

**Student Name:****Grade:** 09**Test Name:** November Chemistry for All: Unit 1 - Atomic Theory  
Assessment**Version:** 1

1. A radioactive sample has a half-life of 10 days. After 50 days, what fraction of the sample is still radioactive?
  - (a)  $1/50$
  - (b)  $1/32$
  - (c)  $1/16$
  - (d)  $1/10$
2. A radioactive substance has an original mass of 80.0 g. After 4 half-lives, what portion of the mass is still radioactive?
  - (a) 5.00 g
  - (b) 10.0 g
  - (c) 20.0 g
  - (d) 40.0 g
3. Four tablespoons of sugar are dissolved in a pitcher of water giving it a density of 1.2 g/L. If more water is then poured into the pitcher, what happens to the density of the solution?
  - (a) The density stays the same.
  - (b) The density increases.
  - (c) The density decreases.
4. The nucleus of the atom is composed of which sub-atomic particles?
  - (a) protons and electrons
  - (b) protons and neutrons
  - (c) electrons and neutrons
  - (d) electrons only

5. Which of the following relative masses is correct?
- (a) protons and neutrons have the same relative mass.
  - (b) an electron has a mass almost 5 times smaller than a proton.
  - (c) a proton has a mass of 2 amu.
  - (d) protons and electrons have the same relative mass.
6. How many protons and electrons are there in a  $\text{Mg}^{2+}$  ion?
- (a) 12 protons, 12 electrons
  - (b) 10 protons, 12 electrons
  - (c) 12 protons, 10 electrons
  - (d) 12 protons, 14 electrons
7. How many valence electrons does a fluorine atom have?
- (a) 1
  - (b) 2
  - (c) 7
  - (d) 8
8. Draw a Lewis structure for the salt LiF. Be sure to show all valence electrons and charges.
9. Identify the number of protons, neutrons, and electrons in the  $^{45}\text{Sc}^{+3}$  cation.
- (a) 21 protons, 24 neutrons, 18 electrons
  - (b) 21 protons, 24 neutrons, 21 electrons
  - (c) 21 protons, 24 neutrons, 24 electrons
  - (d) 45 protons, 21 neutrons, 18 electrons

10. An element has isotopes with the following atomic masses and fractional abundances:

24 amu - 12%

25 amu - 68%

26 amu - 20%

The average atomic mass will be closest to which of the following?

- (a) 24 amu
  - (b) 24.5 amu
  - (c) 25.5 amu
  - (d) 26 amu
11. What are the proper chemical symbols for the carbon-14 and carbon-12 isotopes (in that order)?
- (a)  $^{14}_6\text{C}$  and  $^{14}_{12}\text{C}$
  - (b)  $^{14}_6\text{C}$  and  $^{12}_6\text{C}$
  - (c)  $^{12}_6\text{C}$  and  $^{12}_{12}\text{C}$
  - (d)  $^{14}_{14}\text{C}$  and  $^{12}_{12}\text{C}$
12. Identify what A, X, and Z represent in the following isotope notation:  $^A_Z\text{X}$
- (a) A = atomic number, X = chemical symbol, Z = mass number
  - (b) A = atomic number, X = mass number, Z = chemical symbol
  - (c) A = mass number, X = chemical symbol, Z = atomic number
  - (d) A = chemical symbol, X = atomic number, Z = mass number
13. Write the isotopic notation for the following atoms:

55 protons and 78 neutrons

27 protons and 32 neutrons

53 protons and 74 neutrons

Be sure to show the correct atomic mass, atomic number and chemical symbol.