

## CHEMISTRY DIAGNOSTIC TEST

### Study Guide

CHEM 1A and CHEM 4A have a prerequisite of CHEM 42. Students who think they may be ready for CHEM 1A or CHEM 4A without completing CHEM 42 should take the Chemistry Diagnostic Test **and** complete the Review Questionnaire Form at the Student Success and Assessment Services Office.

### ***TYPICAL QUESTIONS FROM THE CHEMISTRY DIAGNOSTIC TEST***

*(A Periodic Table including atomic weights will be provided during the Chemistry Diagnostic Test)*

#### **Compounds**

1. The number of atoms of all varieties contained in one molecule of benzophenone,  $(C_6H_5)_2CO$  is:
  - a. 3
  - b. 14
  - c. 15
  - d. 24

#### **States**

2. The process in which water changes from the solid state into the gaseous state, by passing the liquid phase, is known as:
  - a. Condensation
  - b. Evaporation
  - c. Sublimation
  - d. Deposition

#### **Reactions**

3. When methane gas ( $CH_4$ ) is completely combusted with oxygen gas ( $O_2$ ), the product(s) is (are):
  - a.  $CO_2$  and  $H_2O$
  - b.  $CO$  and  $H_2O_2$
  - c.  $C$  and  $H_2O$
  - d.  $CH_4O_2$

#### **Periodicity**

4. Which set of elements would have an identical number of valence electrons?
  - a. Na, Mg, Al
  - b. C, Si, Ge
  - c. S, Cl, Ar
  - d. Fe, Co, Ni

#### **Structure**

5. Which of the following molecules would have a three dimensional structure known as a tetrahedral?
  - a.  $H_2O$
  - b.  $CH_4$
  - c.  $NH_3$
  - d.  $SF_4$

## Solutions

6. How many milliliters of water must be added to 100mL of 12.6 M H<sub>2</sub>SO<sub>4</sub> to create 4.2 M H<sub>2</sub>SO<sub>4</sub>?
- 300 mL
  - 33 mL
  - 400 mL
  - 200 mL

## Dynamics

7. A reaction in which the products are formed at a higher potential energy state than that of the initial reactants would be a reaction in which:
- heat is evolved
  - the reactants and products are neutral
  - the reaction process is endothermic
  - the activation energy has a negative value

## Lab Skills

8. Acid-base titrations are performed in the laboratory primarily using which volume measuring device?
- buret
  - beaker
  - volumetric flask
  - graduated cylinder

## Stoichiometry

9. Consider the reaction:  $2\text{Al}_{(s)} + 6\text{HCl}_{(aq)} \rightarrow 2\text{AlCl}_{3(aq)} + 3\text{H}_{2(g)}$   
How many grams of H<sub>2(g)</sub> can be expected from a reaction in which 13.49 g of Al<sub>(s)</sub> react with excess HCl<sub>(aq)</sub> to produce products?
- 0.672 g
  - 13.49 g
  - 1.51 g
  - 0.50 g

## ANSWERS TO SAMPLE QUESTIONS CHEMISTRY DIAGNOSTIC TEST STUDY GUIDE

- 1) COMPOUNDS (D)
- 2) STATES (C)
- 3) REACTIONS (A)
- 4) PERIODICITY (B)
- 5) STRUCTURE (B)
- 6) SOLUTIONS (D)
- 7) DYNAMICS (C)
- 8) LAB SKILLS (A)
- 9) STOICHIOMETRY (C)