General Direction: Choose the best answer from the given alternatives

1. The atoms A and B have the electronic configurations of $1s^2\ 2s^2\ 2p^6{}_{3S}{}^2$and $1s^2\ 2s^{\ 2}\ 2p^5$ respectively. The formula of the compound they form together is most likely to be;-
   A .A_2B_5 B.A_2B_3 C.A_3B D.AB_2 E.A_3B_2
2. Of the following compounds which one contain an element that **violets** the octet rule A. SO_2 B.BCl_3 C .NCl_3 D.$SiCl_4$
3. The number of **sigma bonds** and **Pi bonds** present in **$CH_3CH=CH-CH=CH-CH_3$** are A. 14 , 2 B. 11, 2 C. 15, 2 D. 4, 2
4. Which statement is **not** true?
   A. 2 sigma and 2 pi bonds are present in CO_2B. The type of orbital overlap in HCl is S-S overlap C. The type of hybridization in CH_4 is SP^3D. $COCl_2$ contain 3 sigma bonds and 1 pi bonds
5. Which of the following best describes the formation of **pi (π)** bonds? They are formed by the
   A. side to side way overlapping of S- orbitals B. head to head overlapping of P-orbitals C. side to side way overlapping of P- orbitals D. head to head overlapping of S-orbitals
6. Which of the following orbitals can overlap **both** in head to head and side to side ways A. S-S orbitals B. S-P orbitals C. P-P orbitals D. All
7. The type of orbital overlapping and hybridization respectively in BF_3 are
   A. P-SP^2 overlapping B. S-SP^2 overlapping C.P-SP^3 overlapping D. S-SP^3 overlapping
8. Which of the following statement is **true**?
   A. Two sigma bonds represent one double bond.
   B. A triple bond consists of one π-bond and two sigma bonds.
   C. Bonds formed from S-orbitals overlapping are always sigma bonds.
   D. End to end overlapping has two region of high electron density.
9. Which one of the following types of hybridization **does not** exist?
   A. SP^3d^2B. SP^2 C. SP^3 D. SP^2d^1
10. A species (molecules) **cannot** exist When:
    A. There is less number of electrons in its antibonding orbitals
    B. There are more number of electrons in its bonding orbitals
    C. There is one more electron in its antibonding orbitals
    D. There are equal number of electrons in its bonding and antibonding orbitals
11. All of the following molecules have the same type of hybridization except
    A. H_2O B. NH_3 C. SO_3 D. CH_4
12. Which one of the following species **cannot** exist? A. B_2^+ B. F_2^{-2}C. C_2^{+2} D. N_2^{-2}
13. Which of the following statement is **not true** about bond order?
    A. Molecules having zero bond order cannot exist
    B. The higher the bond order is the less the stable the molecule
    C. All triple bonds have three bonds order

D. It is half the difference b/n bonding electrons & antibonding electrons in molecular orbitals

14. Which one is **not** correctly related with its number of bond order?
A. N_2 → three bond order B. B_2 → one bond order C. C_2^- → 2.5 bond order D. O_2 → 1.5 bond order

15. Which of the following molecule is **not** paramagnetic? A. B_2 B. N_2^- C. C_2^{+2} D. O_2^{+2}

16. The diatomic species X_2^+ has the electron configuration of: $(\delta 1S)^2(\delta^* 1s)^2$ $(\delta 2S)^2(\delta^* 2s)^2$ $(\delta 2Px)^2$ $(\pi 2Py)^2$ $(\pi 2P_z)^2$ $(\pi^* 2Py)^2$ $(\pi^* 2P_z)^1$. Which of these is the actual diatomic species? A. F_2^+ B. N_2^+ C. C_2^+ D. O_2^-

17. Which of the ff pair of molecules is paramagnetic in nature? (Åtomic number of O=8,B=5,N=7, F=9, H =1)
A. O_2 and B_2 B. N_2 and O_2 C. N_2 and F_2 D. H_2 and N_2

18. A neutral molecule having the general formula AB_2, has no any non-bonding pairs of electrons on a central atom. What is the hybridization of the central atom? A. SP B. SP^2 C. SP^3 D. SP^3d E. SP^3d^2

