

1994

due

# CHEMISTRY TEST

3RD  
SAT II

Note: For all questions involving solutions and/or chemical equations, assume that the system is in pure water unless otherwise stated.

NO CALCULATOR

60 minutes

## Part A

Directions: Each set of lettered choices below refers to the numbered questions or statements immediately following it. Select the one lettered choice that best answers each question or best fits each statement, and then fill in the corresponding oval on the answer sheet. A choice may be used once, more than once, or not at all in each set.

### Questions 1-4

(A)  $X_2Y$

(B)  $XY$

(C)  $XY_2$

(D)  $XY_3$

(E)  $XY_4$

Which of the above represents the formula for the most common compound of X and Y, where X and Y represent given pairs of elements as indicated below?

	<u>X</u>	<u>Y</u>
1.	Mg	S
2.	Ca	F
3.	N	H
4.	Si	O

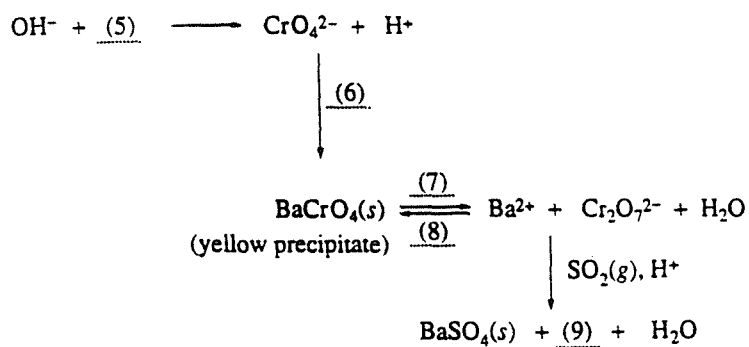
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# CHEMISTRY TEST—Continued

## Questions 5-9

- (A)  $\text{Cr}_2\text{O}_7^{2-}$
- (B)  $\text{H}^+$
- (C)  $\text{OH}^-$
- (D)  $\text{Cr}^{3+}$
- (E)  $\text{Ba}^{2+}$

Which of the above is the appropriate ion for each blank in the following series of reactions?



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## CHEMISTRY TEST—Continued

### Questions 10-12

- (A)  $s-s$  bonds
- (B)  $s-p$  bonds
- (C)  $p-p$  bonds
- (D)  $sp^3-p$  bonds
- (E)  $sp^2-sp^2$  bonds

- 10. Describes the bonding in  $H_2$
- 11. Describes the bonding in  $HF$
- 12. Describes the bonding in  $F_2$

Questions 13-15 refer to the following elements.

- (A) Lithium
- (B) Sodium
- (C) Potassium
- (D) Rubidium
- (E) Cesium

- 13. Which forms the smallest of the  $+1$  ions?
- 14. Which has the largest atomic radius?
- 15. Which has the smallest first ionization energy?

### Questions 16-19

- (A) Element with atomic number 2
- (B) Element with atomic number 7
- (C) Element with atomic number 19
- (D) Element with atomic number 35
- (E) Element with atomic number 74

- 16. An element that reacts vigorously with water
- 17. A transition element
- 18. An element whose chemical properties are similar to those of chlorine
- 19. An element that forms diatomic molecules that have triple bonds

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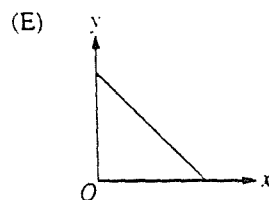
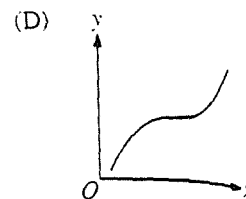
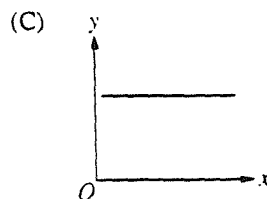
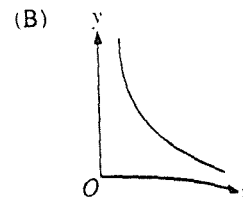
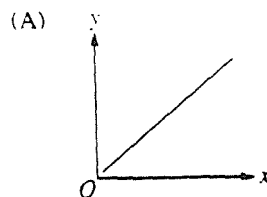
## CHEMISTRY TEST—Continued

Questions 20-22 refer to the following processes.

