Chemistry--Unit 1: Atomic Structure and the Periodic Table
Test Review

vocab
- atom
- atomic mass
- atomic mass unit
- atomic number
- electron
- isotopes
- mass number
- metals
- metalloids
- neutrons
- nonmetals
- periodic law
- proton

know
1. Dalton's atomic theory and what part is now known to be different
2. the charge of the nucleus
3. how to find the number of protons, neutrons, and electrons in an atom
4. the charge of the proton, neutron, and electron
5. the location in the atom of the proton, neutron, and electron
6. what differentiates the atom of one element from an atom of another element
7. various ways to present the mass number of a particular isotope
8. units of relative atomic masses
9. be able to name 10 elements (and give symbols) and 10 compounds (chemical name or chemical formula)

problems
- average atomic mass (can practice from Table of Isotopes)
- mass of atoms from p, n, and e masses
- ratio

questions to try
Completion:

According to Dalton's atomic theory, elements are composed of tiny particles called _____(1). Atoms of each element are _____(2) from the atoms of all other elements. Atoms of different elements can form _____(3) by combining in whole-number ratios. Chemical reactions occur when _____(4) are separated, joined, or rearranged.

Dalton theorized that atoms are indivisible, but the discovery of _____(5) particles changed this theory. Scientists now know that atoms are made up of electrons, which have a _____(6) charge; _____(7), which have a positive charge; and _____(8), which are neutral. The latter two particles are found in the _____(9) of the atom. It was _____(10) who discovered the nucleus of the atom. The nucleus, which has a _____(11) charge, occupies a very small volume of the atom.

In contrast, the negatively charged _____(12) occupy most of the volume of the atom.

The number of _____(13) in the nucleus of an atom is the atomic _____(14) of that element. Because atoms are electrically neutral, the number of protons and _____(15) in an atom are equal. The sum of the _____(16) and neutrons is the mass number. Atoms of the same element are identical in most respects, but they can differ in the number of _____(17) in the nucleus. Atoms that have the same number of protons but different mass numbers are called _____(18).

The _____(19) of an element is the weighted average of the masses of the isotopes of that element. Each of the three known isotopes of hydrogen has _____(20) proton(s) in the nucleus. The most common hydrogen isotope has _____(21) neutrons. It has an atomic mass of _____(22) amu and is called hydrogen-1.

The periodic table organizes the elements into vertical _____(23) and horizontal _____(24) in order of increasing _____(25). The table is constructed so that elements that have similar chemical properties are in the same _____(26). The elements in Groups 1-2, and 13-18 are called the _____(27). The _____(28) make up Group 18. Groups 3-12 are called the _____(29), and between group 2 and 3 in period 6 and 7 are found the _____(30). Group 1 elements (except H) are also known as the _____(31), group 2 elements are known as the _____(32), and the first 4 members of group 17 are called the _____(33).

True-False:

34. _____Atoms of one element can change into atoms of another element during chemical reactions.
35. _____Atoms always combine in one-to-one ratios to form compounds.
36. _____Atoms of one element are different from atoms of other elements.
37. _____According to Dalton's atomic theory, atoms are composed of protons, neutrons, and electrons.
38. _____The mass of an electron is equal to the mass of a neutron.
39. _____The charge on all protons is the same.
40. _____The atomic number of an element is the sum of the protons and electrons in an atom of that element.
41. _____The mass number of an atom is the total number of protons in an atom of that element.
42. _____An atom of nitrogen always has 7 protons and 7 electrons.
43. _____Average atomic masses are expressed in amu's.
44. _____The number of neutrons in the nucleus can be calculated by subtracting the atomic number from the mass number.
45. _____In his periodic table, Mendeleev arranged the elements in ascending order of atomic number.
46. _____The representative elements include the Lanthanide Series.
47. _____The element found in Period 4, Group 3 is Sc.

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Matching:

48. _____atom	a. theory to explain the reactive behavior of elements
49. _____Dalton's atomic theory	b. ancient Greek philosopher
50. _____John Dalton	c. 19th century English school teacher who formulated a theory to describe the structure and chemical reactivity of matter in terms of atoms
51. _____Democritus	d. the smallest particle of an element that retains the properties of that element
52. _____electrons	e. atom that have the same number of protons but different numbers of neutrons
53. _____nucleus	f. weighted average mass of the atoms in a naturally occurring sample of an element
54. _____cathode ray	g. the total number of protons and neutrons in an atom
55. _____protons	h. one-twelfth the mass of a carbon-12 atom
56. _____neutrons	i. the number of protons in the nucleus of an atom of an element
57. _____atomic number	j. the group 18 elements
58. _____mass number	k. groups 1-2, and 13-18
59. _____isotopes	l. horizontal row on the periodic table
60. _____atomic mass unit	m. group 17 elements (first four)
61. _____ave. atomic mass	n. a beam that travels from a cathode to an anode
62. _____period	o. the central core of an atom which is composed of protons and neutrons
63. _____group	p. negatively charged subatomic particles
64. _____representative elements	q. subatomic particles with no charge
65. _____alkali metals	r. positively charged subatomic particles
66. _____transition metals	s. vertical column of elements in the periodic table
67. _____halogens	t. group 1 elements (other than H)
68. _____noble gases	u. groups 3-12

Short Answer:

69. List the elements of group 15. Tell whether each is a metal, non-metal, or metalloid.

70. Which subatomic particles are found in the nucleus of an atom?

71. Which subatomic particles are charged?

72. Name Rutherford's famous experiment. What information did it contribute to atomic structure?

73. How many copper atoms would you have to line up side by side to form a line 1 m long? (refer to practice problems for data)

74. List three properties of metals.

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answers to questions to try

1. atoms
2. different
3. compounds
4. atoms
5. subatomic
6. negative
7. protons
8. neutrons
9. nucleus
10. Rutherford
11. positive
12. electrons
13. protons
14. number
15. electrons
16. protons
17. neutrons
18. isotopes
19. average atomic mass
20. one
21. no
22. 1
23. groups
24. periods
25. atomic number
26. group
27. representative elements
28. noble gases
29. transition metals
30. inner transition metals
31. alkali metals
32. alkaline earth metals
33. halogens
34. F
35. F
36. T
37. F
38. F
39. T
40. F
41. F
42. T
43. T
44. T
45. F
46. F
47. T
48. d
49. a
50. c
51. b
52. p
53. o
54. n
55. r
56. q
57. i
58. g
59. e
60. h
61. f
62. l
63. s
64. k
65. t
66. u
67. m
68. j

69. nitrogen, phosphorus = nonmetal
    arsenic, antimony = metalloid
    bismuth, (ununpentium) = metal
70. protons and neutron
71. protons and electrons
72. Gold Foil Experiment; the existence of a central, small, dense, positively charged nucleus
73. $\frac{1\times10^{8}\,Cu\ atoms}{1cm} = \frac{?}{100\ cm}$ $\quad ? = 1\times10^{10}\ Cu\ atoms$
74. conductors of heat and electricity
    malleable, ductile
    high luster