

Chemistry - Ch 3 Prep-Test

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

1. In oxides of nitrogen, such as N_2O , NO , NO_2 , and N_2O_3 , atoms combine in small whole-number ratios. This evidence supports the law of
a. conservation of mass. b. multiple proportions. c. definite composition. d. mass action.
2. The two oxides of lead, PbO and PbO_2 , are explained by the
a. periodic law. b. law of multiple proportions. c. atomic law. d. law of conservation of mass.
3. If two or more compounds are composed of the same two elements, the ratio of the masses of one element that combine with a fixed mass of the other element is a simple whole number. This is a statement of the law of
a. conservation of mass. b. mass action. c. multiple proportions. d. definite composition.
4. Who was the schoolmaster who studied chemistry and proposed an atomic theory?
a. John Dalton b. Jons Berzelius c. Robert Brown d. Dmitri Mendeleev
5. Who first recognized that the ratio of the number of atoms that combine is the same as the ratio of the masses that combine?
a. Jons Berzelius b. Edward Morley c. John Dalton d. Jon Newlands
6. The principles of atomic theory recognized today were conceived by
a. Avogadro. b. Bohr. c. Dalton. d. Rutherford.
7. According to Dalton's atomic theory, atoms
a. of different elements combine in simple whole-number ratios to form compounds. b. can be divided into protons, neutrons, and electrons. c. of all elements are identical in size and mass. d. can be destroyed in chemical reactions.
8. Dalton's atomic theory did NOT explain the law of
a. whole-number ratios. b. definite proportions. c. conservation of mass. d. conservation of energy.
9. In Rutherford's experiments, most of the particles
a. bounced back. b. passed through the foil. c. were absorbed by the foil. d. combined with the foil.
10. Because most particles fired at metal foil passed straight through, Rutherford concluded that
a. atoms were mostly empty space. b. atoms contained no charged particles. c. electrons formed the nucleus. d. atoms were indivisible.
11. Because a few positively charged particles bounced back from the foil, Rutherford concluded that such particles were
a. striking electrons. b. indivisible. c. repelled by densely packed regions of positive charge. d. magnetic.
12. Rutherford fired positively charged particles at metal foil and concluded that most of the mass of an atom was
a. in the electrons. b. concentrated in the nucleus. c. evenly spread throughout the atom. d. in rings around the atom.
13. What did Rutherford conclude about the structure of the atom?
a. An atom is indivisible. b. Electrons make up the center of an atom. c. An atom carries a positive charge. d. An atom contains a small, dense, positively charged central region.

14. A positively charged particle with mass 1.673×10^{-24} g is a(n)
a. proton. b. neutron. c. electron. d. positron.
15. Which part of an atom has a mass approximately equal to 1/2000 of the mass of a common hydrogen atom?
a. nucleus b. electron c. proton d. electron cloud
16. The mass of a neutron is
a. about the same as that of a proton. b. about the same as that of an electron. c. double that of a proton.
d. double that of an electron.
17. The nucleus of most atoms is composed of
a. tightly packed protons. b. tightly packed neutrons. c. tightly packed protons and neutrons. d. loosely connected protons and electrons.
18. Protons have
a. negative charges. b. an attraction for neutrons. c. no charges. d. no mass.
19. Most of the volume of an atom is occupied by the
a. nucleus. b. nuclides. c. electron cloud. d. protons.
20. The charge on the electron cloud
a. prevents compounds from forming. b. balances the charge on the nucleus. c. attracts electron clouds in other atoms to form compounds. d. does not exist.
21. The smallest unit of an element that can exist either alone or in combination with other such particles of the same or different elements is the
a. electron. b. proton. c. neutron. d. atom.
22. Atoms of the same element that have different masses are called
a. moles. b. isotopes. c. nuclides. d. neutrons.
23. Isotopes of an element contain different numbers of
a. electrons. b. protons. c. neutrons. d. nuclides.
24. The most common form of hydrogen has
a. no neutrons. b. one neutron. c. two neutrons. d. three neutrons.
25. All isotopes of hydrogen contain
a. one neutron. b. two electrons. c. one proton. d. two nuclei.
26. Isotopes of each element differ in
a. the number of neutrons in the nucleus. b. atomic number. c. the number of electrons in the highest energy level. d. the total number of electrons.
27. The total number of protons and neutrons in the nucleus of an atom is its
a. atomic number. b. Avogadro constant. c. mass number. d. number of neutrons.
28. As the mass number of the isotopes of an element increases, the number of protons
a. decreases. b. increases. c. remains the same. d. doubles each time the mass number increases.
29. Atoms of the same element can differ in
a. chemical properties. b. mass number. c. atomic number. d. number of protons and electrons.
30. The abbreviation for atomic mass unit is
a. amu. b. mu. c. a. d. μ .

31. The average atomic mass of an element depends on both the masses of its isotopes and each isotope's
 a. atomic number. b. radioactivity. c. relative abundance. d. mass number.
32. A single atom of an isotope does not have a(n)
 a. relative atomic mass. b. atomic number. c. mass number. d. average atomic mass.
33. The atomic mass listed in the periodic table is the
 a. average atomic mass. b. relative atomic mass of the most abundant isotope. c. relative atomic mass of the most stable radioactive isotope. d. mass number of the most abundant isotope.

