

## 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  $\text{Al}_2(\text{SO}_4)_3 + \text{HCl} \rightarrow \text{AlCl}_3 + \text{H}_2\text{SO}_4$  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**

- a. 500 L
- b. 5.0 L
- c. 500 mL
- d. 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**

- a. the concentration of reactants increase
- b. more reactants collide with energy equal to or greater than the activation energy
- c. the concentrations of products increase
- d. 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:**

$$(9.1 \times 10^4)(1.1 \times 10^{-5})(\log 10^{-13})(1000)$$

- a. 1.3
- b. 13000
- c. -13000
- d.  $1.3 \times 10^{-11}$

**9. Which substance does not obey the Lewis octet rule?**

- a.  $\text{N}_2$
- b. NO
- c.  $\text{CF}_4$
- d. Ar

10. For the reaction at equilibrium:  $2 \text{NO}(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2 \text{NO}_2(\text{g})$  Which change will increase the amount of  $\text{NO}_2(\text{g})$ ?

- a. Remove NO gas
- b. Add NO gas
- c. Add a catalyst
- d. Remove  $\text{O}_2$  gas

11. A fish tank holds  $1.029 \text{ yd}^3$  of water. What is this volume in cubic meters given that  $1 \text{ m} = 1.093 \text{ yd}$ ?

- a.  $1.062 \text{ m}^3$
- b.  $0.9414 \text{ m}^3$
- c.  $1.125 \text{ m}^3$
- d.  $0.7881 \text{ m}^3$

12. How many moles of  $\text{Al}_2\text{O}_3$  can be produced from the reaction of 10.0 g of Al and 19.0 g of  $\text{O}_2$ ?

- a. 0.581 mol
- b. 0.371 mol
- c. 0.185 mol
- d. 0.396 mol

13. When cations and anions join, they form what kind of chemical bond?

- a. ionic
- b. hydrogen
- c. metallic
- d. 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)