19. In which of the following substances will hydrogen bond **not** present?
A. CH_3CH_2OH B. HI C. H_2O D. HNO_3

20. Which species out of the following does **not** contain unpaired electrons? A. N_2^+ B. $O_2^{2-¿¿}$ C. O_2 D. B_2

21. Which of the following has the highest dipole moment? A. CO_2 B. HI C. SO_2 D. H_2O

22. Which of the following statements is **incorrect** about molecular orbitals of molecules?
A. Anti- bonding molecular orbitals are higher in energy than bonding molecular orbitals
B. Sigma molecular orbitals are symmetrical around bonding axis
C. Pi molecular orbitals are unsymmetrical around bonding axis
D. Molecular orbitals are singly occupied in diamagnetic molecules

23. All of the following species are correctly matched with their molecular geometers **except:-**
A. $BF_4^{-¿\rightarrow ¿}$ Tetrahedral C. SO_2 → angular
B. $COCl_2$ → Trigonal planar D. I_3^- → Trigonal bipyramidal

24. An element `**M**` when reacted with oxygen form the compound of the form M_2O_3. Element `M` could be: A. Potassium B. Magnesium C. Aluminum D. Barium

25. Which of the ff ionic compound does not obey the octet rule? A. $CaCl_2$ B. $FeCl_2$ C. KCl D. $MgCl_2$

26. Which of the ff ionic compound has the highest lattice energy? A. LiCl B. NaCl C. CsCl D.KCl

27. Which one the following atoms in its ground state have the highest number of unpaired electron? A. $_{19}K$ B. $_{16}S$ C. $_{20}Ca$ D. $_{15}P$

28. Which electron configurations describe the ground state electron configuration of Ca^{2+}? A.$1s^2\ 2s^2\ 2p^6\ 3p^1$ B.$1s^2\ 2s^2\ 2p^6\ 3s^1$ C. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$ D. $1s^2\ 2s^2\ 2p^6\ 3s^2 3p_x^2 3p_y^1$

29. What is the electron configuration of sulfur (Z=16)?
A. $1s^2 2s^2 2p^6 3s^2 3p^4$ B. $1s^2 2s^2 2p^4$ C. $1s^2 2s^2 3p^6 3s^2 3p^2$ D. $1s^2 2s^2 2p^6 3p^4$

30. **Except** one all of the following molecules are **correctly** written with its type of molecular geometry A. PH_3→ Octahedral B.NCl_3→Trigonal pyramidalC. $COCl_2$ → Trigonal planar D. CS_2 →Linear

31. The type of a molecule containing four bonding pairs and 2 lone pairs electrons on the central atom is likely to be A. AX_2E_3 B. AX_4E_2 C. AX_3E_3 D. AX_2E_4

32. Except one all have a linear molecular geometry A.CO_2 B. XeF_2 C. ClF_3 D. IF_2

33. If element A has low ionization energy and element **B** has high electron affinity. The type of bond formed between element A and B is
A. Coordinate covalent bond B. Covalent bond C. Ionic bond D. Metallic bond

34. Which one of the following compound contains**both** ionic and covalent bonds?
A.PCl_5 B. K_2O C. Na_2CO_3 D. H_3O^+

35. Which statement **is correct** among the followings
A. SO_2, H_2O, NH_3 and SF_4 are all polar molecules B. the total number of electrons in $CO_3^{-2}$are 20 C.Cu_2O, LiF, $FeCl_3$ and KF all violet octet rule D. H_2O, NH_3, HI, CH_3OH all contain hydrogen bond

36. Which of the following species represent a molecule? A. CO_2 B. CuO C. NaCl D. Li_2O

37. As the number of electrons shared between two atoms increased
A. number of bonds formed decreases B. strength of bond increases
C. bond length increasesD. more number of lone pairs left on the central atom

38. Resonance structure is **not** present in A. NO_3^- B.CO_3^{-2} C. NH_4^+ D. O_3

39. All of the following species **do not** obey the octet rule except A. ClO_3 B. ICl_5 C. SF_2 D. BF_3

40. The type of hybridization in C_2H_6 , C_2H_4 and C_2H_2 respectively are
A. SP,Sp^2, SP^3 B. SP^3 , Sp^2, SP C. Sp, SP^3, SP^2 D. SP^3, SP, SP^2

41. An atom has an atomic number of 31 and mass number of 70. How many electrons will i have in it's valence shell? A.5 B. 4 C. 3 D. 2

42. In which one of the following does the central atom achieve an octet of electrons?
A. PCl_5 B. CO_2 C. BH_3 D. $BrCl_3$

