REVISION

CHEMISTRY

grade 10 term 2,3

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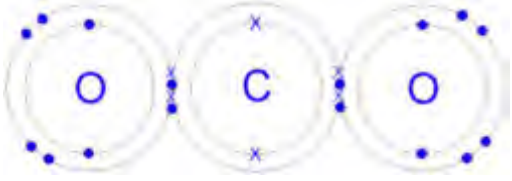
1) **The picture shows how two oxygen atoms covalently bond with one carbon atom to form carbon dioxide. How many electron pairs are shared?**

- ☐ Five electron pairs
- ☐ Four electron pairs
- ☐ One electron pair
- ☐ Two electron pairs



2) **Which 2 statements describe why covalent bonding occurs?**

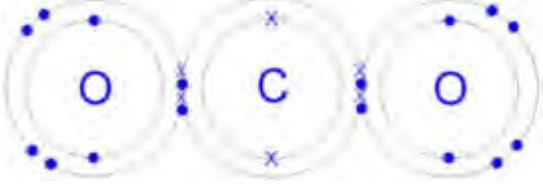
- ☐ Because atoms are always trying to get a full inner electron shell
- ☐ Because atoms are always trying to get a full middle electron shell
- ☐ Because atoms are always trying to get a full outer electron shell
- ☐ So, the atoms become stable

3) **The picture shows the electron arrangement of a chlorine atom. Two chlorine atoms can covalently bond together to form Cl_2. Why?**

- ☐ Both atoms have 5 outer electrons so if they share three pair of electrons, they will both have a complete outer electron shell
- ☐ Both atoms have 6 outer electrons so if they share two pair of electrons they will both have a complete outer electron shell
- ☐ Both atoms have 7 outer electrons so if they share one pair of electrons, they will both have a complete outer electron shell
- ☐ Both atoms have 7 outer electrons so if they share two pair of electrons, they will both have a complete outer electron shell

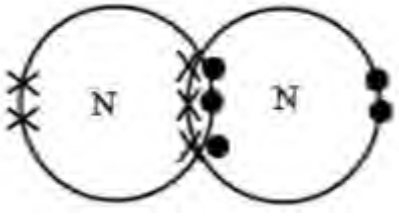
4) **The picture shows how two oxygen atoms covalently bond with one carbon atom to form carbon dioxide. How many covalent bonds are there in total?**

- ☐ Eight covalent bonds
- ☐ Four covalent bonds
- ☐ One covalent bond
- ☐ Three covalent bonds
- ☐ Two covalent bonds

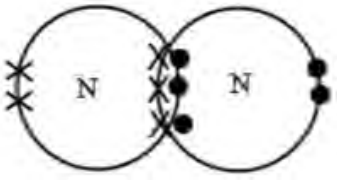


5) **The picture shows how two nitrogen atoms can be covalently bonded together to form N_2. How many covalent bonds are there?**

- ☐ Four covalent bonds
- ☐ One covalent bond
- ☐ Six covalent bonds
- ☐ Three covalent bonds
- ☐ Two covalent bonds



6) The picture shows how two nitrogen atoms can be covalently bonded together to form N_2. How many pairs of electrons are shared?



- ☐ One pair of electrons
- ☐ Six pairs of electrons
- ☐ Three pairs of electrons
- ☐ Two pairs of electrons

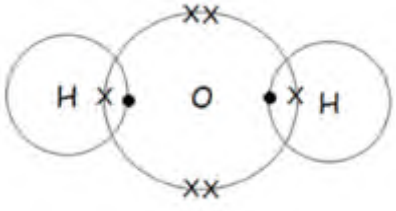
7) Which statement best describes what happens between atoms in a covalent bond?

- ☐ A pair of electrons are shared
- ☐ A pair of electrons are transferred
- ☐ A sea of free electrons is formed around the positive ions
- ☐ Electrons are shared
- ☐ Electrons are transferred

8) Covalent bonding occurs between...

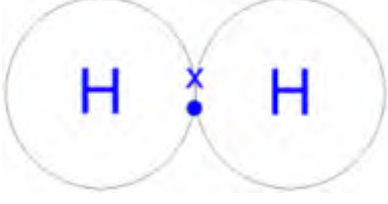
- ☐ metal and non-metal atoms
- ☐ metal atoms
- ☐ non-metal atoms

9) The picture shows how two hydrogen atoms covalently bond with one oxygen atom to form water. How many covalent bonds are there?



- ☐ Four
- ☐ One
- ☐ Three
- ☐ Two

10) The picture shows how two hydrogen atoms can form a covalent bond together. Why do they form a covalent bond?



- ☐ Because both atoms have one outer electron and want to gain 7 electrons to have a full outer electron shell
- ☐ Because both atoms have one outer electron so they both share one electron to gain a full outer electron shell
- ☐ Because one hydrogen atom has two outer electrons and the other atom has zero outer electrons so one electron is transferred so both atoms gain a full outer electron shell

11) Which statement best describes a covalent bond?

- ☐ A The electrostatic force of attraction between positive metal ions and a sea of free electrons
- ☐ B When atoms share a pair of electrons
- ☐ C When atoms share electrons
- ☐ D When electrons are transferred from one atom to another to form ions
- ☐ E When one atom gains electrons and another atom loses electrons

12) As compare to ionic compounds, covalent bond has

- ☐ high melting but low boiling point
- ☐ low melting but high boiling point
- ☐ low melting and boiling point
- ☐ high melting and boiling point

13) Large molecules such as polythene and polystyrene contains

- ☐ ionic bonding
- ☐ metallic bonding
- ☐ covalent bonding
- ☐ dative bonding

14) The bond which comes to existence due to sharing of electrons is known as

- ☐ ionic bonding
- ☐ covalent bonding
- ☐ metallic bonding
- ☐ dative bonding

15) Most of the covalent compounds are found in

- ☐ solid state
- ☐ gaseous state
- ☐ liquid state
- ☐ both in liquid and gaseous state

16) If no loss or gain of electrons occur by mixing of two atoms, we say that they may be attached to each other due to

- ☐ proton attraction
- ☐ neutron attraction
- ☐ sharing of electrons
- ☐ opposite charges

17) Double covalent bond refers to the sharing of

- ☐ one electron
- ☐ two electrons
- ☐ three electrons
- ☐ four electrons

18) Double covalent bond refers to the sharing of

- ☐ one electron
- ☐ one pair of electron
- ☐ three electrons
- ☐ two pairs of electron

19) Common covalent bonds include

- ☐ MgO
- ☐ KF
- ☐ LiCl
- ☐ CH_4

20) Formation of Cl_2 requires sharing of

- ☐ one electron
- ☐ one pair of electrons
- ☐ three electrons
- ☐ two pairs of electrons

21) In Oxygen molecule (O_2), stability is gained through sharing of

- ☐ one electron
- ☐ two electrons
- ☐ three electrons
- ☐ four electrons

22) The bond created by overlapping of one modified orbit on another orbit is known as

- ☐ Sigma bond (σ-bond
- ☐ Pi bond (π-bond
- ☐ Covalent bond
- ☐ Dative bond

23) When a single atom provides both electrons which are needed for completion of covalent bond lead to

- ☐ ionic bond
- ☐ covalent bond
- ☐ co-ordinate bond
- ☐ dative bond

24) A covalently bond molecule's shape and bond angles rely on

- ☐ number of pair of electrons
- ☐ number of lone pair
- ☐ number of proton pairs
- ☐ both A and B

25) Dative covalent bond is found in

- ☐ ammonia
- ☐ ammonium ion
- ☐ urea
- ☐ nitrogen

26) In a molecule of chlorine trifluoride, ClF_3 the bond angle is

- ☐ 87.5°
- ☐ 107.5°
- ☐ 78.5°
- ☐ 107.5°

27) When two atoms of nitrogen bond, how many pairs of electrons will be shared between them?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

28) When two atoms of fluorine bond, how many electrons will be shared between them?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

29) When an atom of H and an atom of F bond together:

- ☐ The H will be partially positive, because it has higher electronegativity than F.
- ☐ The H will be partially negative, because it has higher electronegativity than F.
- ☐ The F will be partially positive, because it has higher electronegativity than H.
- ☐ The F will be partially negative, because it has higher electronegativity than H.

30) Which of the molecules listed below has the most polar bond between the bonded atoms, in terms of greatest END?

- ☐ HF
- ☐ HCl
- ☐ HBr
- ☐ HI

31) Which of the following compounds is formed by covalent bonding?

- ☐ Na_2S
- ☐ $AlCl_3$
- ☐ $C_6H1_2O_6$
- ☐ LiH

32) Which of the following molecules contains a nonpolar covalent bond?

- ☐ H_2O
- ☐ HF
- ☐ F_2
- ☐ NH_3

33) Which of the following molecules contains a polar covalent bond?

- ☐ H_2
- ☐ PH_3
- ☐ F_2
- ☐ NH_3

34) Which of the following molecules is polar?

- ☐ F_2
- ☐ NH_3
- ☐ O_2
- ☐ Cl_2

35) Which of the following molecules has the strongest hydrogen-bond attractions?

- ☐ HF
- ☐ HCl
- ☐ HBr
- ☐ HI

36) Which of the following nonpolar molecules has the highest boiling point?

- ☐ CH_4
- ☐ $C2H_6$
- ☐ C_3H_8
- ☐ C_4H_{10}

37) Which of the following molecules is a liquid at STP?

- ☐ N_2
- ☐ H_2
- ☐ Br_2
- ☐ I_2

38) Which of the following molecules is bent?

- ☐ N_2
- ☐ H_2O
- ☐ NH_3
- ☐ CCl_4

39) Which of the following molecules is pyramidal?

- ☐ N_2
- ☐ H_2O
- ☐ NH_3
- ☐ CCl_4

40) Which of the following molecules is tetrahedral?

- ☐ N_2
- ☐ H_2O
- ☐ NH_3
- ☐ CCl_4

41) Which of the following substances is molecular?

- ☐ NaCl
- ☐ CO_2
- ☐ K_2O
- ☐ C

42) What is a chemical bond that involves sharing a pair of electrons between atoms in a molecule?

- ☐ A covalent bond
- ☐ An ionic bond

43) Covalent chemical bonds where two lobes of one involved electron orbital overlap two lobes of the other is a

- ☐ Ionic bond
- ☐ Covalent bond
- ☐ Sigma bond
- ☐ Pi bond

44) A chemical bond in which one atom loses an electron to form a positive ion and the other atom gains an electron to form a negative ion is a (an)

- ☐ Ionic bond
- ☐ Covalent bond

45) A positively charged ion

- ☐ Anion
- ☐ Cation

46) A negatively charged ion

- ☐ A cation
- ☐ An anion

47) Bonding occurs because of the attractions of

- ☐ Ions
- ☐ Neutrons
- ☐ Electrons
- ☐ Protons

48) A bond in which a single pair electron is shared between a pair of atoms is

- ☐ A single bond
- ☐ Double bond
- ☐ Triple bond
- ☐ Ionic bond

49) A bond in which two pairs of electrons are shared between two atoms.

- ☐ Triple bond
- ☐ Double bound
- ☐ Single bond
- ☐ Ionic bond

50) Which one of the following statements concerning the length of carbon-carbon single, double, and triple covalent bonds is true?

- ☐ The carbon-carbon single bond is shorter than either the carbon-carbon double or triple bond.
- ☐ The carbon-carbon double bond is shorter than either the carbon-carbon single or triple bond.
- ☐ The carbon-carbon triple bond is shorter than either the carbon-carbon single or double bond.
- ☐ The carbon-carbon single, double, and triple bonds all have the same length.

51) Which one of the following is the correct bond angle between atoms adopting a trigonal planar geometry?

- ☐ 180°
- ☐ 109.5°
- ☐ 90°
- ☐ 120°

52) The atoms in a molecule of water adopt what kind of geometry?