- (A) Precipitation
- (B) Oxidation-reduction
- (C) Distillation
- (D) Hydration
- (E) Condensation

- 20. Electrolysis of water to form hydrogen and oxygen gases
- 21. Reaction of silver ion with chloride ion in water solution
- 22. Reaction of iron filings with powdered sulfur

Questions 23-25



- 23. Could be a plot of the pressure of a gas ( $y$ ) against the volume ( $x$ ) for one mole of an ideal gas at fixed temperature
- 24. Could be a plot of the pressure of a gas ( $y$ ) against the absolute temperature ( $x$ ) for one mole of an ideal gas in a fixed volume
- 25. Could be the plot of the average molecular kinetic energy of molecules ( $y$ ) against the absolute temperature ( $x$ ) for one mole of an ideal gas

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# CHEMISTRY TEST—Continued

PLEASE GO TO THE SPECIAL SECTION AT THE LOWER LEFT-HAND CORNER OF PAGE 2 OF YOUR ANSWER SHEET LABELED CHEMISTRY AND ANSWER QUESTIONS 101-115 ACCORDING TO THE FOLLOWING DIRECTIONS.

## Part B

**Directions:** Each question below consists of two statements, I in the left-hand column and II in the right-hand column. For each question, determine whether statement I is true or false and whether statement II is true or false and fill in the corresponding T or F ovals on your answer sheet. Fill in oval CE only if statement II is a correct explanation of statement I.

### EXAMPLES:

<u>I</u>		<u>II</u>
EX 1. $\text{H}_2\text{SO}_4$ is a strong acid	BECAUSE	$\text{H}_2\text{SO}_4$ contains sulfur.
EX 2. An atom of oxygen is electrically neutral	BECAUSE	an oxygen atom contains an equal number of protons and electrons.

### SAMPLE ANSWERS

	I	II	CE*
EX 1	<input checked="" type="radio"/> F	<input checked="" type="radio"/> F	<input type="radio"/> O
EX 2	<input checked="" type="radio"/> F	<input checked="" type="radio"/> F	<input checked="" type="radio"/> T

- | <u>I</u>   |         | <u>II</u>   |
|--|---------|---|
| 101. The shape of a water molecule is linear   | BECAUSE | the bonds in a water molecule are nonpolar.   |
| 102. Some alpha particles shot at a thin metal foil are reflected back toward the source                         | BECAUSE | alpha particles shot at thin metal foil sometimes approach the nuclei of the metal atoms head-on and are thus repelled.     |
| 103. Potassium permanganate is a colored compound  | BECAUSE | both potassium and manganese are metals.  |
| 104. A molecule of silicon tetrachloride, $\text{SiCl}_4$ , is nonpolar  | BECAUSE | the four bonds in $\text{SiCl}_4$ are identical and the molecule has a tetrahedral structure.                               |
| 105. When solid $\text{KNO}_3$ dissolves in water, covalent bonds are broken                                     | BECAUSE | solid $\text{KNO}_3$ dissociates into $\text{K}^+$ and $\text{NO}_3^-$ ions in water.                                       |
| 106. An element that has the electron configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3 4s^2$ is a transition element | BECAUSE | in atoms of transition elements, the $1s$ , $2s$ , $2p$ , $3s$ and $3p$ orbitals are completely filled in the ground state. |
| 107. The reaction of hydrogen with oxygen to form water is an exothermic reaction                                | BECAUSE | water molecules have polar covalent bonds.  |

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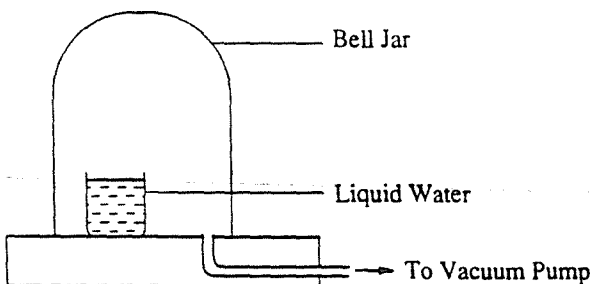
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# CHEMISTRY TEST—Continued

I

II

- |  |         |   |
|--|---------|---|
| 108. An element whose atoms have an outer electron configuration $3s^1$ shows metallic properties                        | BECAUSE | metallic elements readily gain electrons.   |
| 109. $H_2O$ and $H_2O_2$ have the same empirical formula   | BECAUSE | in $H_2O$ and $H_2O_2$ , oxygen has the same oxidation state.                                       |
| 110. A salt whose water solution has a pH of 5 is basic  | BECAUSE | a solution having a pH of 5 has a higher concentration of $H_3O^+$ ions than of $OH^-$ ions.        |
| 111. A buret is normally used in volumetric titrations   | BECAUSE | a buret can accurately measure the volumes of a solution delivered.                                 |
| 112. The combustion of fuels containing sulfur leads to the production of acid rain                                      | BECAUSE | sulfur oxides form acid solutions in water.   |
| 113. After a system has reached chemical equilibrium, there is no change in the concentrations of reactants and products | BECAUSE | reactions are not reversible at equilibrium.  |
| 114. At the same temperature and pressure, 1 liter of hydrogen gas and 1 liter of neon gas have the same mass            | BECAUSE | equal volumes of ideal gases at the same temperature and pressure contain the same number of moles. |



A container of water is placed inside an insulated bell jar as shown above. A vacuum pump lowers the pressure.