43. In the ground state of a cobalt atom, there are _____ unpaired electrons and the atom is _____.
A. 3, paramagnetic B. 5, paramagnetic C. 2, diamagnetic D. 2, paramagnetic

44. What are the over lapping orbitals in the formation of carbon- carbon bond in CH_3CN molecules?
A. sp^2- sp^2B. sp^3- sp C. sp- spD. sp^3- sp^2

45. The hybrid orbitals around a central atom in phosphorous pentachloride molecule are:-
A. sp^3d B. sp^2d C. sp^3 D. sp^3d^2

46. Which one of the following compounds has non- zero dipole moment?
A, CH_4 B. O_2 C. CCl_4 D. CH_3Cl

47. Which type of attractive forces are being overcome when liquid oxygen molecules boils at certain temperature?

A. Dipoles – dipole forces C. Dipole- induced dipole forces
B. Dispersion forces D. Covalent bonds

48. What does the **correc**t Lewis structure for the carbonate ions (CO_3^{2-}) show?
A. 22 valence electrons C. 16 unshared electrons
B. 4 lone pairs of electrons around the carbon atom D. 3 bond pairs of electrons

49. What are the total numbers of sigma($\propto$) and pi(π) bonds present in the structure, CH_3-CH = $CH_{||}$- C- OH, respectively? A.11 & 2 B. 8 & 1 C. 12 & 3 D. 10 & 2
O

50. What is the total number of valence electrons in BrO_3^-? A.20 B. 26 C. 32 D. 40

51. The molecular geometry of a covalent molecule with four sets of electrons from which two are bonding pair and two are lone pair is; A. Seesaw B. T - shape C. Trigonalbipyramid D. Angular

52. How many lone pairs of electrons are there on the sulfur atom in sulfite ion, (SO_3^{2-})? A. 0 B. 1 C. 2 D. 3

53. What hybridization change does the carbon atom undergo in the combustion of methane?

CH_4 (g) + $2O_2$ (g) $\longrightarrow$ CO_2 (g) + $2H_2O$ (g) A. Sp→ Sp^2 B. Sp^2 → Sp^3C. Sp^3 → spD. Sp^2 → Sp

54. The VSEPR theory predicts the molecular geometry of ICl_3 as:

A. triangular planar C. triangular pyramidal
B. triangular bi pyramidal D. T -shaped

55. How many sigma and pi bonds are present in the following molecule? CH_3-CH=CH-CH_3

A. 11 sigma bonds and 1 pi bond C. 9 sigma bonds and 2 pi bonds
B. 10 sigma bonds and 2 pi bonds D. 8 sigma bonds and 1 pi bond

56. Except one all of the followings are a non-polar covalent molecule.
A.CS_2 B. I_2 C. CO_2 D. BF_3 E. SO_2

57. If the electronic configuration of an element is $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $4s^2$ $3d^2$, the electrons involved in chemical bond formation will be_____.
A. $4S^2$ B. $3p^6$**,** $4s^2$ C $3p^6$**,** $3d^2$ D. $3d^2$**,** $4s^2$

58. Which of the following bond angle corresponds to sp^2 hybridization?
A.90° B. 120° C. 180° D. 109°

59. Which among the following is paramagnetic?A. N_2B. N_2^{2-}C. C_2D. O_2^{2-}

60. Which of the following statements is **not correct**?

A. NaCl being an ionic compound is a good conductor of electricity in the solid state.
B. Molecular geometry and electron set arrangement for the given molecule are the same.
C. pi- orbital electrons form weaker bonds than sigma orbital electrons.
D. VSEPR theory can explain the square planar geometry of XeF_4.

61. What is the bond order of F_2^{2-} ?A.1 B.2 C.0 D.3

62. Which of the following molecules would you expect to be non-polar?
A. NH_3 B. H_2O C. PH_3 D. BF_3

63. If a molecule has **V-shape (angular)**, how many **lone pairs** of electrons are there on the central atom? A. 0 B. 2 C. 3 D.4

64. Which of the following molecule can be described by more than one Lewis structure? A. NH_4^+ B. C_2H_2 C. CO_3^{-2} D. PCl_5

65. Which of the following usually produces the weakest interaction between particles of similar molar mass? A. London force B. Dipole-Dipole force C. Covalent bond D. Hydrogen bond

