Quiz Atomic Structure and Atomic Mass

Name _____ Date _____ Period _____

Quiz Chemistry Honors Structure of the Atom and Average Atomic Mass Version A

D 1. The only subatomic particle that does not carry an electric charge is the _____.

a. nucleus
b. electron
c. proton
d. neutron

A 2. Atoms of the same element with different numbers of neutrons are called ____.

a. isotopes
b. metals
c. metalloids
d. radioactive elements

D 3. A certain atom has 26 protons, 26 electrons, and 30 neutrons. Its mass number is ____.

a. 26
b. 30
c. 52
d. 56

B 4. There are _____protons, _____ neutrons and _____ electrons in mercury-199.

a. 80, 121, 80
b. 80, 119, 80
c. 80, 80, 121
d. 80, 201, 80

A 5. A particle that moves around the nucleus is a (n) ____.

a. electron
b. proton
c. neutron
d. quark

D 6. The atomic number of an element whose atoms have 9 protons and 10 neutrons is _____.

a. 19
b. 18
c. 10
d. 9

B 7. The average atomic mass of nitrogen is 14.0067.
Determine which isotope would be most abundant in nature.

a. Nitrogen -13
b. Nitrogen - 14
c. Nitrogen - 15
d. Nitrogen – 14.01

B 8. The mass of a neutron is

a. way smaller than an electron
b. about the same as a proton
c. about the same as an electron
d. double that of a proton

C 9. A certain atom has 15 protons, 15 electrons, and 16 neutrons. Its AMU is ____.

a. 31.00
b. 31
c. 30.97
d. 30

B 10. Determine the correct nuclear notation for the isotope of calcium with 23 neutrons.

a. $^{23}_{20}Ca$
b. $^{43}_{20}Ca$
c. $^{20}_{23}Ca$
d. $^{40}_{20}Ca$

Quiz Atomic Structure and Atomic Mass

Name _____ Date _____ Period _____

Quiz Chemistry Honors Structure of the Atom and Average Atomic Mass Version B

A 1. What is the overall charge of the nucleus in an atom?

a. positive
b. negative
c. neutral
d. no charge for large atoms with more neutrons than protons

A 2. Atoms of the same element with different numbers of neutrons are called ____.

a. isotopes
b. metals
c. metalloids
d. radioactive elements

C 3. A certain atom has 34 protons, 34 electrons, and 40 neutrons. Its mass number is ____.

a. 79
b. 78
c. 74
d. 68

A 4. The volume of the atom is mostly contained in the _____.

a. electron cloud
b. nucleus
c. isotope due to its size
d. within the quark which composes protons and neutrons

B 5. Elements are made up of _____.

a. electron
b. atoms
c. molecules
d. subatomic particles

D 6. The atomic number of an element whose atoms have 9 protons and 10 neutrons is _____.

a. 19
b. 18
c. 10
d. 9

C 7. A certain atom has 15 protons, 15 electrons, and 16 neutrons. Its AMU is ____.

a. 31.00
b. 31
c. 30.97
d. 30

B 8. The average atomic mass of nitrogen is 14.0067.
Determine which isotope would be most abundant in nature.

a. Nitrogen -13
b. Nitrogen - 14
c. Nitrogen - 15
d. Nitrogen – 14.01

B 9. There are _____protons, _____ neutrons and _____ electrons in mercury-199.

a. 80, 121, 80
b. 80, 119, 80
c. 80, 80, 121
d. 80, 201, 80

B 10. Determine the correct nuclear notation for the isotope of calcium with 23 neutrons.

a. $^{23}_{20}Ca$
b. $^{43}_{20}Ca$
c. $^{20}_{23}Ca$
d. $^{40}_{20}Ca$

Quiz Atomic Structure and Atomic Mass

For each of the following, show all work and label with correct units. Final answers should be rounded to two decimal places where appropriate.

8. Rubidium has two naturally occurring isotopes: Rb-85 with 72.0% of atomic mass 84.911 and another unknown isotope of Rubidium that is 28.0% abundant. Determine Rubidium's unknown isotope.

Rb-85 84.911 amu × .720 = 61.14

Rb-? ? × .280 = ? 24.33

86.89 amu

Rb-87

PT → ? 85.47 amu

9. Analysis of two isotopes, determines the composition to be 37.3% of atomic mass 190.96 and 62.7% of atomic mass 192.96. What is the average atomic mass and what is the element?

190.96 × .373 = 71.28

192.96 × .627 = 120.99

192.22 amu

#77 Ir

Iridium

10. Explain in a well formed sentence, why a weighted average is used to calculate the average atomic mass of an element than a simple statistical average.

different % abundance isotopes

assumes all same % abundance

****Bonus ****

Chlorine has two naturally occurring isotopes: Cl-35 (34.969 amu) and Cl-37 (36.956 amu). If Chlorine's average atomic mass is 35.453, what is the percent abundance for each isotope of chlorine?
(work must be shown in logical steps for full credit)

% abundance = 100%

Cl-35 = y

Cl-37 = 1 - y

$34.969y + 36.956(1-y) = 35.453$

$34.969y + 36.956 - 36.956y = 35.453$

$\frac{-1.987y}{-1.987} = \frac{-1.503}{-1.987}$

$y = .7564$

$y = .76$

Cl-35 = 76%

Cl-37 = 24%

Quiz Atomic Structure and Atomic Mass

For each of the following, show all work and label with correct units. Final answers should be rounded to two decimal places where appropriate.

8. Using the Periodic Table, determine which isotope has more neutrons, neon-20 or sodium-20.
Do not just guess, show work to verify your answer.

Ne-20 Atomic #10 20-10 = 10 n°

Na-20 Atomic #11 20-11 = 9 n°

Ne-20

9. Analysis of three isotopes, determines the composition to be .337% of atomic mass 35.97 and .063% of atomic mass 37.96 and 99.6% of atomic mass 39.96. What is the average atomic mass and what is the element?

.00337 × 35.97 = .1212

.00063 × 37.96 = .0239

.996 × 39.96 = 39.80

39.94 amu

Ar, Argon 18

10. Rubidium has two naturally occurring isotopes: Rb-85 with 72.0% of atomic mass 84.911 and another unknown isotope of Rubidium that is 28.0% abundant. Determine Rubidium's unknown isotope.

Rb -87

****Bonus ****

Chlorine has two naturally occurring isotopes: Cl-35 (34.969 amu) and Cl-37 (36.956 amu). If Chlorine's average atomic mass is 35.453, what is the percent abundance for each isotope of chlorine?
(work must be shown in logical steps for full credit)