- |   |         |  |
|---|---------|--|
| 115. When the pressure drops sufficiently, the water starts to boil | BECAUSE | at the boiling point, the vapor pressure of the water equals the pressure inside the bell jar. |
|---|---------|--|

RETURN TO THE SECTION OF YOUR ANSWER SHEET YOU STARTED FOR CHEMISTRY AND ANSWER QUESTIONS 26-70.

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# CHEMISTRY TEST—Continued

## Part C

**Directions:** Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case and then fill in the corresponding oval on the answer sheet.

26. A certain mass of carbon required 16 grams of oxygen to be converted into carbon monoxide, CO. If this same mass of carbon were to be converted into carbon dioxide, CO<sub>2</sub>, the mass of oxygen required would be

(A) 4.0 grams  
(B) 8.0 grams  
(C) 12 grams  
(D) 32 grams  
(E) indeterminable from the information given

27.  $\text{BCl}_3(g) + \dots \text{H}_2(g) \rightarrow \dots \text{HCl}(g) + \dots \text{B}(s)$

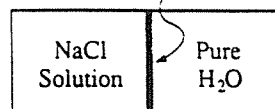
When the equation for the reaction represented above is balanced and all coefficients are reduced to lowest whole-number terms, the coefficient for HCl is

(A) 1 (B) 2 (C) 3 (D) 4 (E) 6

28. Petroleum is an important source for all of the following EXCEPT

(A) paraffin wax  
(B) octane  
(C) ethylene  
(D) cellulose  
(E) lubricating oils

Porous Membrane



29. As shown in the figure above, two compartments are separated by a porous membrane that is permeable to ionic salts. A sodium chloride solution is placed in one compartment while distilled water is placed in the other. Factors that influence the initial rate at which the water diffuses into the compartment containing the NaCl solution include which of the following?

I. Concentration of the sodium chloride solution  
II. Area of the porous membrane  
III. Temperature of the system

(A) I only  
(B) II only  
(C) I and III only  
(D) II and III only  
(E) I, II, and III

30.  $\dots \text{ClO}^- \rightleftharpoons \dots \text{ClO}_3^- + \dots \text{Cl}^-$

When the equation for the reaction represented above is balanced with coefficients reduced to the lowest whole-number terms, correct statements include which of the following?

I. The coefficient for Cl<sup>-</sup> is 4.  
II. The coefficient for ClO<sub>3</sub><sup>-</sup> is 2.  
III. The coefficient for ClO<sup>-</sup> is 3.

(A) I only  
(B) II only  
(C) III only  
(D) I and II only  
(E) I, II, and III

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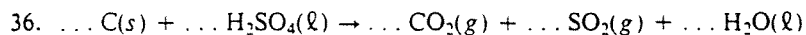
## CHEMISTRY TEST—Continued

31. A student adds 0.1-molar HCl to 0.1-molar KOH until the resulting solution is neutral. When this solution is evaporated to dryness, the substance that remains can be correctly described as which of the following?
- I. A white, crystalline solid
  - II. A covalent solid
  - III. A water-soluble salt
- (A) I only  
(B) II only  
(C) III only  
(D) I and III only  
(E) I, II, and III
32. How many milliliters of 0.200-molar sodium hydroxide must be added to a 100-milliliter solution of 0.100-molar nitric acid to obtain a solution with a pH of 7?
- (A) 10.0 mL  
(B) 25.0 mL  
(C) 50.0 mL  
(D) 100. mL  
(E) 200. mL
33. Which of the following statements about catalysts is true?
- (A) They increase the value of the equilibrium constant.
  - (B) They increase the amount of product present at equilibrium.
  - (C) They increase the concentration of reactants.
  - (D) They are permanently altered as the reaction proceeds.
  - (E) They reduce the activation energy of the reaction.
34. Complete combustion of hydrocarbons produces
- (A)  $C_2H_5OH$
  - (B)  $HC_2H_3O_2$
  - (C)  $H_2 + CH_3COOH$
  - (D)  $CO_2 + H_2O$
  - (E)  $CH_3CH_2CH_3 + CH_4$
35. The rate at which a solid dissolves in water is increased by which of the following?
- I. Increasing the surface area of the solid
  - II. Raising the temperature of the water
  - III. Stirring the mixture
- (A) I only  
(B) II only  
(C) I and II only  
(D) II and III only  
(E) I, II, and III

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## CHEMISTRY TEST—*Continued*