66. Which of the following contain species that are **iso-electronic** with each other?
A. $_{11}Na^+$,$_{12}Mg^{+2}$,$_{13}Al$,$_9F^-$, $_8O^{-2}$ B. $_{11}Na^+$, $_{12}Mg$,$_{13}Al^{+3}$,$_9F^-$, $_8O^{-2}$
C . $_{11}Na$, $_{12}Mg$,$_{13}Al^{+3}$,$_9F^-$, $_8O^{-2}$. D. $_{11}Na^+$,$_{12}Mg^{+2}$,$_{13}Al^{+3}$,$_9F^-$, $_8O^{-2}$

67. Atoms can attain 8 electrons on their outer valence shell by
A. Losing of electrons B. gaining of electrons C. Sharing of electrons D. all of the above

68. Which one is differ from the rest?
A. Ionic bonding B. Hydrogen bonding C. Covalent bonding D. Metallic bonding

69. Atoms in a covalent molecules can violet octet rule due to all of the followings except: A. deficiency of electrons B. Excess of electrons
C. even number of total electrons D. odd number of total electrons

70. Which of the following ionic compounds has the smallest lattice energy?
A. $MgCl_2$ B. $CaCl_2$ C. $AlCl_3$ D. KCl

71. The number of bonding pair and lone pair of electrons respectively in H_2S are
A. 2 , 2 B. 2 , 3 C. 3 , 2 D. 2 , 4

72. Which of the following molecule is AX_3 type? A. BrF_5 B. $POCl_3$ C. $COCl_2$ D. PCl_3

73. All molecules with AX_2E_3 type have a linear geometry. Which one of the following can fulfil this condition? A. ClF_3B. I_3^- C. SF_4 D. XeF_4

74. Dipole-Dipole force is **not** present in A. CH_4 B. HCl C. HI D. HF

75. A neutral molecule having a general formula of AB_3 has two lone pair of electron on the central A. What is the hybridization of A? A. SP B. SP^2 C. SP^3 D. SP^3d E. SP^3d^2

76. The type of hybridization in BCl_4^- is A. SP B. SP^2 C. SP^3 D. SP^3d^1

77. The type of hybridization in alkanes, alkenes and alkynes respectively are
A. SP,Sp^2, SP^3 B. SP^3 , Sp^2, SP C. Sp, SP^3, SP^2 D. SP^3, SP, SP^2

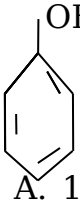
78. According to molecular orbital theory, one of the following molecules does not exist. Identify it.
A. O_2 B. N_2 C. Be_2 D. C_2

79. In the following equation, what type of hybridization change occurs at the carbon atom
CH_3- CH_3 + $^7/_2$ O_2 → $2CO_2$ +$3H_2O$
A. SP^3 to SP^2 B. SP^3 to SP C. SP^3 to SP^3d D. SP^2 to SP

80. From CO_2, H_2O, I_3^{-ii} and BeF_2, which ones have the same molecular shape
A. H_2O and , I_3^{-ii} B. CO_2, BeF_2 and , I_3^{-ii} C. CO_2 and BeF_2 D. H_2O, BeF_2 and CO_2

81. One of the following is not the property of metals.
A. malleable and ductile C. Hard and brittle
B. good conductors of electricity D. Lustre and durable

82. How many sigma and pi bonds are present in phenol (C_6H_5OH) respectively?



A. 10,3 B. 13,3 C. 9,3 D. 12,3

83. How many new hybrid orbitals are formed in hybridization of central atom phosphorous in PCl_3?
A.3 B. 4 C. 5 D. 2

84. What are the over lapping orbitals in the formation of carbon- carbon bond in $CH_2{=}CH_2$ molecules? A. sp^2- sp^2 B. sp^3- sp C. sp- sp D. sp^3- sp^2

85. The bond order and magnetic nature in a molecule of CN^- are
A. 3, paramagnetic B. 2, paramagnetic C. 2, diamagnetic D. 3, diamagnetic

86. Identify the compound formed by an overlap of sp^3 and p orbital's
A. H_2O B. NF_3 C. CH_4 D. PF_5

87. Which one of the following compounds has non- zero dipole moment?
A.NH3 B. H_2 C. CCl_4 D.Cl_2

88. According to molecular orbital theory, one of the following molecules does not Exist. Identify it.
B. H_2 B. C_2^{+2} C. Ne_2 D. O_2^{-2}

