SAT Chemistry Practice Test 17

SAT Chemistry Practice Test 2: Part B

1. What is the oxidation state of bromine in $HBrO_3$?

A. –3

B. –1

C. 1

D. 3

E. 5

2. What is the percent by mass of silicon in a sample of silicon dioxide?

A. 21%

B. 33%

C. 47%

D. 54%

E. 78%

3. How many electrons does a ^{37}Cl ion with a charge of –1 contain?

A. 16

B. 17

C. 18

D. 37

E. 38

4. $CH_4(g) + 2\ O_2(g) \rightarrow CO_2(g) + 2\ H_2O(g) + 800\ kJ$

If 1 mole of $O_2(g)$ is consumed in the reaction given above, how much energy is produced?

A. 200 kJ

B. 400 kJ

C. 800 kJ

D. 1,200 kJ

E. 1,600 kJ

5. Which of the following is NOT true of the element sodium?

A. It takes the oxidation state +1.

B. It reacts with water to form a basic solution.

C. It forms metallic bonds in its solid uncombined form.

D. It is found in nature as a diatomic gas.

E. It reacts with a halogen to form an ionic salt.

6. What volume of a 0.200-molar solution of sodium hydroxide is required to neutralize 40 liters of a 0.300-molar hydrochloric acid solution?

A. 10 liters

B. 20 liters

C. 40 liters

D. 60 liters

E. 120 liters

7. $...PH_3 + ...O_2 \rightarrow ...P_2O_5 + ...H_2O$
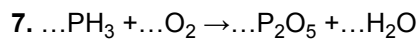
When the equation above is balanced and the coefficients are reduced to the lowest whole numbers, the coefficient for H_2O is
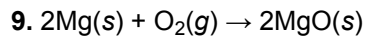
A. 1

B. 2

C. 3

D. 4

E. 5

8. $H_2SO_4(aq) + Ba(OH)_2(aq) \rightarrow$
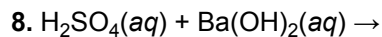
Which of the following are products of the reaction shown above?

I. $O_2(g)$

II. $H_2O(l)$

III. $BaSO_4(s)$

A. I only

B. III only

C. I and II only

D. I and III only

E. II and III only

9. $2Mg(s) + O_2(g) \rightarrow 2MgO(s)$

If 48.6 grams of magnesium are placed in a container with 64 grams of oxygen gas and the reaction above proceeds to completion, what is the mass of $MgO(s)$ produced?

A. 15.4 grams

B. 32.0 grams

C. 80.6 grams

D. 96.3 grams

E. 112 grams

10. An ideal gas in a closed inflexible container has a pressure of 6 atmospheres and a temperature of 27°C. What will be the new pressure of the gas if the temperature is decreased to –73°C?

A. 2 atm

B. 3 atm

C. 4 atm

D. 8 atm

E. 9 atm

11. Equal molar quantities of hydrogen gas and oxygen gas are present in a closed container at a constant temperature. Which of the following quantities will be the same for the two gases?

I. Partial pressure

II. Average kinetic energy

III. Average molecular velocity

A. I only

B. I and II only

C. I and III only

D. II and III only

E. I, II, and III
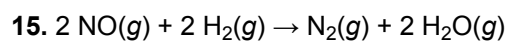
12. Which of the following is a nonpolar molecule?

A. CO_2

B. H_2O

C. NH_3

D. NO

E. HI

13. What is the molar concentration of a 500-milliliter solution that contains 20 grams of $CaBr_2$ (formula weight = 200)?

A. 0.1 molar

B. 0.2 molar

C. 0.5 molar

D. 1 molar

E. 5 molar

14. The structure of $BeCl_2$ can best be described as

A. linear

B. bent

C. trigonal

D. tetrahedral

E. square

**15.** $2\ NO(g) + 2\ H_2(g) \rightarrow N_2(g) + 2\ H_2O(g)$

Which of the following statements is true regarding the reaction given above?