1	Group 1	2	Group 18
1	H Hydrogen 1.01	2	He Helium 4.00
2	Group 1	3	Group 13
3	Li Lithium 6.94	4	B Boron 10.81
4	Be Beryllium 9.01	5	C Carbon 12.01
5	Na Sodium 22.99	6	N Nitrogen 14.01
6	Mg Magnesium 24.30	7	O Oxygen 16.00
7	K Potassium 39.10	8	F Fluorine 19.00
8	Ca Calcium 40.08	9	Ne Neon 20.18
9	Rb Rubidium 85.47	10	Al Aluminum 26.98
10	Sr Strontium 87.62	11	Si Silicon 28.08
11	Cs Cesium 132.90	12	P Phosphorus 30.97
12	Ba Barium 137.33	13	S Sulfur 32.07
13	Fr Francium (223.02)	14	Cl Chlorine 35.45
14	Ra Radium (226.02)	15	Ar Argon 39.95
15		16	Kr Krypton 83.80
16		17	Ga Gallium 69.72
17		18	Ge Germanium 72.61
18		19	As Arsenic 74.92
19		20	Se Selenium 78.96
20		21	Br Bromine 79.90
21		22	Xe Xenon 131.29
22		23	Te Tellurium 127.60
23		24	I Iodine 126.90
24		25	Rn Radon (222.02)
25		26	At Astatine (209.99)
26		27	Po Polonium (208.98)
27		28	Bi Bismuth 208.98
28		29	Pb Lead 207.2
29		30	Tl Thallium 204.38

34. What is the atomic number for aluminum from the figure above?
 a. 13 b. 14 c. 26.98 d. 26.9815
35. In the figure above, a neutral atom of silicon contains
 a. 14 electrons. b. 28.09 electrons. c. 16 electrons. d. 38 electrons.
36. An atom of potassium has 19 protons and 20 neutrons. What is its mass number?
 a. 19 b. 20 c. 39 d. 10
37. A neutral carbon atom (atomic number 6) has
 a. 3 electrons and 3 neutrons. b. 6 protons. c. 3 protons and 3 electrons. d. 3 protons and 3 neutrons.
38. Zn-66 (atomic number 30) has
 a. 30 neutrons. b. 33 neutrons. c. 36 neutrons. d. 96 neutrons.
39. Ag-109 has 62 neutrons. The neutral atom has
 a. 40 electrons. b. 47 electrons. c. 53 electrons. d. 62 electrons.
40. Carbon-14 (atomic number 6), the radioactive nuclide used in dating fossils, has
 a. 6 neutrons. b. 8 neutrons. c. 10 neutrons. d. 14 neutrons.

41. Sulphur-34 (atomic number 16) contains
 - a. 34 protons. b. 18 protons. c. 18 neutrons. d. 16 neutrons.
42. Phosphorus-33 (atomic number 15) contains
 - a. 33 protons. b. 18 neutrons. c. 33 neutrons. d. 18 protons.
43. Silicon-30 contains 14 protons. It also contains
 - a. 16 electrons. b. 16 neutrons. c. 30 neutrons. d. 44 neutrons.
44. Neon-22 contains 12 neutrons. It also contains
 - a. 12 protons. b. 22 protons. c. 22 electrons. d. 10 protons.
45. Calcium-48 (atomic number 20) contains
 - a. 20 electrons. b. 48 protons. c. 20 neutrons. d. 28 protons.
46. Mendeleev's table was called periodic because the properties of the elements
 - a. showed no pattern. b. occurred at repeated intervals called periods. c. occurred at regular time intervals called periods. d. were identical.
47. What are the radioactive elements with atomic numbers from 90 to 103 in the periodic table called?
 - a. the noble gases b. the lanthanides c. the actinides d. the rare-earth elements
48. What are the elements with atomic numbers from 58 to 71 in the periodic table called?
 - a. the lanthanide elements b. the noble gases c. the actinide elements d. the alkali metals
49. Argon, krypton, and xenon are
 - a. alkaline earth metals. b. noble gases. c. actinides. d. lanthanides.
50. In the modern periodic table, elements are ordered according to
 - a. decreasing atomic mass. b. Mendeleev's original design. c. increasing atomic number. d. the date of their discovery.
51. The atomic number of lithium, the first element in Group 1, is 3. The atomic number of the second element in this group is
 - a. 4. b. 10. c. 11. d. 18.

- 5

Matching

Match each item with the correct statement below.

- | | |
|------------|-------------|
| a. proton | d. electron |
| b. nucleus | e. neutron |
| c. atom | |

- 57. the smallest particle of an element that retains the properties of that element
- 58. a positively charged subatomic particle
- 59. a negatively charged subatomic particle
- 60. a subatomic particle with no charge
- 61. the central part of an atom, containing protons and neutrons

Match each item with the correct statement below.

- | | |
|---------------------|----------------|
| a. mass number | d. atomic mass |
| b. atomic mass unit | e. isotope |
| c. atomic number | |

- 62. atoms with the same number of protons, but different numbers of neutrons in the nucleus of an atom
- 63. the total number of protons and neutrons in the nucleus of an atom
- 64. the number of protons in the nucleus of an element
- 65. the weighted average of the masses of the isotopes of an element
- 66. one-twelfth the mass of a carbon atom having six protons and six neutrons

Chemistry - Ch 3 Prep-Test
Answer Section

MULTIPLE CHOICE

1. B
2. B
3. C
4. A
5. C
6. C
7. A
8. D
9. B
10. A
11. C
12. B
13. D
14. A
15. B
16. A
17. C
18. B
19. C
20. B
21. D
22. B
23. C
24. A
25. C
26. A
27. C
28. C
29. B
30. A
31. C
32. D
33. A
34. A
35. A
36. C
37. B
38. C
39. B
40. B

- 41. C
- 42. B
- 43. B
- 44. D
- 45. A
- 46. B
- 47. C
- 48. A
- 49. B
- 50. C
- 51. C
- 52. A
- 53. C
- 54. A
- 55. D
- 56. B

MATCHING

- 57. C
- 58. A
- 59. D
- 60. E
- 61. B
- 62. E
- 63. A
- 64. C
- 65. D
- 66. B