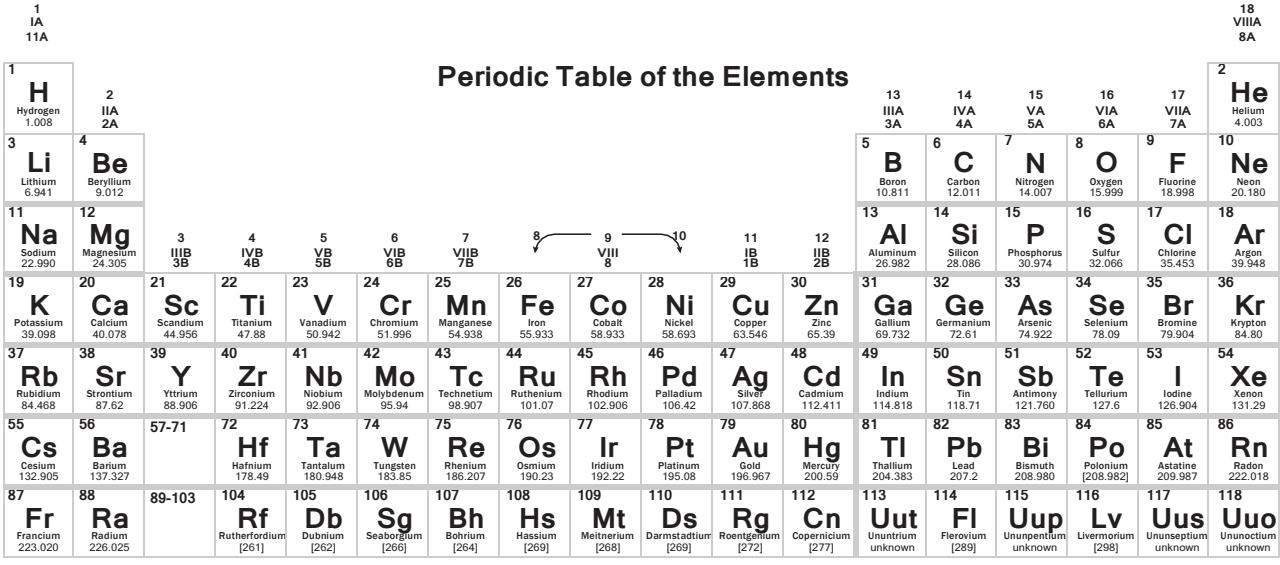
Sample Chemistry 115 Placement Exam

Please note that the sample exam is designed to illustrate the type and degree of difficulty of the exam questions; it does not include questions from all of the topics that will be on the actual placement exam. Simply studying the sample exam questions will not prepare you for the placement exam. See the Study Guide for CHEM 115 Chemistry Placement Exam for a complete list of topics.

Instructions: To use this exam as an indication of readiness for the placement exam, give yourself 15 minutes to take the exam. If you can get 8 or more questions correct in 15 minutes, you are on track to get an acceptable score on the CHEM 115 placement exam.



1. Which of the following phase changes is an exothermic process?

   a. gas to liquid b. solid to gas c. solid to liquid d. none of these

2. Which family of elements has exactly two valence electrons?

   a. noble gases
   b. alkali metals
   c. alkaline earth metals
   d. halogens

3. Which of the following elements has the smallest atomic radii?

   a. Cs b. As c. Bi d. K

4. For a calcium ion, Ca^{2+}, with a mass number of 42, the number of protons, neutrons, and electrons are

   a. 20 protons, 22 neutrons, and 18 electrons.
   b. 20 protons, 42 neutrons, and 22 electrons.
   c. 20 protons, 42 neutrons, and 18 electrons.
   d. 22 protons, 20 neutrons, and 22 electrons.

5. Which substance has covalent bonds?

a. O_2 b. NaCl C. CO d. Both a and c

6. Which of the following is a true statement about periodic trends?

a. Metallic character increases from left to right across a row.
b. Electronegativity increases from left to right across a row.
c. Atomic radii increases from left to right across a row.
d. Both b and c are true.

7. What is the maximum number of electrons that a single *p* orbital can hold?

a. 8 electrons b. 6 electrons c. 4 electrons d. 2 electrons

8. Propane ($CH_3CH_2CH_3$) reacts with oxygen (O_2) to produce carbon dioxide (CO_2) and water (H_2O). How many moles of propane would be needed to produce 0.60 moles of carbon dioxide? Note, you need to write a balance chemical reaction to answer this question correctly.

a. 0.60 moles b. 1.8 moles c. 0.20 moles d. 0.33 moles

9. The correct formula for copper (II) nitrate is

a. $Cu_2(NO_3)_2$ b. $CuNO_3$ c. $Cu(NO_3)_2$ d. Cu_2NO_3

10. What is the correct name of Na_2SO_4?

a. Sodium sulfur tetroxide
b. Sodium sulfate
c. Sodium sulfite
d. Sodium sulfide

11. How many moles of chloride ions are there in 1.0 L of 1.5*M* $MgCl_2(aq)$? *M* = mol/L

a. 1.0 moles b. 1.5 moles c. 2.0 moles d. 3.0 moles

12. What is the mass of 10 moles of CO_2?

a. 440 g b. 280 g C. 44g d. 28 g

13. How many grams of NaCl are needed to make 250 mL of 0.500*M* NaCl solution?
M = mol/L 1000 ml= 1 L

a. 7,300 g b. 7.30 g c. 2.13×10^{-3} g d. 0.125 g

14. The volume of a soft drink bottle is 0.750 L. Given that 1 L = 10^3 cm^3 and 1 cm = 10 mm, this volume in mm is

a. 7.50×10^2 mm^3 b. 7.50×10^3 mm^3 c. 7.50×10^5 mm^3 d. 7.50×10^6 mm^3

Answers: 1a, 2c, 3b, 4a, 5d, 6b, 7d, 8c, 9c, 10b, 11d, 12a, 13b, 14c