89. How many sigma and pi bonds are found in Ethyne (C_2H_2)?
A. $2\delta \wedge ¿2\pi$ B. $3\delta \wedge ¿2\pi$ C. $4\delta \wedge \pi$ D. $2\delta \wedge \pi$

90. A neutral molecule having the general formula AX_2 has two lone pairs of electrons on central atom. What is the hybridization of A? A.Sp^3 B. Sp^3d C. Sp^2 D. sp

91. Which of the following represent the correct electron pair arrangement and molecular shape of BrF_3 respectively? A. trigonal planar, angular C. trigonal bi pyramid, v- shape
B. trigonal planar, T- shape D. trigonal bi pyramid, T- shape

92. How many pairs of unshared valence electrons are present on the central atom of $ICl_4^{-¿¿}$?
A. 0 B. 1 C. 2 D. 3

93. In which of the following compounds intermolecular hydrogen bonding occurs?
A. HCl B. CH_3OH C. H_2CO D. $COCl_2$

94. Which of the following ionic compound does not obey the octet rule?
A. SNO_2 B. $FeCl_2$ C. ZnO D. $SrCl_2$

95. Which of the following molecule has **trigonal pyramidal** molecular geometry
A.PH_3B. XeF_2 C. ClF_3 D. IF_2

96. All of the followings are characteristics of ionic compounds in their solid phase except A. high melting and boiling point B. solubility in water C. high electrical conductivity D. insolubility in organic solvents

97. The molecular geometry of a covalent molecule with five sets of electrons from which three are bonding pair and two are lone pair is; A. Seesaw B. T - shape C. Trigonalbipyramidal D. Linear

98. How many lone pairs of electrons are on the bromine atom in bromine triflouride, (BrF_3)?
A. 0 B. 1 C. 2 D. 3

99. The VSEPR theory predicts the molecular geometry of SF_2 as:
A. triangular planar C. triangular pyramidal
B. triangular bi pyramidal D. V -shaped

100. Which among the following is paramagnetic? A.N_2B. N_2^{2-} C. C_2D. O_2^{2-}

101. Two atoms each contribute **two electrons** for bonding. The type of covalent bond formed by this way is:
A. Single covalent bond B. double covalent bond
C. Triple covalent bond D. Coordinate covalent bond

102. Which of the following molecules would you expect to be not non-polar?
A. CO_3^{-2} B. HCN C. IF_5 D. BF_3

103. If a molecule has **Trigonal pyramid geometry**, how many **lone pairs** of electrons are there on the central atom? A. 1 B. 2 C. 3 D.4

104. Which of the following molecule has no Resonance Lewis structure?
A. O_3 B. SO_2 C. NO_3^- D. $COCl_2$E. N_2O_4

105. Which of the following usually produces the strongest interaction between hydrogen and FON?A. London force B. Dipole-Dipole force C. Covalent bond D. Hydrogen bond

106. The number of bonding pair and lone pair of electrons respectively in XeF_4 are
A. 4, 12 B. 4 , 13 C. 4 , 12 D. 4 , 14

107. Which of the following molecule is AX_2E_2 type? A. BrF_5 B. $POCl_3$ C. $COCl_2$ D. PCl_3 E. H_2S

108. All molecules with AX_4E type have a **seesaw**geometry. Which one of the following can fulfil this condition? A. IF_3 B. $COCl_2$ C. SF_4D. XeF_2

109. Dipole-Dipole force is present in A. CO_2 B. BF_3 C. HI D. PCl_5

110. A neutral molecule having a general formula of A_2B has two lone pair of electron on the central B. What is the hybridization of A? A. SP B. SP^2 C. SP^3 D. SP^3d E. SP^3d^2

111. The type of hybridization of carbon atoms in C_3H_8,C_3H_6 and C_3H_4 respectively is:-
A. Sp, SP^2, Sp^3 B. Sp^3,Sp^2, Sp C. Sp, Sp^3, Sp^2 D. SP^3, SP, SP^2

112. Which molecule is AX_4E_2 type [atomic number of S=16,F=9, Xe=54, Br=35 & cl=17]
A. SF_4 B. XeF_4 C. BrF_5 D. ClF_3

113. Which statement is **not** true for the reason why atoms combine together?
A. to get a nearest noble gas electron configuration B. to lower their energy
C. to produce new substances wit new properties D. to become electrically unstable

