount of energy contained by the electron.

5. Complete the following table.

Element	**Atomic #**	**Mass #**	**# electrons**	**# protons**	**# neutrons**
Ag	108	47			
Sc	21	45			
Rh	103	45			
Pb	82	207			

6. The hypothetical element Colonelbyium has 14 protons and 17 neutrons in its nucleus.
   a) What is the atomic number of this element?
   b) What is the mass number of this element? Show your work.
   c) How many electrons are in this atom?
   d) What is the approximate mass of this element in atomic mass units? Show your work.
   e) If there were an isotope of this element, how would it differ from this atom?

True or False

1. Dalton thought atoms were like billiard balls that were solid spheres. _____
2. In Thomson's raisin bun model, the raisins were protons. _____
3. Rutherford shot tiny particles called "gamma" rays. _____
4. The particles shot by Rutherford were negatively charged. _____
5. Rutherford shot the particles at a thin sheet of gold foil. _____
6. Particles that hit other particles in the nucleus passed through unaffected. _____
7. Rutherford discovered protons! _____
8. Cathode rays are actually electrons. _____
9. Thomson discovered the electron! _____
10. All energy shells can hold a maximum of 2 electrons. _____