- ☐ Linear
- ☐ Tetrahedral
- ☐ Octahedral
- ☐ Trigonal planar

53) Ammonia, NH_3, adopts a tetrahedral geometry. However, the non-bonding pair on the central nitrogen atom distorts the bond angle away from the expected 109.5°. Which of the following statements correctly describes how the bond angle is distorted?

- ☐ The actual bond angle is reduced: it is less than 109.5°
- ☐ The actual bond angle is increased: it is more than 109.5°

54) About which of the bonds along the backbone of a polypeptide is rotation not possible?

- ☐ 1
- ☐ 2
- ☐ 3

55) sp^3 hybridization involves the hybridization of how many atomic orbitals?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

56) Four sp^3 hybrid orbitals adopt what kind of geometry?

- ☐ Linear
- ☐ Trigonal planar
- ☐ Octahedral
- ☐ Tetrahedral

57) When applying VSEPR theory to predict molecular shape, which of the following do we not need to take into account?

- ☐ Valence electrons occupying sigma bonding orbitals
- ☐ Valence electrons occupying pi bonding orbitals
- ☐ Valence electrons occupying non-bonding orbitals

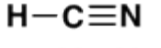
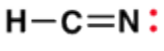
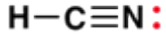
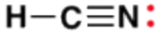
58) Which of the following statements regarding the measurement of the atomic radius are correct? Please select all that apply.

- ☐ The atomic radius is measured between atoms of different elements
- ☐ The atomic radius is measured between atoms of the same element
- ☐ The atomic radius is half the distance between the nuclei of two joined atoms
- ☐ The atomic radius is the distance between the nuclei of two joined atoms
- ☐ The atomic radius is only measured between two covalently-bonded atoms
- ☐ The atomic radius can be measured between both covalently- and ionically-bonded atoms

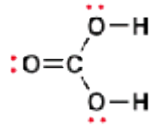
59) From the following possible responses, select those responses that give the combination of bonds that makes up a triple covalent bond.

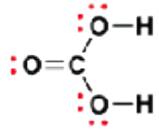
- ☐ Two sigma bonds
- ☐ One sigma bond
- ☐ Two pi bonds
- ☐ One pi bond
- ☐ Three sigma bonds

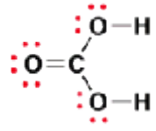
60) Which is a correct Lewis structure for hydrogen cyanide, HCN?

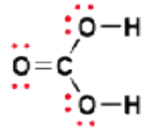
- ☐ 
- ☐ 
- ☐ 
- ☐ 

61) Which is a correct Lewis structure for carbonic acid, H_2CO_3?

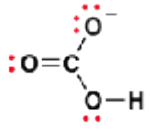
☐ 

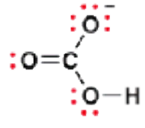
☐ 

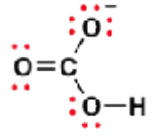
☐ 

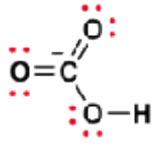
☐ 

62) Which is a correct Lewis structure for hydrogen carbonate ion, HCO_3^-?

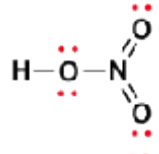
☐ 

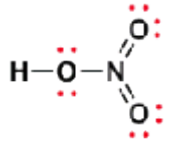
☐ 

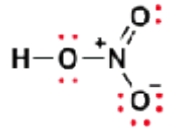
☐ 

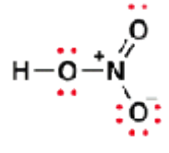
☐ 

63) Which is a correct Lewis structure for nitric acid, HNO_3?

☐ 

☐ 

☐ 

☐ 

64) Which of the following does not have the ground-state configuration $1s^2 2s^2 2p^6$?

- ☐ Ne
- ☐ Na+
- ☐ Cl-
- ☐ F-

65) Which of the following elements is the most electronegative?

- ☐ B
- ☐ C
- ☐ Cl
- ☐ N

66) Which of the following elements is the most electropositive?

- ☐ B
- ☐ C
- ☐ Cl
- ☐ N

67) Which of the following elements is the most electronegative?

- ☐ Br
- ☐ Cl
- ☐ F
- ☐ I

Which of the following elements is the most electropositive?

- ☐ Br
- ☐ Cl
- ☐ F
- ☐ I

68) Which of the following compounds has an ionic bond?

- ☐ H2O
- ☐ NH4Cl
- ☐ CH3Cl
- ☐ CH3Li

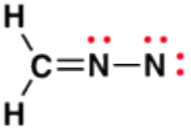
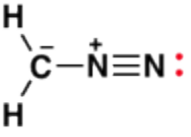
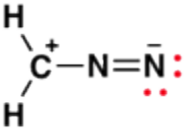
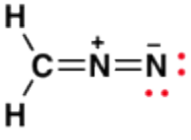
69) Which of the following molecules does not have a dipole moment?

- ☐ CH3Cl
- ☐ CH2Cl2
- ☐ CHCl3
- ☐ CCl4

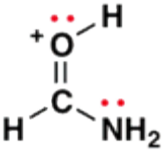
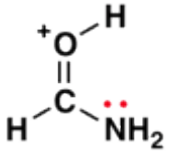
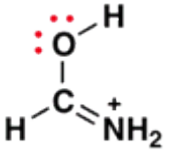
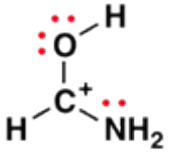
70) Which of the following contains an atom (other than hydrogen) which lacks an octet of valence electrons?

- ☐ NH3
- ☐ $H3O^+$
- ☐ BH3
- ☐ $NH4^+$

71) Which of the following is a correct Lewis structure of diazomethane, CH_2N_2?

- ☐ 
- ☐ 
- ☐ 
- ☐ 

72) Which of the following Lewis structures of protonated methanamide is incomplete?

- ☐ 
- ☐ 
- ☐ 
- ☐ 

73) N_2O_4 is:

- ☐ dinitride pentoxide
- ☐ Dinitrogen tetroxide
- ☐ Nitro-oxalic acid
- ☐ dinitrogen monoxide

74) N_2O_6 is:

- ☐ nitrogen oxide
- ☐ Nitride hexoxide
- ☐ dinitride hexoxygen
- ☐ Dinitrogen heptoxide

75) H_2SO_4 is:

- ☐ Dihydrogen sulfur tetroxide
- ☐ hydrosulfuric acid
- ☐ Sulfurous acid
- ☐ Sulfuric acid

76) CCl_4 is:

- ☐ Monocarbon tetrachloride
- ☐ monocarbon tetrachlorine
- ☐ Carbon tetrachloride
- ☐ carbide pentachlorine

77) OF_2 is:

- ☐ oxygen difluoride
- ☐ Oxide difluorine
- ☐ oxide difluoride
- ☐ Monoxide difluoride

78) N_2O_5 is:

- ☐ nitrogen oxide
- ☐ Dinitrogen pentoxide
- ☐ Nitrite
- ☐ Nitrate

79) N_2O is:

- ☐ Dinitride monoxide
- ☐ Dinitrogen monoxide
- ☐ Nitrogen monoxide
- ☐ dinitrogen monoxygen

80) SO_3 is:

- ☐ sulfate
- ☐ Sulfur dioxide
- ☐ Sulfite
- ☐ sulfuric acid

81) Suppose you encounter a chemical formula with H as the cation. What do you know about this compound immediately?

- ☐ It is an acid
- ☐ It has a +1 charge
- ☐ It is an ionic compound
- ☐ It is a base

82) Which of the following is not a cation?

- ☐ Ca^{2+}
- ☐ Sulfate
- ☐ Iron ion
- ☐ Mercury ion

83) Which set of the chemical name and chemical formula for the compound is correct?

- ☐ Iron phosphate, $FePO_4$
- ☐ Ammonium sulfite, $(NH_4)_2S$
- ☐ Lithium carbonate, $LiCO_3$
- ☐ Magnesium dichromate, $MgCrO_4$

84) What is the correct name for $CoCl_2$

- ☐ Cobalt chlorate
- ☐ Cobalt chloride
- ☐ Cobalt chlorate
- ☐ Cobalt chloride

85) What is the correct name for the N_3^- ion?

- ☐ Nitride ion
- ☐ Nitrite ion
- ☐ Nitrate ion
- ☐ Nitrogen ion

86) When naming a transition metal ion that can have more than one common ionic charge, the numerical value of the charge is indicated by a

- ☐ Superscript after the name
- ☐ Suffix
- ☐ Prefix
- ☐ Roman numeral following the name

87) Which of the following correctly represents an ion pair and ionic compound the ions form?

- ☐ Na^{+}, Cl^{-} ; $NaCl_2$
- ☐ Ca^{2+}, F^{-} ; CaF_2
- ☐ Ba^{2+}, O^{2-} ; Ba_2O_2
- ☐ Pb^{4+} , O^{2-} ; Pb_2O_4

88) What type of ions have names ending in -ide?

- ☐ Only metal ions
- ☐ Only cations
- ☐ Only gaseous ions
- ☐ Only anions

89) What is the formula for hydrosulfuric acid?

- ☐ H_2S_2
- ☐ H_2SO_2
- ☐ HSO_2
- ☐ H_2S

90) Which element, when combined with fluorine, would most likely form an ionic compound?

- ☐ Phosphorus
- ☐ Lithium
- ☐ Carbon
- ☐ Chlorine

91) What is the formula for sulfurous acid?

- ☐ H_2SO_3
- ☐ H_2SO_4
- ☐ H_2SO_2
- ☐ H_2S

92) Which of the following compounds contains the lead ion?

- ☐ Pb_2O
- ☐ PbO
- ☐ Pb_2S
- ☐ $PbCl_4$

93) What is the correct formula for potassium sulfite?

- ☐ K_2SO_3
- ☐ K_2SO_4
- ☐ $KHSO_4$
- ☐ $KHSO_3$

94) Which of the following is true about the composition of ionic compounds?

- ☐ They are composed of anions and cations
- ☐ They are formed from two or more nonmetallic elements
- ☐ They are composed of anions only
- ☐ They are composed of cations only

95) Which of the following is the correct name for N_2O_5 ?

- ☐ Nitrous oxide
- ☐ Nitrogen dioxide
- ☐ Dinitrogen pentoxide
- ☐ Nitrate oxide

96) What is the correct formula for barium chlorate?

- ☐ $BaCl_2$
- ☐ $Ba(ClO_2)_2$
- ☐ $Ba(ClO_3)_2$
- ☐ $Ba(ClO)_2$

97) Which of the following shows correctly an ion pair and ionic compound the two ions form?

- ☐ Fe^{3+} , O^{2-} ; Fe_2O_3
- ☐ Cr^{3+} , I^- ; CrI
- ☐ Sn^{4+} , N^{3-} ; Sn_4N_3
- ☐ Cu^{2+} , O^{2-} ; Cu_2O_2

98) Select the correct formula for sulfur hexafluoride.

- ☐ F_6SO_3
- ☐ F_6S_2
- ☐ SF_6
- ☐ $S2F_6$

99) Which set of chemical name and formula for the same compound is correct?

- ☐ Tin(IV)bromide; $SnBr_4$
- ☐ Iron(II)oxide; Fe_2O_3
- ☐ Aluminum fluorate ; AlF_3
- ☐ Potassium chloride; K_2Cl_2

100) What is the correct name for $Sn_3(PO_4)_2$?

- ☐ Tin(IV)phosphate
- ☐ Tin(III)phosphate
- ☐ Tritin diphosphate
- ☐ Tin(II)phosphate

101) What is the name of H_2SO_3?

- ☐ Sulfuric acid
- ☐ Sulfurous acid
- ☐ Hydrosulfuric acid
- ☐ Hyposulfuric acid

102) Aluminum is a group 3 metal. Which ion does Al typically form?

- ☐ Al^{3-}
- ☐ Al^{5+}
- ☐ Al^{3+}
- ☐ Al^{5-}

103) Which of the following formulas represents an ionic compound?