When the equation for the reaction represented above is balanced and the coefficients are reduced to the lowest whole-number terms, the coefficient for  $\text{SO}_2(g)$  is

- (A) 1   (B) 2   (C) 3   (D) 4   (E) 6

37. The ground state electron configuration of the silicon atom is characterized by which of the following?

- I. Partially filled  $3p$  orbitals
- II. The presence of unpaired electrons
- III. Six valence electrons

- (A) I only  
(B) II only  
(C) I and II only  
(D) I and III only  
(E) I, II, and III

38. Which of the following gases is LEAST dense when all are measured under the same conditions?

- (A)  $\text{CO}_2$    (B)  $\text{Cl}_2$    (C)  $\text{SO}_2$   
(D)  $\text{H}_2$    (E)  $\text{NO}$

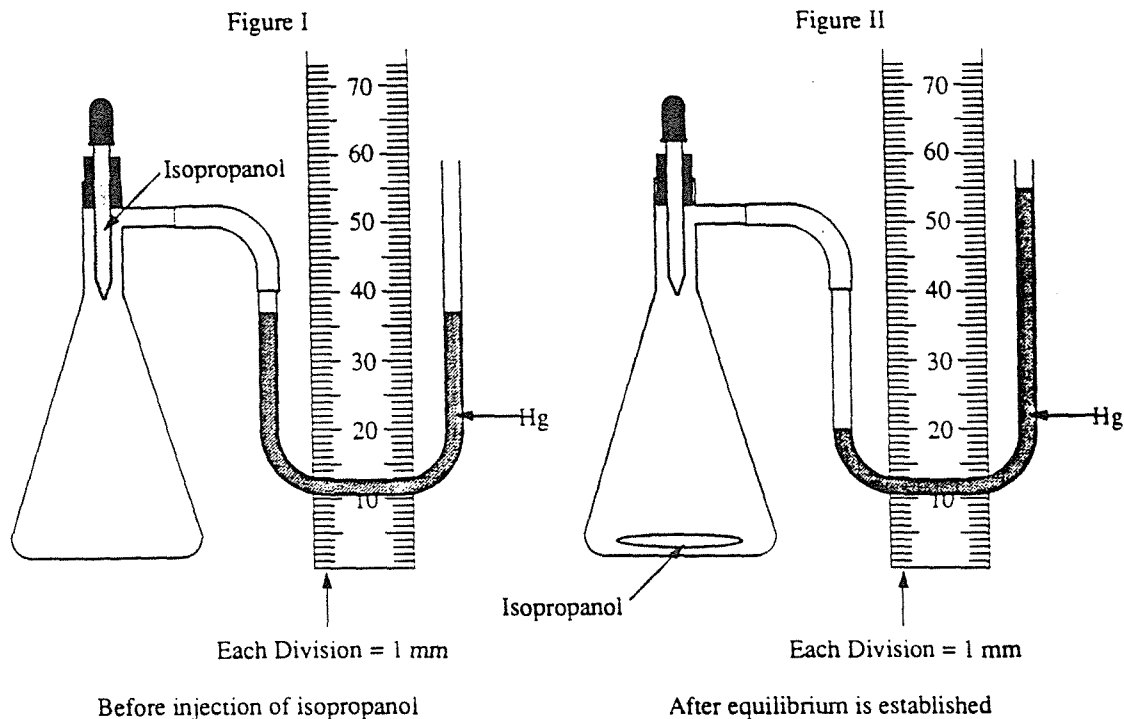
39. Which of the following best accounts for some of the nonideal behavior observed in real gases?

- (A) Some gaseous molecules are not spherical.
- (B) There are intermolecular attractive forces.
- (C) The temperature is not kept constant.
- (D)  $R$ , the gas constant, is not a true constant.
- (E) Experimental errors are made in the measurement of the pressure and the volume.

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## CHEMISTRY TEST—Continued

Questions 40-43 refer to the experiment shown below in which the vapor pressure of isopropanol was determined. Throughout the experiment, the temperature was held constant at 25°C, and the atmospheric pressure remained at 760 millimeters of Hg.



