

To register for CHEM 111, you must meet one of these prerequisites:

- a. a score of 60% or better on the chemistry placement exam, OR
- b. a minimum 560 math SAT or minimum 25 math ACT score, OR
- c. a grade of C or better in Math 143, Math 160, or Math 170, OR
- d. a grade of C or better in Chemistry 101, OR
- e. a score of 49 or better on the COMPASS College Algebra exam.

A practice chemistry placement exam is given below. The chemistry placement exam is designed to test your knowledge of basic chemistry. Topics covered on the exam are: significant figures, the metric system, dimensional analysis (unit conversion), density, nomenclature of simple inorganic compounds and common acids, percent mass calculations, scientific notation, balancing equations, molar mass (molecular weight), the mole, stoichiometry, molarity, dilutions, basic algebra, and graphing. You should have had most of these topics in your high school chemistry course.

Be sure to bring a non-text entry/non-graphing scientific calculator, #2 pencil and photo ID when you come to take the test.

PRACTICE CHEMISTRY PLACEMENT EXAM

1. How many of the numbers below have 5 significant figures?

0.0054 19.000 0.00006 1.6090×10^8 13607

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

2. Nitric acid is a solution of which of the following dissolved in water?

- a) HNO_4
- b) H_2NO_3
- c) HNO_2
- d) HNO_3
- e) H_2NO

3. Which of the following is the smallest mass?

- a) 2.1 kg
- b) 4.2×10^{10} ng
- c) 5.8×10^2 g
- d) 8.4×10^4 cg
- e) 6.7×10^4 mg

4. If 250 mL of a 0.50 M NaCl solution is diluted to 840 mL, what is the molarity of the resulting solution?

- a) 0.15 M
- b) 6.7 M
- c) 0.60 M
- d) 1.7 M
- e) 0.0025 M

5. Iron(III) sulfite has the formula

- a) Fe_3SO_3
- b) $\text{Fe}_2(\text{SO}_4)_3$
- c) $\text{Fe}_2(\text{SO}_3)_3$
- d) Fe_2SO_4
- e) Fe_2SO_3

6. How many atoms of carbon are in 24 grams of carbon?

- a) 1.2×10^{24} atoms
- b) 1.7×10^{26} atoms
- c) 1.2×10^{25} atoms
- d) 3.0×10^{24} atoms
- e) 3.0×10^{23} atoms

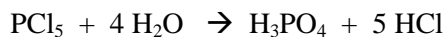
7. A solution is prepared by dissolving sugar in water. The solution is 25.0%, by mass, sugar. How many grams of **WATER** are in 472 grams of this solution?
- a) 118 g
 - b) 157 g
 - c) 408 g
 - d) 354 g
 - e) 396 g

8. The balanced chemical equation for the reaction between PCl_5 and water is given below. If 3.45 moles of HCl are produced, how many moles of water reacted?



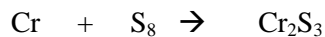
- a) 0.690 mol
 - b) 0.863 mol
 - c) 2.76 mol
 - d) 3.45 mol
 - e) 4.31 mol
9. How many grams of calcium bromide are in 50.0 mL of a 0.25 M calcium bromide solution?
- a) 2.5 g
 - b) 1.5 g
 - c) 1.3×10^{-2} g
 - d) 24 g
 - e) 40. g
10. 26.0 g of a liquid that has a density of 1.44 g/mL needs to be measured out in a graduated cylinder. What volume should be used?
- a) 37.4 mL
 - b) 0.0554 mL
 - c) 18.1 mL
 - d) 0.0267 mL
 - e) 26.0 mL
11. One gram of alum, $\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$, contains 1.3×10^{21} Al atoms. How many oxygen atoms are contained in 1.0 g alum?
- a) 1.3×10^{21} atoms
 - b) 2.6×10^{22} atoms
 - c) 1.6×10^{22} atoms
 - d) 1.0×10^{22} atoms
 - e) 2.1×10^{22} atoms
12. How many grams of AlF_3 are in 2.64 moles of AlF_3 ?
- a) 3.14×10^{-2} g
 - b) 121 g
 - c) 222 g
 - d) 5.74×10^{-2} g
 - e) 31.8 g

13. The balanced chemical equation for the reaction between PCl_5 and water is given below. If 12.0 g of PCl_5 reacts completely with water, how many grams of HCl will be produced?