- ☐ CS_2
- ☐ BaI_2
- ☐ PCl_3
- ☐ $N2O_4$

104) Molecular compounds are usually

- ☐ Composed of two or more nonmetals
- ☐ Composed of positive and negative ions
- ☐ Composed of metal and nonmetal
- ☐ Composed of two or more transition elements

What is the formula for phosphoric acid?

- ☐ H_3PO_4
- ☐ H_2PO_3
- ☐ HPO_4
- ☐ HPO_2

105) Which of the following formulas represents a molecular compound?

- ☐ SO_2
- ☐ ZnO
- ☐ BeF_2
- ☐ Xe

106) Which of the following shows both the correct formula and correct name of an acid?

- ☐ $HClO_2$, chloric acid
- ☐ HNO_2, hydronitrous acid
- ☐ H_3PO_4, phosphoric acid
- ☐ HI, iodic acid

107) How are chemical formulas of binary ionic compounds generally written?

- ☐ Anion on the left, cation on the right
- ☐ Roman numeral first, then anion, then cation
- ☐ Subscripts first, then ions
- ☐ Cation on the left, anion on the right

108) Which of the following shows a prefix used in naming binary molecular compounds with its corresponding number?

- ☐ Hexa- , 8
- ☐ Deca- , 7
- ☐ Octa- , 4
- ☐ Nona- , 9

109) Which of the following correctly provides the names and formulas of polyatomic ions?

- ☐ Nitrite: NO^- ; nitrate: NO_2^-
- ☐ Carbonate: HCO_3^- ; bicarbonate: CO_3^{2-}
- ☐ Sulfite: S_2^- ; sulfate: SO_3^-
- ☐ Chromate: CrO_4^{2-} ; dichromate: $Cr_2O_7^{2-}$

110) What is the formula for carbon dioxide?

- ☐ 2 CO
- ☐ CO_2
- ☐ CaO_2
- ☐ C_2O_2

111) There are a few common names of covalent compounds you should memorize. For example, what is the formula for water?

- ☐ HO_2
- ☐ 2 HO
- ☐ H_2O
- ☐ H_2O_2

112) The correct name for SiC is:

- ☐ silicon carbide
- ☐ silver carbide
- ☐ carbosilicon
- ☐ silver carbon

113) What is the formula for carbon tetrachloride?

- ☐ C_4Cl
- ☐ 4 CCl
- ☐ CCl_4
- ☐ CCl_5

114) P_2O_5 is named:

- ☐ dipotassium pentoxide
- ☐ phosphorus oxide
- ☐ diphosphorus pentoxide
- ☐ diphosphorus heptoxide

115) What is the formula of nitrogen triiodide?

- ☐ NI
- ☐ N_3I
- ☐ HNI_3
- ☐ NI_3

116) What is the name given to $H_2S(g)$?

- ☐ hydrogenated sulfur
- ☐ sulfur hydride
- ☐ hydrogen sulfide
- ☐ hydrogen disulfide

117) SiO_2 is found in sand, glass, and quartz. What is the correct name for this compound?

- ☐ silicon dioxide
- ☐ silicate
- ☐ silicon
- ☐ salicylate

118) The formula for dinitrogen pentoxide is:

- ☐ Ni_2O_5
- ☐ N_2O_4
- ☐ N_3O_3
- ☐ N_2O_5

119) Ozone is another important covalent compound that is known by its common name. What is the formula for ozone?

- ☐ O_2
- ☐ Os_3
- ☐ O_3
- ☐ CN

120) Which one of the following statements concerning the length of carbon-carbon single, double, and triple covalent bonds is true?

- ☐ The carbon-carbon single bond is shorter than either the carbon-carbon double or triple bond.
- ☐ The carbon-carbon double bond is shorter than either the carbon-carbon single or triple bond.
- ☐ The carbon-carbon triple bond is shorter than either the carbon-carbon single or double bond.
- ☐ The carbon-carbon single, double, and triple bonds all have the same length.

121) Which one of the following is the correct bond angle between atoms adopting a trigonal planar geometry?

- ☐ 180°
- ☐ 109.5°
- ☐ 90°
- ☐ 120°

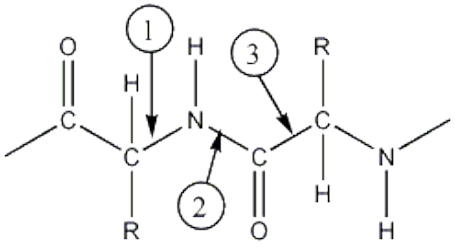
122) The atoms in a molecule of water adopt what kind of geometry?

- ☐ Linear
- ☐ Tetrahedral
- ☐ Octahedral
- ☐ Trigonal planar

123) Ammonia, NH3, adopts a tetrahedral geometry. However, the non-bonding pair on the central nitrogen atom distorts the bond angle away from the expected 109.5°. Which of the following statements correctly describes how the bond angle is distorted?

- ☐ The actual bond angle is reduced: it is less than 109.5°
- ☐ The actual bond angle is increased: it is more than 109.5°

124) About which of the bonds along the backbone of a polypeptide is rotation not possible?



- ☐ 1
- ☐ 2
- ☐ 3

125) sp3 hybridization involves the hybridization of how many atomic orbitals?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

126) Four sp3 hybrid orbitals adopt what kind of geometry?

- ☐ Linear
- ☐ Trigonal planar
- ☐ Octahedral
- ☐ Tetrahedral

127) When applying VSEPR theory to predict molecular shape, which of the following do we not need to take into account?

- ☐ Valence electrons occupying sigma bonding orbitals
- ☐ Valence electrons occupying pi bonding orbitals
- ☐ Valence electrons occupying non-bonding orbitals

128) Which of the following statements regarding the measurement of the atomic radius are correct? Please select all that apply.

- ☐ The atomic radius is measured between atoms of different elements
- ☐ The atomic radius is measured between atoms of the same element
- ☐ The atomic radius is half the distance between the nuclei of two joined atoms
- ☐ The atomic radius is the distance between the nuclei of two joined atoms
- ☐ The atomic radius is only measured between two covalently-bonded atoms
- ☐ The atomic radius can be measured between both covalently- and ionically-bonded atoms

129) From the following possible responses, select those responses that give the combination of bonds that makes up a triple covalent bond.

- ☐ Two sigma bonds
- ☐ One sigma bond
- ☐ Two pi bonds
- ☐ One pi bond
- ☐ Three sigma bonds

Which one of the following is a linear molecule?

- ☐ $BeCl_2$
- ☐ BF_3
- ☐ CH_4
- ☐ CCl_4

130) Which of the following is the correct order for the electron pair repulsions?

- ☐ lone pair-lone pair < bond pair-bond pair < bond pair-lone pair
- ☐ lone pair-lone pair < bond pair-lone pair < bond pair-bond pair
- ☐ bond pair-bond pair < bond pair-lone pair < lone pair-lone pair
- ☐ bond pair-bond pair < lone pair-lone pair < bond pair-lone pair

131) Which of the following is not a trigonal planar molecule?

- ☐ $AlCl_3$
- ☐ AlH_3
- ☐ BF_3
- ☐ NH_3

132) Which of the following is tetrahedral?

- ☐ BF_3
- ☐ CH_4
- ☐ NH_3
- ☐ SF_6

133) The shape of a molecule with six bond pairs and no lone pairs is...

- ☐ hexahedral
- ☐ octahedral
- ☐ tetrahedral
- ☐ trigonal bipyramidal

134) Which one of following molecules does not have any three of its atoms in a straight line?

- ☐ $BeCl_2$
- ☐ CO_2
- ☐ H_2O
- ☐ SF_6

135) The bond angles in a molecule of boron trifluoride are...

- ☐ 90°
- ☐ 107°
- ☐ 109.5°
- ☐ 120°

136) The bond angles in PF5 are...

- ☐ all 72°
- ☐ 90° and 120°
- ☐ 109.5° and 120°
- ☐ 109.5° and 90°

137) Which of the following species has a shape based on two lone pairs and two bond pairs?

- ☐ NH_3
- ☐ NH_2^-
- ☐ NH_4^+
- ☐ PH3

138) The shape of carbon dioxide is described as...

- ☐ linear
- ☐ octahedral
- ☐ tetrahedral
- ☐ trigonal planar

139) The H-N-H bond angles in the ammonium ion NH_4^+ are...

- ☐ greater than the H-N-H bond angles in ammonia
- ☐ identical H-N-H bond angles in ammonia
- ☐ 107°
- ☐ less than the H-N-H bond angles in ammonia

140) The shape of XeF_4 molecules is based on them having...

- ☐ 4 bond pairs
- ☐ 4 bond pairs and 1 lone pair
- ☐ 4 bond pairs and 2 lone pairs
- ☐ 4 bond pairs and 4 lone pairs

141) Which one of the following molecules/ions is square planar?

- ☐ CH_4
- ☐ NH_4^+
- ☐ PCl_4+
- ☐ XeF_4

142) The molecule whose shape is based on lone pairs is...

- ☐ CH_4
- ☐ CO_2
- ☐ H_2O
- ☐ SF_6

The ion whose shape is not based on lone pairs is...

- ☐ NH_4^+
- ☐ NH_2^-
- ☐ H_3O^+
- ☐ PCl_4-

143) Which of the following statements about ammonia molecules is not true?

- ☐ they possess a lone pair
- ☐ the H-N-H bond is 107°
- ☐ they are pyramidal in shape
- ☐ they are tetrahedral in shape

144) Which of the following statements about SO_2 molecules is true?

- ☐ the O→ S→ O bond angle is 180°
- ☐ their shape is based on then having two lone pairs and two double bond pairs
- ☐ their shape is based on then having one lone pair and two bond bond pairs
- ☐ they are trigonal planar

145) Which of following best describes the shape of SO_3 molecules?

- ☐ linear
- ☐ square planar
- ☐ tetrahedral
- ☐ trigonal planar

146) In which of the following changes are the bond angles in the second species smaller than the first?

- ☐ H_2O and H_3O^+
- ☐ CH_4 and CO_2
- ☐ NH_4^+ and NH_3
- ☐ $AlCl_4$- and $AlCl_3$

147) The shape of BrF_3 is best described as...

- ☐ linear
- ☐ pyramidal
- ☐ trigonal planar
- ☐ T-shaped

148) The molecular structure of SF_6 is

- ☐ linear
- ☐ tetrahedral
- ☐ hexagonal
- ☐ octahedral

The number of bonding pairs of electrons in water H_2O is

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

149) Lone pairs in CO_2 are

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

150) The bond angle of SF_6 is

- ☐ 90°
- ☐ 180°
- ☐ 120°
- ☐ 87.5°

151) Molecule with the bond of shape trigonal pyramid is

- ☐ H_2O
- ☐ CO_2
- ☐ CH_4
- ☐ BF_3

152) Which inter molecular force is the predominant inter molecular force for non-polar molecules?

- ☐ Dispersion Forces
- ☐ Dipole-Dipole

153) Which inter molecular force results from polar molecules?

Dispersion Forces

- ☐ Dipole-Dipole

154) Which molecular geometry below is non-polar?

- ☐ Trigonal planar
- ☐ Trigonal pyramidal
- ☐ Bent
- ☐ See-saw

155) Which molecular geometry below is polar?

- ☐ Square planar
- ☐ Tetrahedral
- ☐ T-shaped
- ☐ Linear

156) Which bond has electrons that are shared equally?

- ☐ Non-polar ionic
- ☐ Non-polar covalent
- ☐ Polar covalent
- ☐ Ionic

157) Using electronegativity values, what type of bond is C–H?

- ☐ Non-polar
- ☐ Polar
- ☐ Ionic
- ☐ Hydrogen

158) Using electronegativity values, what type of bond is C–O?

- ☐ Non-polar
- ☐ Polar
- ☐ Ionic
- ☐ Hydrogen

159) Using electronegativity values, what type of bond is B-F?