40. According to Figure I, the initial pressure inside the flask is
  - (A) near zero (vacuum)
  - (B) 27 mm Hg
  - (C) 760 mm Hg
  - (D)  $(760 - 27)$  mm Hg
  - (E)  $(760 + 27)$  mm Hg
41. According to Figure II, the vapor pressure of isopropanol at 25°C was determined to be
  - (A) 20 mm Hg
  - (B) 35 mm Hg
  - (C) 45 mm Hg
  - (D) 725 mm Hg
  - (E) 795 mm Hg
42. Which of the following is a possible source of error in the results of this experiment?
  - (A) Inaccurate weighing of the isopropanol
  - (B) The presence of bits of broken glass in the flask
  - (C) Failure to correct for humidity
  - (D) Misreading of the atmospheric pressure
  - (E) Leakage around the rubber stopper
43. Which of the following changes in the experiment would cause the Hg levels in the U-tube to vary from those shown in Figure II?
  - (A) Replacing the flask with one that has a round bottom
  - (B) Doubling the volume of liquid injected into the flask
  - (C) Increasing the temperature of the system to 30°C
  - (D) Replacing the air originally in the flask with helium gas at a pressure of 760 mm Hg
  - (E) Increasing the diameter of the U-tube

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## CHEMISTRY TEST—Continued

44. Filtration is a technique particularly suited to the separation of
- (A) two solids with different densities
  - (B) two liquids with different molar masses
  - (C) two liquids with different boiling points
  - (D) a solid and a liquid
  - (E) a gas and a liquid
45. In which of the following compounds does bromine have the highest positive oxidation state?
- (A) HBr
  - (B) BrF<sub>3</sub>
  - (C) BrO<sub>2</sub>
  - (D) NaBrO
  - (E) NaBrO<sub>3</sub>
46. What is the empirical formula of a compound that contains 0.025 mole of Cd, 0.050 mole of C, and 0.100 mole of O?
- (A) CdCO
  - (B) CdCO<sub>2</sub>
  - (C) CdCO<sub>3</sub>
  - (D) CdC<sub>2</sub>O<sub>2</sub>
  - (E) CdC<sub>2</sub>O<sub>4</sub>
47. The mass of  $6.02 \times 10^{23}$  molecules of a gas is 64.0 grams. What volume does 8.00 grams of the gas occupy at standard temperature and pressure?
- (A) 2.80 liters
  - (B) 8.00 liters
  - (C) 11.2 liters
  - (D) 22.4 liters
  - (E) 64.0 liters
48. Raising the temperature at which a chemical reaction proceeds may do all of the following EXCEPT
- (A) increase the molecular collision frequency
  - (B) increase the number of molecules with energy greater than the activation energy
  - (C) speed up the forward and reverse reactions
  - (D) decrease the randomness of the system
  - (E) change the relative concentrations of products to reactants that are present at equilibrium
49. To determine whether a water solution of Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> at room temperature is supersaturated, one can
- (A) heat the solution to its boiling point
  - (B) add water to the solution
  - (C) add a crystal of Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> to the solution
  - (D) acidify the solution
  - (E) cool the solution to its freezing point

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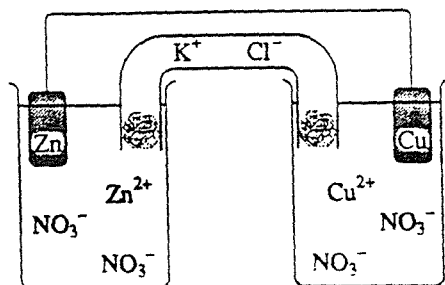
## CHEMISTRY TEST—Continued

### Questions 50-52

The following elements are listed in order of decreasing reactivity as they appear in the electrochemical series.

Ca, Na, Mg, Zn, Fe, H, Cu, Hg, Ag, Au

50. The element that is the best reducing agent is  
(A) Ca (B) Au (C) H (D) Fe (E) Cu
51. Of the following, the element that does NOT react with hydrochloric acid to produce hydrogen gas is  
(A) Zn (B) Fe (C) Hg (D) Ca (E) Mg



52. In the electrochemical cell shown above, which of the following half-reactions occurs at the anode?
- (A)  $\text{Cu}^{2+} + e \rightarrow \text{Cu}$   
 (B)  $\text{Zn}(s) \rightarrow \text{Zn}^{2+} + 2e$   
 (C)  $\text{Zn}^{2+} + 2e \rightarrow \text{Zn}(s)$   
 (D)  $\text{Cu}(s) \rightarrow \text{Cu}^{2+} + 2e$   
 (E)  $\text{Cu}^{2+} + 2e \rightarrow \text{Cu}(s)$

53. An atom contains 15 protons, 15 electrons, and 16 neutrons. Which of the following combinations of particles is an isotope of that atom?

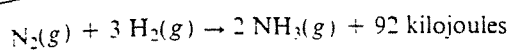
	Protons	Electrons	Neutrons
(A)	16	16	17
(B)	15	16	16
(C)	15	15	15
(D)	14	15	16
(E)	14	14	15

54. What is the percent composition by mass of aluminum in a compound of aluminum and oxygen if the mole ratio of Al:O is 2:3?
- (A) 37% Al  
 (B) 47% Al  
 (C) 53% Al  
 (D) 63% Al  
 (E) 74% Al
55. At constant temperature, the change of state of any substance from liquid to gas always includes which of the following?
- I. The breaking of covalent bonds  
 II. An increase in the randomness of the system  
 III. The absorption of energy
- (A) I only  
 (B) II only  
 (C) I and II only  
 (D) II and III only  
 (E) I, II, and III

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# CHEMISTRY TEST—Continued

## Questions 56-57



56. Ammonia is produced from nitrogen and hydrogen by the exothermic reaction represented above. When 4 moles of ammonia are produced by the reaction, which of the following occurs?