- a) 60.0 g
b) 2.10 g
c) 0.420 g
d) 0.0952 g
e) 10.5 g
14. Which of the following would be the correct name for N_2O_3 ?
- a) dinitrogen trioxide
b) nitrogen(II) oxide
c) nitrogen(III) oxide
d) nitrogen oxide
e) nitrogen(II) oxygen(III)
15. How many moles of C_4F_8 are in 265 grams of C_4F_8 ?
- a) 8.55 mol
b) 1.89×10^{-5} mol
c) 5.30×10^4 mol
d) 1.32 mol
e) 0.755 mol
16. What is the percent, by mass, of oxygen in $\text{Zn}(\text{BrO}_3)_2$?
- a) 24.83%
b) 39.00%
c) 29.89%
d) 39.79%
e) 17.57%
17. Given: $Z = 0.43Y + 12$; What is Y when $Z = 28$?
- a) 93
b) 6.9
c) 24
d) 17
e) 37
18. A metal having a mass of 44 grams is dropped in 118.2 cm^3 of water and sinks to the bottom. The volume of the water and object is 124.3 cm^3 . What is the density of the metal?
- a) 0.37 g/cm^3
b) 7.2 g/cm^3
c) 0.35 g/cm^3
d) 2.7 g/cm^3
e) 2.9 g/cm^3

19. When the equation below is properly balanced, what is the coefficient for S_8 ?



- a) 1
- b) 2
- c) 3
- d) 4
- e) none of these

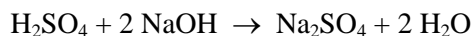
20. An antacid tablet containing 0.50 g of NaHCO_3 is dissolved in 250 mL of water. What is the molar concentration of NaHCO_3 in the solution?

- a) 0.024 M
- b) 4.1 M
- c) 0.0020 M
- d) 0.0060 M
- e) 2.0 M

21. What is the formula of the compound formed between the potassium ion and the sulfide ion?

- a) KS
- b) KS_2
- c) K_2S_3
- d) KS_3
- e) K_2S

22. How many mL of 0.250 M H_2SO_4 is required to completely react with 25.0 mL of 1.50 M NaOH ?



- a) 150. mL
- b) 50.0 mL
- c) 300. mL
- d) 75.0 mL
- e) none of the above

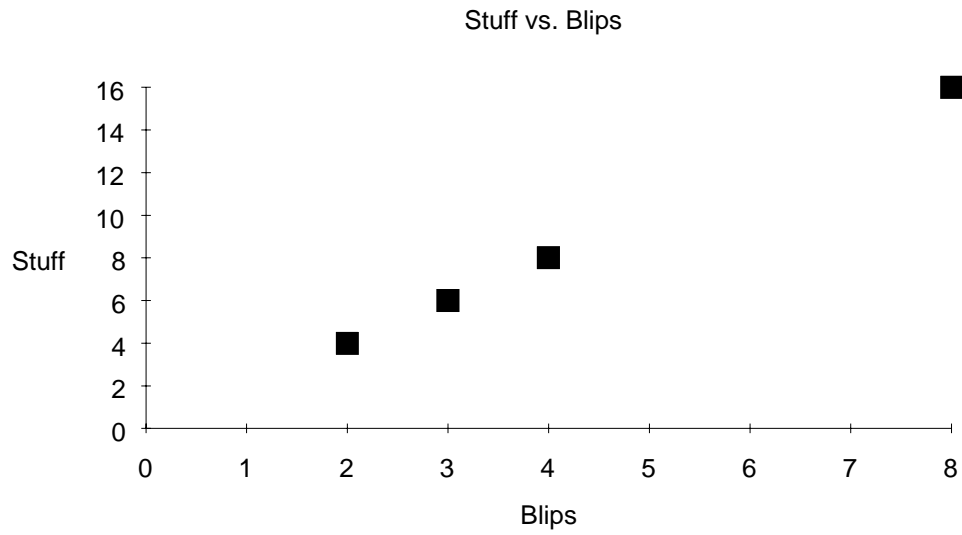
23. Assume that you are a physician administering a drug in a solution containing 5.0 mg drug/L solution. If the recommended dosage of the drug is 3.5×10^{-6} g per kilogram of body weight, what volume of solution would you prescribe daily for a 68 kg patient?

- a) 97 mL
- b) 53 mL
- c) 86 mL
- d) 23 mL
- e) 48 mL

24. How many kilometers is 5.82×10^4 cm?

- a) 5.82×10^3 km
- b) 0.582 km
- c) 5.82×10^9 km
- d) 5.82 km
- e) 5.82×10^5 km

25. Data was collected on an experiment that relates "Stuff" to "Blips". Using a "best fit" line for the data, how much stuff would I have if I had 20 blips?



- a) 0 b) 10 c) 20 d) 30 e) 40

Answers:

1. c
2. d
3. b
4. a
5. c
6. a
7. d
8. c
9. a
10. c
11. b
12. c
13. e
14. a
15. d
16. c
17. e
18. b
19. c
20. a
21. e
22. d
23. e
24. b
25. e