- ☐ Non-polar
- ☐ Polar
- ☐ Ionic
- ☐ Hydrogen

160) What is the predominant inter molecular force for CH_4?

- ☐ Dispersion forces
- ☐ Dipole-dipole

161) What is the predominant inter molecular force for NH_3?

- ☐ Dispersion forces
- ☐ Dipole-dipole

162) What is the predominant inter molecular force for SiO_2?

- ☐ Dispersion forces
- ☐ Dipole-dipole

163) What is the predominant inter molecular force for H_2O?

- ☐ Dispersion forces
- ☐ Dipole-dipole

164) What happens to the boiling point as the strength of the inter molecular force increases?

- ☐ Decreases
- ☐ Increase
- ☐ Impossible to tell
- ☐ What's boiling point?

165) Is the molecule CCl_4 polar or non-polar?

- ☐ polar
- ☐ non-polar

166) What is the predominant inter molecular force in the molecule HCN?

- ☐ Dispersion Forces
- ☐ Dipole-Dipole

167) Which of the following molecules has an equal electron distribution around it's bonded atoms?

- ☐ HCl
- ☐ CO_2
- ☐ Br_2
- ☐ all of the above

168) Which of the following molecules has unequal electron distribution around it's bonded atoms?

- ☐ HCl
- ☐ CBr_4
- ☐ N_2
- ☐ all of the above

169) Which of the following molecules is non-polar?

- ☐ NH_3
- ☐ BCl_3
- ☐ SO_2
- ☐ ICl_3

170) Which of the following molecules is polar?

- ☐ SiS_2
- ☐ PCl_5
- ☐ SO_2
- ☐ XeF_4

171) What type of bond has a difference in Electronegativity between 0.4 and 1.7?

- ☐ non-polar
- ☐ polar
- ☐ ionic
- ☐ I don't know

172) What type of bond has a difference in Electronegativity between 0.0 and 0.4?

- ☐ non-polar
- ☐ polar
- ☐ ionic
- ☐ I don't know

173) What type of bond has a difference in Electronegativity of 1.7 or greater?

- ☐ non-polar
- ☐ polar
- ☐ ionic
- ☐ I don't know

174) Which molecule below is water soluble?

- ☐ NH_3
- ☐ CH_4
- ☐ SiO_2
- ☐ BCl_3

175) Which property below is NOT for non-polar molecules?

- ☐ Not water soluble
- ☐ Low melting point
- ☐ High boiling point
- ☐ Usually gas or liquid at room temp.

176) Which property below is NOT for polar molecules?

- ☐ Water soluble
- ☐ High melting point
- ☐ Soft solids
- ☐ Usually liquid or solid at room temp.

177) Both polar and non-polar molecules will always experience which inter molecular force?

- ☐ Dispersion Forces
- ☐ Dipole-Dipole
- ☐ Hydrogen bonding
- ☐ Ionic bonding

178) Intermolecular forces or inter molecular forces are...

- ☐ covalent or ionic bonds
- ☐ within a molecule
- ☐ between neighboring molecules
- ☐ stronger than bonds

179) A bond dipole points toward...

- ☐ the less electronegative element
- ☐ the element with a partial positive charge
- ☐ the element with a partial negative charge
- ☐ the negative ion

180) Which molecule below has polar bonds but is a non-polar molecule?

- ☐ SO_2
- ☐ SiO_2
- ☐ CH_4
- ☐ H_2O

181) Which atom is the molecular dipole pointed toward in CH_2O?

- ☐ C
- ☐ H
- ☐ O
- ☐ none

182) The electrons that reside in the outermost energy levels of an atom are called _____.

- ☐ core electrons
- ☐ valence electrons
- ☐ lone pairs
- ☐ nonbonded electrons
- ☐ bonded electrons

183) What is the formula for manganese dioxide?

- ☐ MnO_2
- ☐ MnO_4
- ☐ MgO_2
- ☐ MgO_4

184) What is the name of SO_3?

- ☐ sulfur oxygen
- ☐ sulfite
- ☐ sulfate
- ☐ sulfur trioxide

What is the name of NH_3?

- ☐ ammonium
- ☐ ammonia
- ☐ nitrogen trihydrogen
- ☐ nitrogen hydride

185) Electronegativity is _____.

- ☐ the ability of an atom to attract electrons to itself in a chemical bond.
- ☐ the measure of an atom's ability to make ionic bonds.
- ☐ the amount of energy required for an atom to accept an electron.
- ☐ the amount of energy required for an atom to lose an electron.

186) Identify the ionic compound among the following:

- ☐ SO_2
- ☐ $AlCl_3$
- ☐ CH_4
- ☐ HF

187) Which of the following is a polar molecule?

- ☐ CCl_4
- ☐ H_2O
- ☐ CO_2
- ☐ H_2Be

188) What is the overall polarity of methane?

- ☐ nonpolar covalent
- ☐ polar covalent
- ☐ ionic
- ☐ nonpolar ionic

189) What does it mean when a molecule is said to be polar?

- ☐ one end of the molecule is slightly negative while the other end is slightly positive
- ☐ both ends of the molecule are slightly positive
- ☐ both ends of the molecule is slightly negative
- ☐ the molecule is neutral
- ☐ the difference in electronegativities is zero

190) The shape of a water molecule is _____.

- ☐ trigonal
- ☐ bent
- ☐ linear
- ☐ tetrahedral

191) Intermolecular forces are forces _____.

- ☐ within molecules
- ☐ between molecules
- ☐ pushing molecules apart
- ☐ of attraction between the protons and electrons

192) Which of the following is a polar molecule?

- ☐ CCl_4
- ☐ CO_2
- ☐ CH_4
- ☐ CH_3Cl

193) What is the predicted bond angle for a molecule with a trigonal planar electron-pair geometry?

- ☐ 180o
- ☐ 120o
- ☐ 109.5o
- ☐ 45o
- ☐ 90o

194) What is the electron-pair geometry for a molecule with two electron pairs?

- ☐ Linear
- ☐ Trigonal planar
- ☐ Tetrahedral
- ☐ Trigonal bipyramidal
- ☐ Octahedral

195) Which of the following molecules dissolves in water?

- ☐ CCl_4
- ☐ CBr_4
- ☐ C_6H_6
- ☐ H_3OH

196) The chemical formula of lead sulphate is

- ☐ Pb_2SO_4
- ☐ $Pb(SO_4)_2$
- ☐ $PbSO_4$
- ☐ $Pb_2(SO_4)_3$

197) Which information is not conveyed by a balanced chemical equation?

- ☐ Physical states of reactants and products
- ☐ Symbols and formulae of all the substances involved in a particular reaction
- ☐ Number of atoms/molecules of the reactants and products formed
- ☐ Whether a particular reaction is actually feasible or not

198) Chemically rust is

- ☐ hydrated ferrous oxide
- ☐ only ferric oxide
- ☐ hydrated ferric oxide
- ☐ none of these

199) Both CO_2 and H_2 gases are

- ☐ heavier than air
- ☐ colorless
- ☐ acidic in nature
- ☐ soluble in water

200) Which of the following gases can be used for storage of fresh sample of an oil for a long time?

- ☐ Carbon dioxide or oxygen
- ☐ Nitrogen or helium
- ☐ Helium or oxygen
- ☐ Nitrogen or oxygen

201) The electrolytic decomposition of water gives H_2 and O_2 in the ratio of

- ☐ 1: 2 by volume
- ☐ 2: 1 by volume
- ☐ 8: 1 by mass
- ☐ 1: 2 by mass

202) In the decomposition of lead nitrate to give lead oxide, nitrogen dioxide and oxygen gas, the coefficient of nitrogen dioxide (in the balanced equation) is

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

203) Fatty foods become rancid due to the process of

- ☐ oxidation
- ☐ corrosion
- ☐ reduction
- ☐ hydrogenation

204) Silver article turns black when kept in the open for a few days due to formation of

- ☐ H_2S
- ☐ AgS
- ☐ $AgSO_4$
- ☐ Ag_2S

205) When crystals of lead nitrate are heated strongly in a dry test tube

- ☐ crystals immediately melt
- ☐ a brown residue is left
- ☐ white fumes appear in the tube
- ☐ a yellow residue is left

206) Dilute hydrochloric acid is added to granulated zinc taken in a test tube. The following observations are recorded. Point out the correct observation.

- ☐ The surface of metal becomes shining
- ☐ The reaction mixture turns milky
- ☐ Odor of a pungent smelling gas is recorded
- ☐ A colorless and odorless gas is evolved

207) When carbon dioxide is passed through lime water,

- ☐ calcium hydroxide is formed
- ☐ white precipitate of CaO is formed
- ☐ lime water turns milky
- ☐ color of lime water disappears.

208) When a magnesium ribbon is burnt in air, the ash formed is

- ☐ black
- ☐ white
- ☐ yellow
- ☐ pink

209) In which of the following, heat energy will be evolved?

- ☐ Electrolysis of water
- ☐ Dissolution of NH4Cl in water
- ☐ Burning of L.P.G.
- ☐ Decomposition of AgBr in the presence of sunlight

210) Rancidity can be prevented by

- ☐ adding antioxidants
- ☐ storing food away from light
- ☐ keeping food in refrigerator
- ☐ all of these

211) The reaction of H_2 gas with oxygen gas to form water is an example of

- ☐ combination reaction
- ☐ redox reaction
- ☐ exothermic reaction
- ☐ all of these reactions

212) The reaction in which two compounds exchange their ions to form two new compounds is called

- ☐ replacement reaction
- ☐ combination reaction
- ☐ double replacement reaction
- ☐ redox reaction

213) On immersing an iron nail in $CuSO_4$ solution for few minutes, you will observe

- ☐ no reaction takes place
- ☐ the color of solution fades away
- ☐ the surface of iron nails acquires a black coating
- ☐ the color of solution changes to green

214) An element X on exposure to moist air turns reddish-brown and a new compound Y is formed. The substance X and Y are

- ☐ X → Fe, Y → Fe_2O_3
- ☐ X → Ag, Y → Ag_2S
- ☐ X → Cu, Y → CuO
- ☐ X → Al, Y → Al_2O_3

215) Which among the following is not a physical change?

- ☐ Melting of solids to liquids
- ☐ Vaporization of liquids to gases
- ☐ Liquefaction of gases to liquids
- ☐ Decay of matter

216) Which among the following is not a chemical change?

- ☐ Melting of ice
- ☐ Carbon cycle
- ☐ Dehydration of substances
- ☐ Fermentation of substances

217) Physical changes are _____.

- ☐ temporary
- ☐ permanent
- ☐ irreversible
- ☐ endothermic

218) An example of a chemical change is _____.

- ☐ formation of clouds
- ☐ glowing of an electric light
- ☐ dropping sodium into water
- ☐ dissolving of salt in water

219) Which of these will cause a chemical change to occur?

- ☐ Grinding of wheat into flour
- ☐ Lighting of a gas stove
- ☐ Evaporation of water from a lake
- ☐ Ringing of an electric bell

220) Chemical changes are _____.

- ☐ temporary, reversible and a new substance is produced
- ☐ always accompanied by exchange of light
- ☐ permanent, irreversible and a new substance is produced
- ☐ never accompanied by exchange of light and heat energy

221) Which of the following is a physical change?

- ☐ Solubility in water
- ☐ Combustibility
- ☐ Aerial oxidation
- ☐ Reaction with water

222) Which of the following information is conveyed by a chemical reaction?

- ☐ The color changes taking place
- ☐ The structure of the reactants and products
- ☐ The absorption of energy only
- ☐ The masses of the reactants and products involved in the reaction

223) Which is the correct symbol for manganese?

- ☐ M
- ☐ Ma
- ☐ Mn
- ☐ Mg

224) The symbol H stands for _____of hydrogen.

- ☐ one atom
- ☐ one molecule
- ☐ one ion
- ☐ two atoms

225) The correct formula for nitrogen dioxide is _____.

