SAT Chemistry Practice Paper 8

SET 1

Is measured in units of atmospheres or millimeters of mercury

A. Molarity

B. Molality

C. Mole fraction

D. Density

E. Partial pressure

2. Is measured in units of moles/kilogram

A. Molarity

B. Molality

C. Mole fraction

D. Density

E. Partial pressure

3. Is a measure of mass per unit volume

A. Molarity

B. Molality

C. Mole fraction

D. Density

E. Partial pressure

4. Is the quantity used in the calculation of boiling point elevation

A. Molarity

B. Molality

C. Mole fraction

D. Density

E. Partial pressure

5. Chiefly responsible for the relatively high boiling point of water

A. Hydrogen bonding

B. Ionic bonding

C. Network bonding

D. London dispersion force

E. Metallic bonding

6. Is present in liquid oxygen

A. Hydrogen bonding

B. Ionic bonding

C. Network bonding

D. London dispersion force

E. Metallic bonding

7. Is primarily responsible for the hardness of diamond

A. Hydrogen bonding

B. Ionic bonding

C. Network bonding

D. London dispersion force

E. Metallic bonding

8. Allows copper to conduct electricity

A. Hydrogen bonding

B. Ionic bonding

C. Network bonding

D. London dispersion force

E. Metallic bonding

9. Is present in solid KCl

A. Hydrogen bonding

B. Ionic bonding

C. Network bonding

D. London dispersion force

E. Metallic bonding

10. Has 7 valence electrons

A. Na^+

B. Al

C. F

D. Ti

E. Br^-

11. Has the electron configuration $1s^22s^22p^63s^23p^1$

A. Na^+

B. Al

C. F

D. Ti

E. Br^-

12. Has the same electron configuration as a neon atom

A. Na^+

B. Al

C. F

D. Ti

E. Br^-

13. Has valence electrons in d orbitals

A. Na^+

B. Al

C. F

D. Ti

E. Br^-

14. Will be colored blue

A. A 0.01-molar solution of HNO_3

B. A 0.01-molar solution of $HC_2H_3O_2$

C. A 0.01-molar solution of $Cu(NO_3)_2$

D. A 0.01-molar solution of $NaNO_3$

E. A 0.01-molar solution of NaOH

15. Will have a pH of 2

A. A 0.01-molar solution of HNO_3

B. A 0.01-molar solution of $HC_2H_3O_2$

C. A 0.01-molar solution of $Cu(NO_3)_2$

D. A 0.01-molar solution of $NaNO_3$

E. A 0.01-molar solution of NaOH

16. Will have the lowest freezing point

A. A 0.01-molar solution of HNO_3

B. A 0.01-molar solution of $HC_2H_3O_2$

C. A 0.01-molar solution of $Cu(NO_3)_2$

D. A 0.01-molar solution of $NaNO_3$

E. A 0.01-molar solution of NaOH

17. Will contain undissociated aqueous particles

A. A 0.01-molar solution of HNO_3

B. A 0.01-molar solution of $HC_2H_3O_2$

C. A 0.01-molar solution of $Cu(NO_3)_2$

D. A 0.01-molar solution of $NaNO_3$

E. A 0.01-molar solution of NaOH

18. Is the amount of energy that must be added to raise the temperature of 1 gram of a substance 1°C

A. Enthalpy change

B. Entropy change

C. Gibbs free energy change

D. Activation energy

E. Specific heat capacity

19. Its value indicates the spontaneity of a reaction

A. Enthalpy change

B. Entropy change

C. Gibbs free energy change

D. Activation energy

E. Specific heat capacity

20. Its value indicates whether a reaction is endothermic or exothermic

A. Enthalpy change

B. Entropy change

C. Gibbs free energy change

D. Activation energy

E. Specific heat capacity

21. Is the measure of the pull of the nucleus of an atom on the electrons of other atoms bonded to it

A. Ionization energy

B. Electronegativity

C. Atomic radius

D. Atomic number

E. Mass number

22. Is the energy required to remove an electron from an atom

A. Ionization energy

B. Electronegativity

C. Atomic radius

D. Atomic number

E. Mass number

23. Is equal to the number of protons in an atom

A. Ionization energy

B. Electronegativity

C. Atomic radius

D. Atomic number

E. Mass number

SET 2

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%

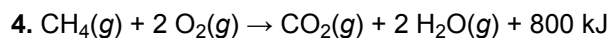**3.** How many electrons does a ^{37}Cl ion with a charge of –1 contain?

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 →...P_2O_5 +...H_2O
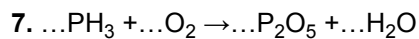
When the equation above is balanced and the coefficients are reduced to the lowest whole numbers, the coefficient for H_2O is

A. 1

B. 2

C. 3

D. 4

E. 5

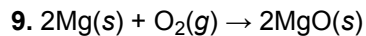**8.** $H_2SO_4(aq)$ + $Ba(OH)_2(aq)$ →
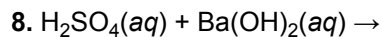
Which of the following are products of the reaction shown above?

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
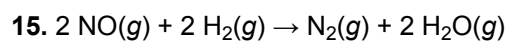
12. Which of the following is a nonpolar molecule?

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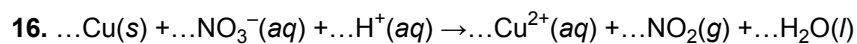
When the equation above is balanced with lowest whole number coefficients, the coefficient for $H^+(aq)$ will be

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)
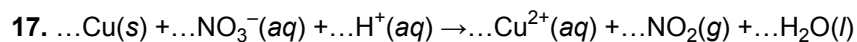
Which of the following takes place during the reaction above?

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?

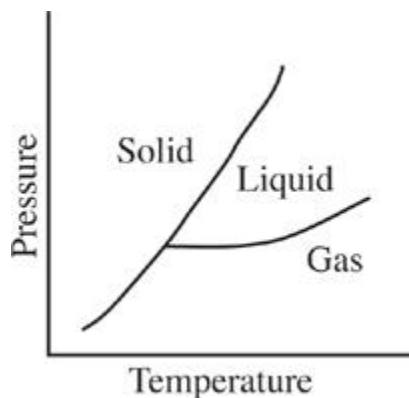A. CH

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)
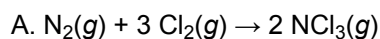
B. $H_2O(g) \rightarrow H_2O(l)$

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. $2 NO_2(g) \rightarrow N_2O_4(g)$

Pressure (y-axis), Temperature (x-axis); regions labeled Solid, Liquid, Gas

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. $BaCO_3$ $K_{sp} = 5.1 \times 10^{-9}$

B. $PbCrO_4$ $K_{sp} = 2.8 \times 10^{-13}$

C. $AgCl$ $K_{sp} = 1.8 \times 10^{-10}$

D. $CaSO_4$ $K_{sp} = 9.1 \times 10^{-6}$

E. ZnC_2O_4 $K_{sp} = 2.7 \times 10^{-8}$