A. If 1 mole of H_2 is consumed, 0.5 mole of N_2 is produced.

B. If 1 mole of H_2 is consumed, 0.5 mole of H_2O is produced.

C. If 0.5 mole of H_2 is consumed, 1 mole of N_2 is produced.

D. If 0.5 mole of H_2 is consumed, 1 mole of NO is consumed.

E. If 0.5 mole of H_2 is consumed, 1 mole of H_2O is produced.

16. …$Cu(s)$ +…$NO_3^-(aq)$ +…$H^+(aq)$ →…$Cu^{2+}(aq)$ +…$NO_2(g)$ +…$H_2O(l)$
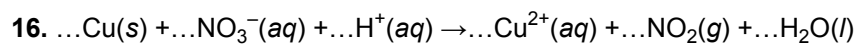
When the equation above is balanced with lowest whole number coefficients, the coefficient for $H^+(aq)$ will be

A. 1

B. 2

C. 3

D. 4

E. 5

17. …$Cu(s)$ +…$NO_3^-(aq)$ +…$H^+(aq)$ →…$Cu^{2+}(aq)$ +…$NO_2(g)$ +…$H_2O(l)$
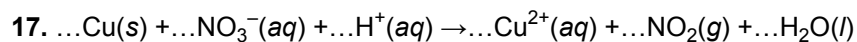
Which of the following takes place during the reaction above?

A. $Cu(s)$ is oxidized.

B. $Cu(s)$ is reduced.

C. $H^+(aq)$ is oxidized.

D. $H^+(aq)$ is reduced.

E. $NO_3^-(aq)$ is oxidized.

18. Which of the following could be the molecular formula for a molecule with an empirical formula of CH_2?

A. CH

B. CH_4

C. C_2H_2

D. C_2H_6

E. C_3H_6

19. When CO_2 is bubbled through distilled water at 25°C, which of the following is most likely to occur?

A. Solid carbon will precipitate.

B. An electrical current will be produced in an oxidation-reduction reaction.

C. The pH of the solution will be reduced.

D. The water will boil.

E. Methane (CH_4) gas will be formed.

20. In which of the following processes is entropy increasing?

A. $N_2(g)$ + 3 $Cl_2(g)$ → 2 $NCl_3(g)$
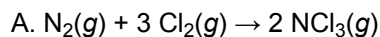
B. $H_2O(g) \rightarrow H_2O(l)$

C. $2\ H_2O(l) \rightarrow 2\ H_2(g) + O_2(g)$

D. $CO(g) + 2\ H_2(g) \rightarrow CH_3OH(l)$

E. $2\ NO_2(g) \rightarrow N_2O_4(g)$
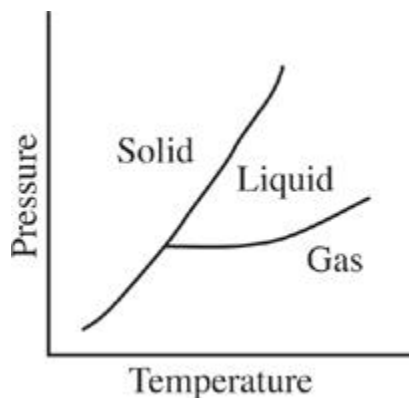
21. Based on the phase diagram above, which series of phase changes could take place as pressure is decreased at a constant temperature?

A. Solid to liquid to gas

B. Solid to gas to liquid

C. Gas to liquid to solid

D. Gas to solid to liquid

E. Liquid to gas to solid

22. Which of the following forms of radioactive decay has (have) no electrical charge?

I. Alpha decay

II. Beta decay

III. Gamma decay

A. II only

B. III only

C. I and II only

D. I and III only

E. II and III only

23. Based on the solubility products given below, which of the following salts is the most soluble?

A. $BaCO_3$ K_{sp} = 5.1 × 10^{-9}

B. $PbCrO_4$ K_{sp} = 2.8 × 10^{-13}

C. $AgCl$ K_{sp} = 1.8 × 10^{-10}

D. $CaSO_4$ K_{sp} = 9.1 × 10^{-6}

E. ZnC_2O_4 K_{sp} = 2.7 × 10^{-8}