- ☐ NO
- ☐ N_2O
- ☐ NO_2
- ☐ N_2O_5

226) The correct formula for ammonium sulphate is _____.

- ☐ NH_4SO_4
- ☐ $(NH_4)_2SO_4$
- ☐ $(NH_3)_2SO_4$
- ☐ $(NH_4)_2(SO_4)_2$

227) Which of the following is an incorrect formula?

- ☐ $NaCl_2$
- ☐ $BaSO_4$
- ☐ H_2CO_3
- ☐ P_2O_5

228) In one molecule of ammonium sulphide there are _____.

- ☐ 2 atoms of N, 8 atoms of H, and 1 atom of S
- ☐ 1 atom of N, 4 atoms of H, and 1 atom of S
- ☐ 1 atom of N, 4 atoms of H, and 2 atoms of S
- ☐ 2 atoms of N, 8 atoms of H, and 2 atoms of S

229) The correctly balanced equation for $FeS_2 + O_2 \rightarrow Fe_2O_3 + SO_2$ is _____.

- ☐ $2FeS_2 + O_2 \rightarrow Fe_2O_3 + 4SO_2$
- ☐ $2FeS_2 + 3O_2 \rightarrow 2Fe_2O_3 + 4SO_2$
- ☐ $4FeS_2 + 4O_2 \rightarrow 2Fe_2O_3 + 2SO_2$
- ☐ $4FeS_2 + 11O_2 \rightarrow 2Fe_2O_3 + 8SO_2$

230) The sign used to indicate a reversible reaction is _____.

- ☐ $\rightarrow$
- ☐ $\cong$
- ☐ $\leftarrow$
- ☐ ‡

231) Breaking of lead bromide into lead and bromine is an example of _____.

- ☐ decomposition reaction
- ☐ synthesis reaction
- ☐ replacement reaction
- ☐ neutralization reaction

232) In the equation

$PbO_2 + 4HCl \rightarrow PbCl_2 + 2H_2O + Cl_2$, the substance undergoing oxidation is _____.

- ☐ lead dioxide
- ☐ hydrochloric acid
- ☐ hydrogen
- ☐ lead chloride

233) $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$ **is an example of _____.**

- ☐ neutralization reaction
- ☐ redox reaction
- ☐ double replacement reaction
- ☐ decomposition reaction

234) In the reaction:

$BaCl_2 + ZnSO_4 \rightarrow ZnCl_2 + BaSO_4$, the white precipitate seen is due to _____.

- ☐ $ZnCl_2$
- ☐ $BaSO_4$
- ☐ $BaCl_2$
- ☐ $ZnSO_4$

235) A chemical reaction has taken place in which of the following process?

- ☐ Ice melts into water
- ☐ A wet shirt got dried in sunlight
- ☐ A brown layer is formed over iron rod kept in air
- ☐ Sugar getting dissolved in water

236) Which of the following is not a chemical Reaction?

- ☐ Formation of salt solution
- ☐ Milk turns sour in hot weather
- ☐ Burning of match stick
- ☐ Contamination of food

237) A chemical reaction has taken place can be represented by which of the following condition?

- ☐ Evolution of gas
- ☐ Heat released
- ☐ Change in color
- ☐ All the above

238) A chemical equation properly written has which of the following features?

- ☐ Temperature required
- ☐ Should be balanced
- ☐ Should have information regarding physical states
- ☐ All the above

239) A Chemical equation should be balanced to

- ☐ Display conservation of energy
- ☐ Display conservation of mass
- ☐ To make equation attractive
- ☐ All the above

240) An unbalanced chemical equation is equation written in Skeletal form

- ☐ Proper form
- ☐ Simple form
- ☐ Unorganized form

241) A chemical equation is said to be balanced if number of

- ☐ Compounds are same in both side
- ☐ Molecules are same in both side
- ☐ Number of atoms is same in both side
- ☐ Number of electrons are same in both side

242) When magnesium is burnt in air then

- ☐ Magnesium is reacting with oxygen
- ☐ Magnesium is reacting with nitrogen
- ☐ Magnesium is reacting with carbon
- ☐ Magnesium is reacting with Carbon di oxide

243) Write values of a,b and c if following chemical reaction is balanced .

$$aMg + bO_2 \rightarrow cMgO$$

- ☐ a→ 1, b→ 2, c→ 2
- ☐ a→ 2, b→ 1, c→ 2
- ☐ a→ 2, b→ 2, c→ 2
- ☐ a→ 1, b→ 2. c→ 1

244) Write values of a, b and c so that following chemical equation is balanced

$$aH_2 + bO_2 \rightarrow cH_2O$$

- ☐ a→ 2, b→ 1, c→ 2
- ☐ a→ 1, b→ 1, c→ 2
- ☐ a→ 1, b→ 2, c→ 1
- ☐ a→ 2, b→ 2, c→ 1

245) Potassium chlorate (+ heat) → Potassium chloride + Oxygen [$2\ KClO_3 \rightarrow 2\ KCl + 3\ O_2$] is an example of

- ☐ synthesis or direct combination reaction
- ☐ simple replacement reaction
- ☐ decomposition reaction
- ☐ double replacement reaction
- ☐ Half-n-half Clue

246) Zinc + Hydrochloric acid → Zinc chloride + Hydrogen [$Zn + 2\ HCl \rightarrow ZnCl_2 + H_2$] is an example of

- ☐ simple replacement reaction
- ☐ decomposition reaction
- ☐ synthesis or direct combination reaction
- ☐ double replacement reaction
- ☐ Half-n-half Clue

247) Magnesium + Oxygen → Magnesium oxide [$2\ Mg + O_2 \rightarrow 2\ MgO$] is an example of

- ☐ simple replacement reaction
- ☐ synthesis or direct combination reaction
- ☐ decomposition reaction
- ☐ double replacement reaction
- ☐ Half-n-half Clue

248) Sodium oxide + Water → Sodium hydroxide [$Na_2O + H_2O \rightarrow 2\ NaOH$] is an example of

- ☐ decomposition reaction
- ☐ double replacement reaction
- ☐ simple replacement reaction
- ☐ synthesis or direct combination reaction
- ☐ Half-n-half Clue

249) Copper carbonate (+ heat) → Copper oxide + Carbon dioxide [$CuCO_3 \rightarrow CuO + CO_2$] is an example of

- ☐ synthesis or direct combination reaction
- ☐ simple replacement reaction
- ☐ decomposition reaction
- ☐ double replacement reaction
- ☐ Half-n-half Clue

250) Iron + Sulfur → Iron sulfide [Fe + S → FeS] is an example of

- ☐ synthesis or direct combination reaction
- ☐ simple replacement reaction
- ☐ decomposition reaction
- ☐ double replacement reaction
- ☐ Half-n-half Clue

251) Water (+ electric current) → Hydrogen + Oxygen [$2\ H_2O \rightarrow 2\ H_2 + O_2$] is an example of

- ☐ decomposition reaction
- ☐ synthesis or direct combination reaction
- ☐ simple replacement reaction
- ☐ double replacement reaction

252) Identify the type of reaction: $N_2 + 3H_2 \rightarrow 2NH_3$

- ☐ Synthesis
- ☐ Decomposition
- ☐ Single Replacement
- ☐ Double Replacement
- ☐ Combustion

253) Identify the type of reaction: $2NaI + {}_{F2} \rightarrow 2NaF + I_2$

- ☐ Synthesis
- ☐ Decomposition
- ☐ Single Replacement
- ☐ Double Replacement
- ☐ Combustion

254) Identify the type of reaction: $2AgCl + BaBr_2 \rightarrow 2AgBr + BaCl_2$

- ☐ Synthesis
- ☐ Decomposition
- ☐ Single Replacement
- ☐ Double Replacement
- ☐ Combustion

255) Identify the type of reaction: $C_2H_6 + 5O_2 \rightarrow 3H_2O + 2CO_2$

- ☐ Synthesis
- ☐ Decomposition
- ☐ Single Replacement
- ☐ Double Replacement
- ☐ Combustion

256) Identify the type of reaction:$2H_2O \rightarrow 2H_2 + O_2$

- ☐ Synthesis
- ☐ Decomposition
- ☐ Single replacement
- ☐ Double replacement
- ☐ Combustion

257) How many atoms of oxygen are on the reactant side?$2H_2O \rightarrow 2H_2 + O_2$

- ☐ One
- ☐ Two
- ☐ Four
- ☐ Three
- ☐ I don't know!

258) How many atoms of oxygen are on the left side?$2H_2O \rightarrow 2H_2 + O_2$

- ☐ One
- ☐ Two
- ☐ Four
- ☐ Three
- ☐ I don't know!

259) How many nitrogen atoms are on the right side? $N_2 + 3H_2 \rightarrow 2NH_3$

- ☐ Three
- ☐ Two
- ☐ Four
- ☐ Six
- ☐ I don't know!

260) How many hydrogen atoms are on the product side? $N_2 + 3H_2 \rightarrow 2NH_3$

- ☐ Six
- ☐ Five
- ☐ Four
- ☐ Three
- ☐ Two

261) The chemical reaction: $2\ H_2O \rightarrow 2\ H_2 + O_2$ is a:

- ☐ synthesis reaction
- ☐ decomposition reaction
- ☐ single replacement reaction
- ☐ double replacement reaction
- ☐ combustion reaction

262) The chemical reaction: $8\ Fe + S_8 \rightarrow 8\ FeS$ is a:

- ☐ synthesis reaction
- ☐ decomposition reaction
- ☐ single replacement reaction
- ☐ double replacement reaction
- ☐ combustion reaction

263) The chemical reaction: $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$ is a:

- ☐ synthesis reaction
- ☐ decomposition reaction
- ☐ single replacement reaction
- ☐ double replacement reaction
- ☐ combustion reaction

264) The chemical reaction: $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$ is a:

- ☐ synthesis reaction
- ☐ decomposition reaction
- ☐ single replacement reaction
- ☐ double replacement reaction
- ☐ combustion reaction

265) The chemical reaction: $2\ H_2 + O_2 \rightarrow 2\ H_2O$ is a:

- ☐ synthesis reaction
- ☐ decomposition reaction
- ☐ single replacement reaction
- ☐ double replacement reaction
- ☐ combustion reaction

266) The chemical reaction: $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$ is a:

- ☐ synthesis reaction
- ☐ decomposition reaction
- ☐ single replacement reaction
- ☐ double replacement reaction
- ☐ combustion reaction

267) The chemical reaction: $2\ Fe + 6\ NaBr \rightarrow 2\ FeBr_3 + 6\ Na$ is a:

- ☐ synthesis reaction
- ☐ decomposition reaction
- ☐ single replacement reaction
- ☐ double replacement reaction
- ☐ combustion reaction

268) The chemical reaction: $Pb + O_2 \rightarrow PbO_2$ is a:

- ☐ synthesis reaction
- ☐ decomposition reaction
- ☐ single replacement reaction
- ☐ double replacement reaction
- ☐ combustion reaction

269) The chemical reaction: $2\ CO + O_2 \rightarrow 2\ CO_2$ is a:

- ☐ synthesis reaction
- ☐ decomposition reaction
- ☐ single replacement reaction
- ☐ double replacement reaction
- ☐ combustion reaction

270) The chemical reaction: $Ca(OH)_2 + H_2SO_4 \rightarrow CaSO_4 + 2\ H_2O$ is a:

- ☐ synthesis reaction
- ☐ decomposition reaction
- ☐ single replacement reaction
- ☐ double replacement reaction
- ☐ combustion reaction

271) Which of the following substances should be written in molecular form in an ionic equation?

- ☐ Na_2SO_4
- ☐ K_2CO_3
- ☐ $BaCl_2$
- ☐ $Fe(OH)_3$
- ☐ $Ba(OH)_2$

272) Which of the following substances should be written in molecular form in net ionic equations representing reactions in aqueous solutions?