(A) 46 kilojoules are absorbed.  
 (B) 92 kilojoules are absorbed.  
 (C) 184 kilojoules are absorbed.  
 (D) 92 kilojoules are given off.  
 (E) 184 kilojoules are given off.

57. According to the equation above, what mass of nitrogen gas is required to produce 68 grams of ammonia?

(A) 112 grams  
 (B) 56 grams  
 (C) 44 grams  
 (D) 28 grams  
 (E) 14 grams

58. The electron dot structure for the hydronium ion is

(A)  $\text{H}^+$   
 (B)  $[\text{H}:\ddot{\text{O}}:]^-$   
 (C)  $[\text{H}:\ddot{\text{O}}:\text{H}]^+$   
 (D)  $[\text{H}:\ddot{\text{O}}:\text{H}]^+$   
 (E)  $[\text{H}:\ddot{\text{O}}:\text{H}]^+$

59. Which of the following does NOT react with a dilute  $\text{H}_2\text{SO}_4$  solution?

(A)  $\text{NaNO}_3$   
 (B)  $\text{Na}_2\text{S}$   
 (C)  $\text{Na}_3\text{PO}_4$   
 (D)  $\text{Na}_2\text{CO}_3$   
 (E)  $\text{NaOH}$

60.  $\dots \text{AlCl}_3(aq) + \dots \text{NH}_3(aq) + \dots \text{H}_2\text{O} \rightarrow$

Which of the following is one of the products obtained from the reaction above?

(A)  $\text{AlN}$   
 (B)  $\text{AlH}_3$   
 (C)  $\text{Al}$   
 (D)  $\text{Al}(\text{NO}_3)_3$   
 (E)  $\text{Al}(\text{OH})_3$

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## CHEMISTRY TEST—Continued

61. A 0.1-molar solution of which of the following compounds has the lowest hydrogen ion concentration?

(A) HCl  
 (B)  $\text{AlCl}_3$   
 (C)  $\text{NaHCO}_3$   
 (D) NaOH  
 (E)  $\text{HC}_2\text{H}_3\text{O}_2$  (acetic acid)

Mixture	Milliliters of 0.1 M $\text{Pb}(\text{NO}_3)_2$	Milliliters of 0.1 M NaI
I	2	7
II	3	6
III	4	5
IV	5	4
V	6	3

Which of the mixtures listed above yields the maximum amount of precipitated  $\text{PbI}_2$ ?

(A) I (B) II (C) III (D) IV (E) V

63. When  $\text{HS}^-$  acts as a Brønsted base, which of the following is formed?

(A)  $\text{S}^{2-}$   
 (B)  $\text{H}^-$   
 (C)  $\text{H}_2\text{S}$   
 (D)  $\text{H}_2\text{S}_2$   
 (E)  $\text{H}_3\text{S}^-$

64.  $2 \text{NO}(g) + \text{H}_2(g) \rightleftharpoons \text{N}_2\text{O}(g) + \text{H}_2\text{O}(g) + 351 \text{ kilojoules}$

If the total pressure on the system is increased when the reaction represented above is at equilibrium, which of the following occurs?

(A) The concentration of  $\text{H}_2\text{O}$  increases.  
 (B) The concentration of  $\text{N}_2\text{O}$  decreases.  
 (C) The rate of the reaction decreases.  
 (D) The temperature of the system decreases.  
 (E) The  $\text{H}_2$  gas condenses.

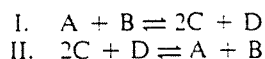
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## CHEMISTRY TEST—Continued

65. Neutralization of 500 milliliters of 2-molar NaOH requires the smallest volume of which of the following?

(A) 1 M  $\text{H}_2\text{SO}_4$   
 (B) 1 M  $\text{CH}_3\text{COOH}$   
 (C) 1 M  $\text{HCl}$   
 (D) 1 M  $\text{NH}_3$   
 (E) 0.1 M  $\text{H}_2\text{SO}_4$

66. Boron trifluoride,  $\text{BF}_3$ , is a nonpolar molecule, whereas ammonia,  $\text{NH}_3$ , is a polar molecule. The difference in polarities is related to the fact that
- (A)  $\text{BF}_3$  has no hydrogen bonding and  $\text{NH}_3$  does  
 (B)  $\text{BF}_3$  is triangular planar and  $\text{NH}_3$  is pyramidal  
 (C)  $\text{BF}_3$  is a Lewis base and  $\text{NH}_3$  is a Lewis acid  
 (D) the B-F bond is less polar than the N-H bond  
 (E) boron is more electronegative than nitrogen

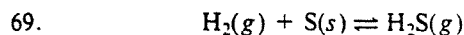


67. If the equilibrium constant for the reaction represented by equation I above is  $4.0 \times 10^{-2}$ , what is the value of the equilibrium constant for the reaction represented by equation II?

