

# 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.

Periodic Table of the Elements																	
1 IA 11A																	18 VIIIA 8A
1 H Hydrogen 1.008	2 IIA 2A											13 IIIA 3A	14 IVA 4A	15 VA 5A	16 VIA 6A	17 VIIA 7A	2 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305	3 IIIB 3B	4 IVB 4B	5 VB 5B	6 VIB 6B	7 VIIB 7B	8 VIII 8	9 VIII 8	10 VIII 8	11 IB 1B	12 IIB 2B	13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.066	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.88	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.933	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.732	32 Ge Germanium 72.61	33 As Arsenic 74.922	34 Se Selenium 78.09	35 Br Bromine 79.904	36 Kr Krypton 84.80
37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.71	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.29
55 Cs Cesium 132.905	56 Ba Barium 137.327	57-71	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.85	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [208.982]	85 At Astatine 209.987	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Fl Flerovium [289]	115 Uup Ununpentium unknown	116 Lv Livermorium [298]	117 Uus Ununseptium unknown	118 Uuo Ununoctium unknown

- Which of the following phase changes is an exothermic process?
  - gas to liquid
  - solid to gas
  - solid to liquid
  - none of these
- Which family of elements has exactly two valence electrons?
  - noble gases
  - alkali metals
  - alkaline earth metals
  - halogens
- Which of the following elements has the smallest atomic radii?
  - Cs
  - As
  - Bi
  - K
- For a calcium ion,  $\text{Ca}^{2+}$ , with a mass number of 42, the number of protons, neutrons, and electrons are
  - 20 protons, 22 neutrons, and 18 electrons.
  - 20 protons, 42 neutrons, and 22 electrons.
  - 20 protons, 42 neutrons, and 18 electrons.
  - 22 protons, 20 neutrons, and 22 electrons.

5. Which substance has covalent bonds?
- a. O<sub>2</sub>                      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<sub>3</sub>CH<sub>2</sub>CH<sub>3</sub>) reacts with oxygen (O<sub>2</sub>) to produce carbon dioxide (CO<sub>2</sub>) and water (H<sub>2</sub>O). 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<sub>2</sub>(NO<sub>3</sub>)<sub>2</sub>              b. CuNO<sub>3</sub>                      c. Cu(NO<sub>3</sub>)<sub>2</sub>              d. Cu<sub>2</sub>NO<sub>3</sub>
10. What is the correct name of Na<sub>2</sub>SO<sub>4</sub>?
- 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 1.5M MgCl<sub>2</sub>(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<sub>2</sub>?
- a. 440 g                      b. 280 g                      c. 44g                      d. 28 g
13. How many grams of NaCl are needed to make 250 mL of 0.500M NaCl solution?  
*M* = mol/L 1000 ml = 1 L
- a. 7,300 g                      b. 7.30 g                      c. 2.13 x 10<sup>-3</sup> g              d. 0.125 g
14. The volume of a soft drink bottle is 0.750 L. Given that 1 L = 10<sup>3</sup> cm<sup>3</sup> and 1 cm = 10 mm, this volume in mm is
- a. 7.50 x 10<sup>2</sup> mm<sup>3</sup>      b. 7.50 x 10<sup>3</sup> mm<sup>3</sup>      c. 7.50 x 10<sup>5</sup> mm<sup>3</sup>      d. 7.50 x 10<sup>6</sup> mm<sup>3</sup>

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