- ☐ $NaNO_2$
- ☐ $KC_2H_3O_2$
- ☐ HI
- ☐ HNO_2
- ☐ HNO_3

273) Which net ionic equation best represents the reaction (if a reaction occurs) between AgCl and KNO_3

- ☐ $AgCl + NO_3^- \rightarrow AgNO_3 + Cl^-$
- ☐ $Ag+ + K+ \rightarrow AgK$
- ☐ $Ag+ + NO_3^- \rightarrow AgNO_3$
- ☐ $AgCl + KNO_3 \rightarrow AgNO_3 + KCl$
- ☐ No reaction

274) Write the net ionic equation for the reaction, if any, which occurs when Na_2CO_3 and hydrochloric acid are mixed. Both are in aqueous solution if soluble.

- ☐ $Na_2CO_3 + 2H^+ \rightarrow 2Na^+ + CO_2 + H_2O$
- ☐ $CO_3^{2-} + 2H+ \rightarrow CO_2 + H_2O$
- ☐ $Na+ + Cl^- \rightarrow NaCl$
- ☐ $Na_2CO_3 + HCl \rightarrow$ No Reaction

275) What is the correct net ionic equation for the reaction (if a reaction occurs) between $Fe(NO_3)_3$ and KOH

- ☐ $Fe(NO_3)_3 + 3OH^- \rightarrow Fe(OH)_3 + 3NO_3^-$
- ☐ $Fe(NO_3)_3 + 3KOH \rightarrow Fe(OH)_3 + 3KNO_3$
- ☐ No reaction
- ☐ $Fe^{3+} + 3KOH \rightarrow Fe(OH)_3 + 3K^+$
- ☐ $Fe^{3+} + 3OH^- \rightarrow Fe(OH)_3$

276) Which net ionic equation best represents the reaction (if a reaction occurs) between $NaC_2H_3O_2$ and HCl:

- ☐ $C_2H_3O_2^- + HCl \rightarrow CCl^- + 2H_2 + CO_2$
- ☐ $Na^+ + Cl^- \rightarrow NaCl$
- ☐ $C_2H_3O_2^- + H^+ \rightarrow HC_2H_3O_2$
- ☐ $NaC_2H_3O_2 + H^+ \rightarrow HC_2H_3O_2 + Na^+$
- ☐ No reaction will occur.

277) Choose the correct net ionic equation for the reaction (if a reaction occurs) between $Ba(OH)_2$ and H_2SO_4

- ☐ $Ba(OH)_2 + H_2SO_4 \rightarrow$ No reaction
- ☐ $OH^- + H^+ \rightarrow H_2O$
- ☐ $Ba^{2+} + 2OH^- + 2H+ + SO_4^{2-} \rightarrow BaSO_4 + 2H_2O$
- ☐ $Ba^{2+} + SO_4^{2-} \rightarrow BaSO_4$
- ☐ $Ba^{2+} + H_2SO_4 \rightarrow BaSO_4 + 2H^+$

278) The correct form of the acid HF as it should be written in an ionic equation is:

- ☐ $H^+ + F^-$
- ☐ HF^-
- ☐ HF^+
- ☐ HF
- ☐ H^+

279) Which of the following net ionic equations best represents the reaction that takes (if any) when sodium metal is placed in water?

- ☐ $Na + H_2O \rightarrow Na_2O + H_2$
- ☐ $2Na + 2H_2O \rightarrow 2Na^+ + 2OH^- + H_2$
- ☐ $Na + H_2O \rightarrow NaH + OH$
- ☐ $Na + H_2O \rightarrow Na^+ + OH^- + H_2$
- ☐ $Na + H_2O \rightarrow$ no reaction

280) The net ionic equation for the reaction, if any, when aqueous solutions of $CuCl_2$ and Na_2S are mixed is:

- ☐ $Cu^{2+} + S^{2-} \rightarrow CuS$
- ☐ $CuCl_2 + S^{2-} \rightarrow CuS + 2Cl^-$
- ☐ $Na_2S + Cu^{2+} \rightarrow CuS + 2Na^+$
- ☐ $Cu + S \rightarrow CuS$
- ☐ $Na_2S + CuCl_2 \rightarrow CuS + 2NaCl$

281) The net ionic equation for the reaction, if any, which occurs when aqueous solutions of manganese chloride and sodium carbonate are mixed is:

- ☐ $MnCl_2 + CO_3^{2-} \rightarrow MnCO_3 + 2Cl^-$
- ☐ $MnCl_2 + 2Na^+ \rightarrow 2NaCl + Mn^{2+}$
- ☐ $Mn^{2+} + CO_3^{2-} \rightarrow MnCO_3$
- ☐ $Mn^{2+} + 2Cl- + 2N^{a+} + CO_3^{2-} \rightarrow$ no reaction
- ☐ $MnCl_2 + Na_2CO_3 \rightarrow MnCO_3 + 2NaCl$

282) Which of the following substances should be written in molecular form in an ionic equation?

- ☐ $HC_2H_3O_2$
- ☐ HBr
- ☐ HCl
- ☐ HI
- ☐ HNO_3

283) which of the following should be represented in ionic form in aqueous solution?

- ☐ HNO_2
- ☐ HF
- ☐ $HClO_4$
- ☐ HCN
- ☐ $HC_2H_3O_2$

284) Which of the following net ionic equations best represents the reaction that takes place when solid calcium carbonate and aqueous nitric acid solution are mixed?

- ☐ $CO_3^{2-} + 2H^+ \rightarrow H_2CO_3$
- ☐ $CaCO_3 + 2HNO3 \rightarrow Ca(NO_3)_2 + H_2CO_3$
- ☐ $CaCO_3 + 2H^+ \rightarrow Ca^{2+} + H_2CO_3$
- ☐ $CaCO_3 + 2H^+ \rightarrow Ca^{2+} + H_2O + CO_2$
- ☐ $Ca^{2+} + 2NO_3^- \rightarrow Ca(NO_3)_2$

285) When the following equation is balanced with the smallest possible set of integer coefficients, what is the coefficient of Pb?

$$\_\_ PbO + \_\_ NH_3 \rightarrow \_\_ Pb + \_\_ N_2 + \_\_ H_2O$$

- ☐ 1
- ☐ 2
- ☐ 5
- ☐ 4
- ☐ 3

286) When the following chemical equation is correctly balanced, using the smallest possible whole number coefficients, the coefficient before the H_2O is:

$$\_\_Mg_3N_2 + \_\_H_2O \rightarrow \_\_Mg(OH)_2 + \_\_NH_3$$

- ☐ 6
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5

287) The net ionic equation for the reaction , if any, when aqueous solutions of H_2SO_4 and $Ba(OH)_2$ are mixed is:

- ☐ $H^+ + OH^- \rightarrow H_2O$
- ☐ $Ba^{2+} + SO_4^{2-} \rightarrow BaSO_4$
- ☐ $Ba^{2+} + 2OH^- + 2H^+ + SO_4^{2-} \rightarrow BaSO_4 + 2H_2O$
- ☐ $Ba(OH)_2 + 2H^+ + SO_4^{2-} \rightarrow BaSO_4 + 2H_2O$
- ☐ $Ba(OH)_2 + 2H^+ \rightarrow Ba^{2+} + 2H_2O$

288) Which net ionic equation best represents the reaction (if a reaction occurs) between $CuCl_2$ and K_2S

- ☐ $CuCl_2 + S^{2-} \rightarrow CuS + 2Cl^-$
- ☐ $Cu^{2+} + K_2S \rightarrow CuS + 2K^+$
- ☐ $Cu^{2+} + S^{2-} \rightarrow CuS$
- ☐ $2Cl^- + K_2S \rightarrow 2KCl + S^{2-}$
- ☐ No reaction will occur.

289) When the following equation is balanced with the smallest whole number coefficients possible, the coefficient of KNO_3 is:

$$\_\_\_K_3PO_4 + \_\_\_Ca(NO_3)_2 \rightarrow \_\_\_KNO_3 + \_\_\_ Ca_3(PO_4)_2$$

- ☐ 3
- ☐ 2
- ☐ 4
- ☐ 6
- ☐ 5

290) A mole of any substance contains

- ☐ 6.022×10^{22} particles
- ☐ 6.022×10^{23} particles
- ☐ 6.022×10^{24} particles
- ☐ 6.022×10^{25} particles

291) 1 mole of substance refers to

- ☐ molar mass
- ☐ atomic mass
- ☐ electron mass
- ☐ neutron mass

292) 6.022×10^{23} atoms of Sulphur contains

- ☐ 2 moles
- ☐ 3 moles
- ☐ 4 moles
- ☐ 1 mole

293) If one mole of carbon contains x atoms then number of atoms in 12g of Mg are

- ☐ x
- ☐ 0.5x
- ☐ 2x
- ☐ 1.5x

294) The number of atoms of hydrogen in 2 moles of NH_3

- ☐ 5×10^{23}
- ☐ 3.01×10^{23}
- ☐ 3.61×10^{24}
- ☐ 4×10^{23}

295) What is the mass of one mole of Fe_2CO_3?

- ☐ 83.9
- ☐ 163.7
- ☐ 171.7
- ☐ 202.3

296) What is the percent composition of oxygen in As_3O_2?

- ☐ 12.5%
- ☐ 53%
- ☐ 60%
- ☐ 87.5%

297) If the empirical formula is $MgBr_2$, which of the following formulas is an example of a possible molecular formula?

- ☐ Mg_2Br
- ☐ Mg_2Br_4
- ☐ Mg_3Br_2
- ☐ Mg_4Br_2

298) What is an empirical formula?

- ☐ Shows the number of atoms
- ☐ The formula you find from dividing all mole values by the smallest mole value
- ☐ The proportion of elements in a compound

299) Calculate the percent composition of hydrogen in sodium bisulfate

- ☐ 0.8%
- ☐ 1.4%
- ☐ 19.2%
- ☐ 80.8%

300) If the empirical formula is 80% carbon and 20% hydrogen, how much mass of each does that represent?

- ☐ 20 g carbon, 80 g hydrogen
- ☐ 80 g carbon, 20 g hydrogen
- ☐ 100 g
- ☐ There is not enough information

301) What is Avogadro's number?

- ☐ $6.02 \times 10_{22}$
- ☐ $6.02 \times 10_{23}$
- ☐ 22.4
- ☐ The molar mass of an element

302) 22.4 L at STP is equal to which of the following?

- ☐ 1 mole of gas
- ☐ 1 mole of liquid
- ☐ 22.4 moles of gas
- ☐ 22.4 moles of liquid

303) How many atoms are in three moles of oxygen?

- ☐ $1.81x10_{24}$
- ☐ $2.01x10_{23}$
- ☐ $6.02x10_{23}$
- ☐ 32

304) What is the percent water in magnesium sulfide dihydrate?

- ☐ 24.2%
- ☐ 43.1%
- ☐ 75.8%

305) The number of atoms in a mole of any pure substance is called

- ☐ its atomic number.
- ☐ Avogadro's number.
- ☐ its mass number.
- ☐ its gram-atomic number.

306) What can be said about 1 mol Ag and 1 mol Au?

- ☐ They are equal in mass.
- ☐ They contain the same number of atoms.
- ☐ Their molar masses are equal.
- ☐ They have the same atomic mass.

307) An Avogadro's number of any element is equivalent to

- ☐ the atomic number of that element.
- ☐ the mass number of that element.
- ☐ 6.022×10^{23} particles.
- ☐ 12 g of that element.

308) The atomic mass of hydrogen is 1.008 amu. The reason that this value is not a whole number is that

- ☐ hydrogen only exists as a diatomic molecule.
- ☐ the mass of hydrogen is the sum of the masses of the protons and electrons in the atom.
- ☐ the mass of a proton is not exactly equal to 1 amu.
- ☐ hydrogen has more than one isotope.

309) A chemical formula includes the symbols of the elements in the compound and subscripts that indicate

- ☐ the number of formula units present.
- ☐ the number of atoms or ions of each type.
- ☐ the formula mass.
- ☐ the charges on the elements or ions.