(A)  $16 \times 10^{-4}$   
 (B)  $4.0 \times 10^{-2}$   
 (C)  $\frac{1}{4.0}$   
 (D)  $\frac{1}{4.0 \times 10^{-2}}$   
 (E)  $4.0 \times 10^2$

68. A solution is made by adding 5.6 grams of KOH (molar mass 56 grams) to enough water to make 1.0 liter of solution. What is the approximate pH of the resulting solution?

(A) 1  
 (B) 3  
 (C) 7  
 (D) 9  
 (E) 13



What is the mass action expression (equilibrium constant expression) for the equilibrium mixture of solid sulfur, hydrogen gas, and hydrogen sulfide gas represented by the equation above?

(A)  $K = \frac{1}{[\text{H}_2]}$   
 (B)  $K = \frac{1}{[\text{H}_2\text{S}]}$   
 (C)  $K = \frac{[\text{H}_2\text{S}]}{[\text{H}_2]}$   
 (D)  $K = \frac{[\text{H}_2][\text{S}]}{[\text{H}_2\text{S}]}$   
 (E)  $K = \frac{[\text{H}_2\text{S}]}{[\text{H}_2][\text{S}]}$

70. A 1.0-liter sample of a 0.01-molar solution of  $\text{CaCl}_2$  contains a total of

(A) 0.04 mole of  $\text{Ca}^{2+}$   
 (B) 0.02 mole of  $\text{Ca}^{2+}$   
 (C) 0.01 mole of  $\text{Cl}_2$   
 (D) 0.01 mole of  $\text{Cl}^-$   
 (E) 0.02 mole of  $\text{Cl}^-$

## STOP

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS TEST ONLY.  
 DO NOT TURN TO ANY OTHER TEST IN THIS BOOK.

TABLE A

Answers to the SAT II: Chemistry Subject Test, Form 3PAC7 reformatted, and  
Percentage of Students Answering Each Question Correctly

Question Number	Correct Answer	Right	Wrong	Percentage of Students Answering the Question Correctly*	Question Number	Correct Answer	Right	Wrong	Percentage of Students Answering the Question Correctly*
1	B			88	33	E			73
2	C			82	34	D			69
3	D			78	35	E			66
4	C			66	36	B			67
5	A			45	37	C			52
6	E			88	38	D			75
7	B			41	39	B			58
8	C			35	40	C			56
9	D			39	41	B			24
10	A			90	42	E			54
11	B			79	43	C			55
12	C			64	44	D			83
13	A			85	45	E			52
14	E			84	46	E			76
15	E			55	47	A			52
16	C			62	48	D			55
17	E			84	49	C			63
18	D			89	50	A			47
19	B			71	51	C			56
20	B			40	52	B			28
21	A			53	53	C			64
22	B			51	54	C			42
23	B			38	55	D			45
24	A			59	56	E			64
25	A			44	57	B			45
26	D			78	58	C			56
27	E			87	59	A			16
28	D			66	60	E			41
29	E			51	61	D			35
30	C			75	62	B			36
31	D			54	63	C			50
32	C			55	64	A			44

Table A continued on next page



Table A continued from previous page

Question Number	Correct Answer	Right	Wrong	Percentage of Students Answering the Question Correctly*	Question Number	Correct Answer	Right	Wrong	Percentage of Students Answering the Question Correctly*
65	A			27	106	T,T			30
66	B			45	107	T,T			32
67	D			54	108	T,F			48
68	E			34	109	F,F			61
69	C			44	110	F,T			60
70	E			49	111	T,T,CE			73
101	F,F			63	112	T,T,CE			70
102	T,T,CE			74	113	T,F			65
103	T,T			48	114	F,T			53
104	T,T,CE			63	115	T,T,CE			54
105	F,T			48					

\*These percentages are based on an analysis of the answer sheets for a random sample of 2,382 students who took this form of the test in May 1994 and whose mean score was 598. They may be used as an indication of the relative difficulty of a particular question. Each percentage may also be used to predict the likelihood that a typical SAT II: Chemistry Subject Test candidate will answer correctly that question on this edition of this test.

