

# California Chemistry Diagnostic Test

Topics Covered on the Chemistry Exam include:

- Scientific notation
- Unit Conversions
- Compounds and elements
- States of matter
- Reactions of matter
- Structure of matter
- Periodic properties
- Solutions
- Equilibrium
- Kinetics
- Thermodynamics
- Lab skills
- Basic Math and Algebra Skills

## Sample Questions

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1. What is the correct name for  $\text{Mg}_3\text{P}_2$ ?
  - a. magnesium phosphorous
  - b. magnesium phosphide
  - c. magnesium phosphate
  - d. magnesium phosphite
2. What is the approximate percent-by-mass of carbon in  $\text{C}_3\text{H}_6\text{O}_2$  (molar mass = 74 g)?
  - a. 8
  - b. 43
  - c. 49
  - d. 74
3. When the equation
$$\text{Al}_2(\text{SO}_3)_3 + \text{HCl} \rightarrow \text{AlCl}_3 + \text{H}_2\text{SO}_3$$
is balanced, the smallest whole number coefficient for HCl is
  - a. 1
  - b. 3
  - c. 4
  - d. 6
4. A substance releases heat when it changes from
  - a. Liquid to solid
  - b. Solid to gas
  - c. Solid to liquid
  - d. Liquid to gas
5. Which element has exactly five electrons in the highest principle energy level?
  - a. Se
  - b. Ba
  - c. P
  - d. Ge

6. What volume of 1.5M NaOH is needed to provide 0.75 mol of NaOH
- 500 L
  - 5.0 L
  - 500 mL
  - 0.75 L
7. For a chemical reaction it is usually found that the reaction rate is faster at higher temperature. The rate increases because
- the concentration of reactants increase
  - more reactants collide with energy equal to or greater than the activation energy
  - the concentrations of products increase
  - the volume expands and there is more room for new compounds to form
8. Which answer, to the correct number of significant figures, is closest to the true value of the expression:  
 $(9.1 \times 10^4)(1.1 \times 10^{-5})(\log 10^{-13})(1000)$
- 1.3
  - 13000
  - 13000
  - $1.3 \times 10^{-11}$
9. Which substance does not obey the Lewis octet rule?
- $N_2$
  - NO
  - $CF_4$
  - Ar
10. For the reaction at equilibrium:  
 $2 NO(g) + O_2(g) \rightarrow 2 NO_2(g)$
- Which change will increase the amount of  $NO_2(g)$ ?
- Remove NO gas
  - Add NO gas
  - Add a catalyst
  - Remove  $O_2$  gas
11. A fish tank holds  $1.029 \text{ yd}^3$  of water. What is this volume in cubic meters given that  $1\text{m} = 1.093 \text{ yd}$ ?
- $1.062 \text{ m}^3$
  - $0.9414 \text{ m}^3$
  - $1.125 \text{ m}^3$
  - $0.7881 \text{ m}^3$
12. How many moles of  $Al_2O_3$  can be produced from the reaction of 10.0 g of Al and 19.0 g of  $O_2$ ?
- 0.581 mol
  - 0.371 mol
  - 0.185 mol
  - 0.396 mol
13. When cations and anions join, they form what kind of chemical bond?
- ionic
  - hydrogen
  - metallic
  - covalent

ANSWERS: 1. (b) 2. (c) 3. (d) 4. (a) 5. (c) 6. (c) 7. (b) 8. (c) 9. (b) 10. (b) 11. (d) 12. (c) 13. (a)