310) How many atoms of fluorine are in a molecule of carbon tetrafluoride, CF_4?

- ☐ 1
- ☐ 2
- ☐ 4
- ☐ 5

311) A formula that shows the simplest whole-number ratio of the atoms in a compound is the

- ☐ molecular formula.
- ☐ ideal formula.
- ☐ structural formula.
- ☐ empirical formula.

312) The molar mass of an element is the mass of one

- ☐ atom of the element.
- ☐ liter of the element.
- ☐ gram of the element.
- ☐ mole of the element.

313) To determine the molar mass of an element, one must know the element's

- ☐ Avogadro number.
- ☐ atomic number.
- ☐ number of isotopes.
- ☐ average atomic mass.

314) What is the molar mass of magnesium?

- ☐ 12.00 g
- ☐ 26.982 g
- ☐ 24.305 g
- ☐ 22.990 g

315) What is the empirical formula for a compound that is 36.1% Ca and 63.9% Cl?

- ☐ CaCl
- ☐ Ca_2Cl
- ☐ $CaCl_2$
- ☐ Ca_2Cl_2

316) The molecular formula for vitamin C is $C_6H_8O_6$. What is the empirical formula?

- ☐ CHO
- ☐ CH_2O
- ☐ $C_3H_4O_3$
- ☐ $C_2H_4O_2$

317) The percentage of sulfur in SO_2 is about 50%. What is the percentage of oxygen in this compound?

- ☐ 25%
- ☐ 50%
- ☐ 75%
- ☐ 90%

318) What is the percentage of OH– in $Ca(OH)_2$?

- ☐ 45.9%
- ☐ 66.6%
- ☐ 75%
- ☐ 90.1%

319) How many atoms are there in 3.33 moles of strontium?

- ☐ 2.00×10^{24} atoms
- ☐ 3.21×10^{32} atoms
- ☐ 1.11×10^{11} atoms
- ☐ 4.24×10^{23} atoms

320) How many atoms are there in 3.33 moles of strontium?

- ☐ 2.00×10^{24} atoms
- ☐ 3.21×10^{32} atoms
- ☐ 1.11×10^{11} atoms
- ☐ 4.24×10^{23} atoms

321) What is the mass of 3.35 moles of sulfur trioxide?

- ☐ 335 g
- ☐ 268 g
- ☐ 245 g

322) How many moles are there in 425.0 g of sodium chloride?

- ☐ 9.835 mol
- ☐ 8.126 mol
- ☐ 7.272 mol
- ☐ 6.691 mol

323) What is the mass of 5.55 moles of carbon monoxide?

- ☐ 155 g
- ☐ 143 g
- ☐ 138 g
- ☐ 122 g

324) Avogadro's number represents the number of atoms in

- ☐ 12g of $C1_2$
- ☐ 320g of Sulphur
- ☐ 32g of oxygen
- ☐ 12.7g of iodine

325) The number of moles of carbon dioxide which contain 8 g of oxygen is

- ☐ 0.5 mol
- ☐ 0.20 mol
- ☐ 0.40 mol
- ☐ 0.25 mol

326) The total no of ions present in 111 g of $cacl_2$ is

- ☐ One mole
- ☐ Two mole
- ☐ Three mole
- ☐ Four moles

327) Which of the following weighs the most ?

- ☐ one g-atom of nitrogen
- ☐ One mole of water
- ☐ One mole of sodium
- ☐ One molecule of H_2SO_4

328) 5.0 liter of 0.4 M H_2SO_4 Contains-

- ☐ 2.0 Mole Of H_2SO_4
- ☐ 0.4 mole H_2SO_4
- ☐ 5.0 mole H_2SO_4
- ☐ 2.0 moles H_2O

329) A symbol not only represents the name of the element but also represents-

- ☐ its atomic no.
- ☐ 1 gm-atom
- ☐ its atomicity
- ☐ Reactivity.

330) Which has maximum number of atoms?

- ☐ 1.806×10^{23}
- ☐ 31.80×10^{23}

331) The maximum no. of molecules is present in

- ☐ 15 L of H_2 gas at S.T.P
- ☐ 5 L of N_2 gas at S.T.P
- ☐ 0.5 g of H_2 gas
- ☐ 10 g of O_2 gas.

332) The number of g-atom of oxygen in 6.02×10^{24} CO molecules is

- ☐ 0.5
- ☐ 5
- ☐ 10
- ☐ 1

333) Number of electrons in 1.8 mL of H_2O is:

- ☐ 6.02×10^{23}
- ☐ 3.011×10^{23}
- ☐ 0.6022×10^{23}
- ☐ 60.22×10^{23}

334) Which names are associated with 1g / NA ?

- ☐ Rutherford
- ☐ Dalton
- ☐ Avogadro
- ☐ 1 gram

335) 100 g $caco_3$ is treated with I liter of 1N HCl. What would be the weight of co2 liberated after the completion of the reaction?

- ☐ 5.5 g
- ☐ 11g
- ☐ 22g
- ☐ 33g

336) The mass of carbon present in 0.5 mole of K4 $[Fe(CN)_6]$ is

- ☐ 1.8 g
- ☐ 18 g
- ☐ 3.6 g
- ☐ 36 g

337) Number of water molecules in the drop of water, if 1 ml of water has 20 drops and A is Avogadro's number, is-

- ☐ 0.5A/18
- ☐ 0.05A
- ☐ 0.5A
- ☐ 0.05A/18

338) 0.224 L of H_2 gas at S.T.P is equivalent to

- ☐ mol
- ☐ 1g

339) A sample of phosphorus trichloride (PCl_3) contains 1 .4 moles of the substance. how many atoms are there is the sample?

- ☐ 5.6
- ☐ 4
- ☐ 8.431×10^{23}
- ☐ 3.372×10^{24}

340) Which among the following is the heaviest?

- ☐ One mole is oxygen
- ☐ One molecule of Sulphur trioxide
- ☐ 100 amu of uranium
- ☐ 44 g of carbon dioxide.

341) 6.02×10^{22} molecules of N_2 at NTP will occupy a volume of

- ☐ 22.4 liters
- ☐ 2.24 liters
- ☐ 6.02 liters
- ☐ 6.02 mL

342) How many grams are contained in 1 gram-atom of Na?

- ☐ 13g
- ☐ 23g
- ☐ g
- ☐ 1/23g

343) I mole of a compound contain 1 mole of C and 2 moles of O. The molecular weight of the compound is

- ☐ 3
- ☐ 12
- ☐ 32
- ☐ 44

344) The number of atoms of oxygen present in 10.6g of Na_2CO_3 will be.

- ☐ 6.02×10^{22}
- ☐ 12.04×10^{22}
- ☐ 1.806×10^{23}
- ☐ 31.8

345) Which of the following has the largest number of atoms?

- ☐ 0.5 g atom of Cu
- ☐ 0.635 g of Cu
- ☐ 0.25 mole of Cu
- ☐ 3.35 × 1020 amu of Cu

346) The number of atoms present in 16 g of oxygen is

- ☐ 6.05 × 1011.5
- ☐ 3.01 × 1023
- ☐ 3.01 × 1011.5
- ☐ 6.02 × 1023

347) Number of atoms in 12 g of C_6^{12} is-

- ☐ 5
- ☐ 12
- ☐ 6.022×10^{23}
- ☐ $12 \times 6.022 \times 10^{23}$

348) Which of the following contains the greatest number of oxygen atoms?

- ☐ 1 g of O
- ☐ 1g of O_2
- ☐ 1 g of O_3
- ☐ All have the same number of atoms

349) The total number of atoms represented by the compound $CuSO_4.5H_2O$ is -

- ☐ 27
- ☐ 21
- ☐ 5
- ☐ 8

350) Which of the following has the highest mass?

- ☐ 1 g-atom of C
- ☐ 3.011×10^{23} atoms of oxygen
- ☐ 1/2 mole of CH_4
- ☐ 10 mL of water

351) If the atomic weight of carbon were set at 24 amu, the value of the Avogadro constant would be

- ☐ 6.022×10^{23}
- ☐ 12.044×10^{23}
- ☐ 3.011×10^{23}
- ☐ none of these

352) If 32 g of O2 contain 6.022×1023 molecules at NTP then 32g of S, under the same conditions, will contain,

- ☐ 6.022×10^{23} S
- ☐ 3.011×10^{23} S
- ☐ 12.044×10^{23} S
- ☐ 1×10^{23} S

353) Atomic mass of an elements is

- ☐ the actual mass of one atom of the element
- ☐ the relative mass of an atom of the element
- ☐ the average relative mass of different atoms of the element
- ☐ much different from the mass number of the element.

354) The correct value of Avogadro's number is

- ☐ 6.02×10^{21}
- ☐ 6.02×10^{22}
- ☐ 6.02×10^{23}
- ☐ $.62 \times 10^{-34}$

355) Which one of the following statements is incorrect?

- ☐ One gram atom of carbon contains Avogadro's number of atoms.
- ☐ One mole of oxygen gas contains Avogadro's number of atoms.
- ☐ One mole of hydrogen contains Avogadro's number of atoms.
- ☐ One mole of electrons stands for 6.02x1023 electrons

356) The no. of gram atoms of oxygen present in 0.3 g--- mole of $(COOH)_2.2H_2O$ is:

- ☐ 0.6
- ☐ 1.8
- ☐ 1.2
- ☐ 3.6

357) Which sample contains the largest number of atoms?

- ☐ 1 mg of C_4H_{10}
- ☐ 1 mg of N_2
- ☐ 1 mg of Na
- ☐ 1 mL of water

358) One mole of P_4 molecules contain:

- ☐ 1 molecule of p
- ☐ 4 molecules of p
- ☐ $\frac{1}{4} \times 6.022 \times 10^{23}$ atoms of p
- ☐ 24.088×10^{23} atoms of p

359) A formula with the lowest whole # ratio of elements in a compound is called _____.

- ☐ covalent formula
- ☐ chemical formula
- ☐ empirical formula
- ☐ molecular formula

360) A chemical formula that shows the actual # and kinds of atoms present in one molecule of a compound is called _____.

- ☐ molecular formula
- ☐ covalent formula
- ☐ empirical formula
- ☐ ionic formula

361) Which of the following is an empirical formula?

- ☐ P_4O_{10}
- ☐ H_2O_2
- ☐ N_2O
- ☐ C_2H_4

362) All of the following are empirical formulas EXCEPT

- ☐ N_2O_4
- ☐ Na_2SO_4
- ☐ C_3H_8
- ☐ $Al_3(SO_4)_2$

363) Which of the following is the correct empirical formula for C_4H_{10}?

- ☐ C_2H_5
- ☐ C_8H_{20}
- ☐ C_4H_{10}
- ☐ $CH_{2.5}$

364) A substance has a molecular formula of $C_8H_10N_4O_2$. The empirical formula is

- ☐ $C_2H_6N_2O$
- ☐ $C_9H_7N_3O$
- ☐ CHNO
- ☐ $C_4H_5N_2O$

365) A compound is 25.9% nitrogen and 74.1% oxygen. Find its empirical formula.

- ☐ NO
- ☐ N_4O_6
- ☐ N_2O_4
- ☐ N_2O_5

366) Determine the empirical formula for a compound with 87.1% Ag and 12.9% S.

- ☐ AgS_2
- ☐ Ag_2S
- ☐ Ag_4S_2
- ☐ Ag_3S_5

367) The empirical formula of a substance is CH_2O. Its molar mass is 180. What is the molecular formula?

- ☐ C_2H4O_2
- ☐ $C_4H_8O_4$
- ☐ $C_8H_{16}O_8$
- ☐ $C_6H_{12}O_6$

368) Epinephrine (adrenaline) is a hormone secreted into the bloodstream in times of stress. It contains 59.0% C, 7.15% H, 26.20% O, and 7.65% N and has a molar mass of 183 g/mol. What is its molecular formula?