TABLE B

**Scaled Score Conversion Table**  
**Chemistry Subject Test (Form 3PAC7)**

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
85	800	49	640	13	440
84	800	48	640	12	440
83	800	47	630	11	430
82	800	46	620	10	430
81	800	45	620	9	420
80	800	44	610	8	420
79	800	43	610	7	410
78	800	42	600	6	410
77	790	41	600	5	400
76	790	40	590	4	390
75	780	39	590	3	390
74	780	38	580	2	380
73	770	37	580	1	380
72	770	36	570	0	370
71	760	35	560	-1	370
70	760	34	560	-2	360
69	750	33	550	-3	360
68	750	32	550	-4	350
67	740	31	540	-5	340
66	730	30	540	-6	340
65	730	29	530	-7	330
64	720	28	530	-8	330
63	720	27	520	-9	320
62	710	26	510	-10	320
61	710	25	510	-11	310
60	700	24	500	-12	310
59	700	23	500	-13	300
58	690	22	490	-14	300
57	690	21	490	-15	290
56	680	20	480	-16	280
55	670	19	480	-17	280
54	670	18	470	-18	270
53	660	17	470	-19	270
52	660	16	460	-20	260
51	650	15	450	-21	260
50	650	14	450		

# Correct Answers

1988

**TABLE A**  
Answers to Chemistry Achievement Test, Form 3KAC2,  
and Percentage of Students Answering Each Question Correctly

Question Number	Correct Answer	Right	Wrong	Percentage of Students Answering the Question Correctly	Question Number	Correct Answer	Right	Wrong	Percentage of Students Answering the Question Correctly
1	D			76%	46	B			53%
2	C			67	47	B			80
3	A			78	48	A			45
4	B			89	49	D			28
5	E			75	50	B			66
6	E			75	51	B			40
7	C			54	52	D			45
8	C			48	53	E			51
9	C			72	54	E			47
10	A			74	55	E			60
11	C			64	56	D			69
12	E			71	57	C			53
13	C			38	58	A			58
14	B			50	59	B			74
15	E			71	60	B			39
16	A			55	61	D			68
17	B			56	62	E			39
18	A			43	63	A			45
19	D			82	64	A			51
20	D			32	65	E			74
21	A			73	66	D			22
22	B			54	67	C			36
23	E			46	68	D			41
24	B			71	69	D			38
25	A			46	70	C			48
26	D			44	71	E			49
27	A			58	72	E			37
28	A			56	73	E			24
29	A			47	74	B			29
30	C			54	75	C			30
31	C			43	76	D			47
32	A			53	77	B			31
33	D			41	78	B			31
34	B			43	79	E			47
35	D			28	80	B			32
36	B			65	81	D			21
37	A			53	82	C			43
38	E			42	83	D			16
39	D			43	84	D			29
40	B			57	85	B			18
41	A			64					
42	B			69					
43	B			79					
44	E			75					
45	B			48					

Note: The percentages are based on the analysis of the answer sheets for a random sample of students who took this test in January 1988 and whose mean score was 546.

## How to Score the Chemistry Achievement Test

When you take the Chemistry Achievement Test, your answer sheet will be "read" by a scanning machine that will record your responses to each question. Then a computer will compare your answers with the correct answers and produce your raw score. You get one point for each correct answer. For each wrong answer, one-fourth of a point is

subtracted to correct for random guessing. Questions you omit are not counted. Your raw score is converted to a College Board scaled score that is reported to you and to the colleges you specify. After you have taken the practice test, you can get an idea of what your score might be by following the instructions in the next two sections.

### Determining Your Raw Score

<p><b>Step 1:</b> Table A on the next page lists the correct answers for all the questions on the test.* Compare your answer with the correct answer and</p> <ul style="list-style-type: none"><li>• Put a check in the column marked "Right" if your answer is correct.</li><li>• Put a check in the column marked "Wrong" if your answer is incorrect.</li><li>• Leave both columns blank if you omitted the question.</li></ul>
<p><b>Step 2:</b> Count the number of right answers and enter the number here ..... _____</p>
<p><b>Step 3:</b> Count the number of wrong answers and enter</p> <p>the number here ..... 4) _____</p> <p>Enter the result of dividing by 4 here. .... _____</p>
<p><b>Step 4:</b> Subtract the number you obtained in Step 3 from the number in Step 2; round the result to the nearest whole number (for example, any number from 44.50 to 45.49 rounds to 45) and enter here ..... _____</p>
<p>The number you obtained in Step 4 is your raw score. Instructions for converting your raw score to a scaled score are given on page 85.</p>

\*The last column in Table A gives the percentage of students who took the test in January 1988 that answered the question correctly. (See page 86 for further explanation.)