- ☐ $C7H_9N_2O$
- ☐ $C_8H_{12}NO_2$
- ☐ $C_5H_{11}N3O_2$
- ☐ $C_9H_{13}NO_3$

369) The empirical formula for water is

- ☐ CO_2
- ☐ HO
- ☐ H_2
- ☐ H_2O

370) The molecular formula gives

- ☐ simplest ratio of atoms
- ☐ actual whole number ratio of atoms
- ☐ whole number ratio of atoms
- ☐ natural number ratio of atoms
- ☐

371) In glucose the simplest ratio between C, H and O is

- ☐ 2 : 1 : 3
- ☐ 3 : 2 : 1
- ☐ 1 : 2 : 1
- ☐ 3 : 4 : 1

372) The formula which gives the simplest whole number ratio of atoms is

- ☐ empirical formula
- ☐ molecular formula
- ☐ chemical formula
- ☐ none of above

373) To convert between moles and atoms of a substance, _____ must be used.

- ☐ formula masses
- ☐ mole ratios
- ☐ atomic masses
- ☐ Avogadro's number

374) The simplest whole-number ratio of atoms in a compound is called the _____.

- ☐ empirical formula
- ☐ molecular formula
- ☐ formula mass
- ☐ none of the above

375) What is the empirical formula of a compound containing 0.347 mole P to 1.031 mole Cl?

- ☐ PCl_3
- ☐ PCl_5
- ☐ P_2Cl_5
- ☐ P_2Cl_6

376) Determine the empirical formula of a compound that was found to contain 6.412 g potassium, 2.292 g N, and 7.871 g O.

- ☐ KN_2O_5
- ☐ KNO_3
- ☐ KNO_2
- ☐ K_2NO_5

377) How many atoms of chromium are in 2.35 g $Na_2Cr_2O_7$?

- ☐ 2.14×10^{22}
- ☐ 5.39×10^{21}
- ☐ 1.08×10^{22}
- ☐ 9.27×10^{-23}

378) Why do chemists usually work with moles instead of amu?

- ☐ amu's are hard to count
- ☐ individual atoms or molecules are too small
- ☐ they like large numbers
- ☐ they are lazy

379) How many grams are in 1 mole of 16O?

- ☐ it depends on the element
- ☐ it depends on the formula of the compound
- ☐ 16
- ☐ 6.022×10^{23}

380) To convert between moles and atoms of a substance, _____ must be used.

- ☐ formula masses
- ☐ mole ratios
- ☐ atomic masses
- ☐ Avogadro's number

381) Which is the molar mass of acetylsalicylic acid (aspirin), $C_9H_8O_4$:

- ☐ 29 g
- ☐ 108 g
- ☐ 196 g
- ☐ 180 g
- ☐ none of the above

382) How many hydrogen atoms are present in 42 g of ammonium carbonate?

- ☐ 3.5
- ☐ 8
- ☐ 2.6×10^{23}
- ☐ 10^{24}
- ☐ 2.1×10^{24}

383) A mole of H_2

- ☐ contains 6×10^{23} atoms
- ☐ contains 6×10^{23} molecules
- ☐ contains 1 gram of hydrogen
- ☐ is 6×10^{23} grams of hydrogen
- ☐ none of the above

384) How many mL of water must be added to 300 mL of 0.75 M HCl to dilute the solution to 0.25 M?

- ☐ 900 mL
- ☐ 600 mL
- ☐ 300 mL
- ☐ 930 mL
- ☐ 100 mL

385) What volume of concentrated nitric acid (15.0 M) is required to make 300mL of a 2.5M nitric acid solution?

- ☐ 1.8 L
- ☐ 50 mL
- ☐ 12.5 mL
- ☐ 18 mL
- ☐ 8 mL

386) What is the molarity of a solution that contains 3.00 moles of solute and 12.00 Liters of solution?

- ☐ 0.25 M
- ☐ 3.00 M
- ☐ 4.00 M
- ☐ 12.00 M
- ☐ Not enough information is given to the question.

387) A compound of vanadium and oxygen is found to be 56.04 percent by weight vanadium. What is the empirical formula of the compound?

(V = 51.00, O = 16.00)

- ☐ VO_2
- ☐ V_2O
- ☐ V_3O_2
- ☐ V_2O_3
- ☐ V_2O_5

388) Calculate the number of moles of $CaCO_3$ (Formula wt. = 100) in a sample that weighs 25.0 grams.

- ☐ 25.0
- ☐ 100
- ☐ 4.0
- ☐ 0.750
- ☐ 0.250

389) Calculate the amount of sulfur dioxide produced when 145 grams of iron pyrite (FeS_2) completely reacts with oxygen according to the equation:

$$4FeS_2 + 11O_2 \rightarrow 2Fe_2O_3 + 8SO_2$$

(FeS_2 = 120, SO_2 = 64.1)

- ☐ 77.5
- ☐ 38.7
- ☐ 155
- ☐ 1.21
- ☐ 129

390) Metal X combines with oxygen to form a compound with the formula X_2O_7. 0.0441 grams of oxygen (O) combines with 0.0432 grams of metal X. Calculate the atomic weight of X. (Atomic wt. of O = 16.00)

- ☐ 15.7
- ☐ 4.48
- ☐ 4.67
- ☐ 54.9
- ☐ 16.3

391) The percent, by weight, of oxygen in barium nitrate, $Ba(NO_3)_2$ is:

Weights: N = 14.0, Ba = 137, O = 16.0, $Ba(NO_3)_2$ = 261

- ☐ 0.368%
- ☐ 6.13%
- ☐ 36.8%
- ☐ 137%
- ☐ 2.30%

392) A sample of an oxide of an unknown metal, M, contains 46.0 grams of M and 16.0 g of oxygen. If the formula of the metal oxide is M_2O, what is the atomic weight of the metal M? Atomic weight: O = 16.0

- ☐ 39.1
- ☐ 23.0
- ☐ 46.0
- ☐ 63.5
- ☐ 92.0

393) The molecular formula of the sugar glucose is $C_6H_{12}O_6$.

Molar masses: $C_6H_{12}O_6$ = 180; C = 12.0; H = 1.01; O = 16.0

If a sample of glucose contains 4.00 moles of H, how many moles of C are there in the sample?

- ☐ 4.0
- ☐ 2.0
- ☐ 8.0
- ☐ 18.0
- ☐ 48.0

394) What is the percent by weight of P in the compound in P_4S_3?

- ☐ 17.7
- ☐ 12.9
- ☐ 56.4
- ☐ 43.2
- ☐ 77.5

395) The molecular formula of the sugar glucose is $C_6H_{12}O_6$.

Molar masses: $C_6H_{12}O_6$ = 180; C = 12.0; H = 1.01; O = 16.0

If a sample of glucose contains 3.00 moles of carbon, how many oxygen atoms are there in the sample?

- ☐ 4.98×10^{-24}
- ☐ 5.98×10^{-23}
- ☐ 2.01×10^{23}
- ☐ 1.81×10^{24}
- ☐ 2.17×10^{25}

396) What is the number of O atoms in 88.0 grams of CO_2 (MW = 44.0)?

- ☐ 1.00
- ☐ 4.00
- ☐ 6.02×10^{23}
- ☐ 1.20×10^{24}
- ☐ 2.41×10^{24}

MW = molecular weight

397) What is the weight of one F_2 molecule in grams?

(Atomic weight F = 19.0)

- ☐ 1.58×10^{-22}
- ☐ 6.31×10^{-23}
- ☐ 1.43×10^{-23}
- ☐ 2.29×10^{25}
- ☐ 1.58×10^{22}

398) Which of the following could be an empirical formula?

- ☐ H_2O_2
- ☐ C_6H_6
- ☐ $C_6H_{12}O_6$
- ☐ CH_2O
- ☐ N_2O_4

399) What is the percent by weight of sulfur in SO_2?

Atomic weights: S = 32.0, O =16.0

- ☐ 33.3
- ☐ 48.0
- ☐ 50.0
- ☐ 64.0
- ☐ 66.7

400) The combustion of one mole of a hydrocarbon yields 3.00 moles of CO_2 and 4.00 moles of H_2O. The empirical formula of this compound is:

- ☐ C_3H_4
- ☐ C_3H_3
- ☐ CH_4
- ☐ C_4H_3
- ☐ C_3H_8

401) A 25.0-gram sample of a compound contains 6.64 grams of potassium (K, at.wt. = 39.1), 8.84 grams of chromium (Cr, at.wt. = 52.0), and 9.52 grams of oxygen (O, at.wt. = 16.0). Find the empirical formula of this compound.

- ☐ K_2CrO_4
- ☐ K_3CrO_3
- ☐ $K_2Cr_2O_7$
- ☐ $KCrO_4$
- ☐ $K_7Cr_2O_2$

at.wt. = atomic weight

402) Which of the following samples contains the largest number of atoms?

Atomic weights: C =12.0; O =16.0

- ☐ $6.02x10^{23}$ H_2 molecules
- ☐ 28.0 grams of CO
- ☐ 0.50 mol NH_3
- ☐ 24.0 grams of carbon
- ☐ They all contain the same number of atoms.

403) If 12.4 g of phosphorus reacts with sulfur to form 22.0 g of a compound of P and S, what is the simple formula of the compound?

Atomic Weights: P =31.0; S =32.1

- ☐ P_2S
- ☐ P_3S_2
- ☐ P_3S_4
- ☐ P_2S_3
- ☐ P_4S_3

404) A certain substance is analyzed and found to contain the following weight percentages: 36.84% nitrogen (N) and 63.16% oxygen (O). Determine the empirical formula of this compound.

(Atomic wts: N =14.0, O =16.0)

- ☐ N_3O_2
- ☐ NO
- ☐ NO_2
- ☐ N_2O
- ☐ N_2O_3

405) X is an element that consists of diatomic molecules (X_2). Calculate the weight of one atom of X if 1.23x1023 molecules of X_2 weigh 32.7 grams.

- ☐ 32.7
- ☐ $2.66x10^{-22}$
- ☐ $1.33x10^{-22}$
- ☐ $1.23x10^{23}$
- ☐ $7.52x10^{21}$

406) The percent, by weight, of nitrogen in ammonium sulfate, $(NH_4)_2SO_4$ is:

(atomic weights: N =14.0, H =1.01, S =32.1, O =16.0)

- ☐ 21.2%
- ☐ 10.6%
- ☐ 28.0%
- ☐ 14.0%
- ☐ 132%

407) How many moles of CO_2 are present in 220 mg?

- ☐ moles
- ☐ 0.005 mole
- ☐ 5000 moles
- ☐ 10 moles

408) What is the percent water in hydrated calcium chloride...$CaCl_2 \cdot 2H_2O$?

- ☐ 66.67%
- ☐ 32.47%
- ☐ 24.51%
- ☐ 12.26%

409) What is the empirical formula for a compound that contains 17.34% hydrogen and 82.66% carbon?

- ☐ C_5H
- ☐ C_2H_5
- ☐ CH_3
- ☐ CH_2

410) What is the molecular formula for a compound that is 46.16% carbon, 5.16% hydrogen and 48.68% fluorine if the molar mass of this compound is 156.12 g?

- ☐ $C_3H_4F_2$
- ☐ $C_5H_{10}F_5$
- ☐ $C_6H_8F_4$
- ☐ $C_6H_6F_3$

411) If 2.68 g of hydrated sodium sulfate, $Na_2SO_4 \cdot nH_2O$, on heating produces 1.26 g of water, what is the empirical formula of this compound?

- ☐ $Na_2SO_4H_2O$
- ☐ $2Na_2SO_4H_2O$
- ☐ $Na_2SO_47H_2O$
- ☐ $9Na_2SO_48H_2O$

412) One mole of $(NH_4)_2HPO_4$ contains _? _ moles of hydrogen atoms.

- ☐ 1
- ☐ 5
- ☐ 6
- ☐ 9