114. Which of the following pairs of energies are totally endothermic?

A. heat of sublimation and lattice energy B. ionization energy and dissociation energy C. electron affinity and lattice energy

D. ionization energy and electron affinity

115. Which of the following is not a factor for the formation of ionic bonding?

A. Ionization energy B. Electro negativity C. Lattice energy D. Electron affinity

116. The molecular geometry of a covalent molecule with five sets of electrons from which three are bonding pair and two are lone pair is A. Seesaw B. T - shape C. Trigonal bipyramidal D. Linear

117. If element A has low ionization energy and element **B** has high electron affinity. The type of bond formed between element A and B is

A. Coordinate covalent bond B. Covalent bond C. Ionic bond D. Metallic bond

118. Which one of the following compound contains both ionic and covalent bonds?

A. PCl_5 B. K_2O C. Na_2CO_3 D. H_3O^+

119. The change in enthalpy that occurs when an ionic solid is separated in to an isolated ions in the gas phase is A. Ionization energy B. Sublimation energy C. Electron affinity D. Lattice energy

120. As the number of electrons shared between two atoms increase

A. number of bonds formed decreases B. strength of bond increases

C. bond length increase D. more number of lone pairs left on the central atom

121. Resonance structure is not present in A. NO_3^- B. CO_3^{-2} C. NH_4^+ D. O_3

122. All of the following species **do not** obey the octet rule except A. ClO_3 B. ICl_5 C. SF_2 D. BF_3

123. In which one of the following does the central atom achieve an octet of electrons?

B. PCl_5 B. CO_2 C. BH_3 D. $AlCl_3$

124. Except one all of the following molecules are **correctly** written with its types of hybridization A. SO_2→ Octahedral B. BF_4^{-ii}→Tetrahedral C. $COCl_2$ → Trigonal planar D. CS_2 →Linear

125. What does the **correc**t Lewis structure for the carbonate ions (CO_3^{2-ii}) show?

C. 22 valence electrons C. 16 unshared electrons

D. 4 lone pairs of electrons around the carbon atom D. 3 bond pairs of electrons

126. According to molecular orbital theory, one of the following molecules does not Exist. Identify it. A. O_2 B. N_2 C. Be_2 D. C_2

127. Atoms take part in bond formation to

A/ attain a stable electronic configuration B/ increase their charge density

C/ increase their energy D/ neutralize their charge

128. The atoms A and B have the electronic configurations of $1s^2$ $2s^2$ $2p^6{}_{3S}{}^2$and $1s^2$ $2s^2$ $2p^5$ each **respectively**. The formula of the compound they form together is most likely to be;- A .A_2B_5 B.A_2B_3 C.A_3B D.AB_2 E.A_3B_2

129. Two elements Aand B belong to the same group in the periodic table. The atomic number of "B" is twice that of 'A'. The electronegativity of A is_ A. Equal B .Lower C.Higher D. Twice

130. The type of orbital overlapping and hybridization respectively in BF_3 are

A. P-SP^2 overlapping B. S-SP^2 overlapping C.P-SP^3 overlapping D. S-SP^3 overlapping

131. Which of the following is true about an atom?

A. There is an atom with more than one proton but no neutron
B. An atom has equal number of proton, electron and neutron
C. An atom of one element is differ from an atom of another element only by their physical properties.
D. Atoms of the same elements have different masses

132. “The mass of one element combining with affixed mass of the other element must be in whole number ration” This is according to the law of

A. Conservation of mass B. Definite proportion C. Multiple proportion D. Mass action

133. The model of the atom that developed the statement that electrons can be described only interms of the probability of their location is

A. Bohr’s model B. Rutherford’s model C. Quantum mechanical model D. Thomson’s m

134. Which of the following is the correct ground state electronic configuration for $_{29}Cu$?

A. $1S^2$ $2S^2$ $2P^6$ $3S^2$ $3P^6$ $4S^2$ $3d^9$ C. $1S^2$ $2S^2$ $2P^6$ $3S^2$ $3Pd^{10}$

B. $1S^2$ $2S^2$ $2P^6$ $3S^2$ $3P^6$ $4S^1$ $3d^{10}$ D.$1S^2$ $2S^2$ $2P^6$ $3S^2$ $3P^6$$4S^0$$3d^{10}$

135. Which of the following groups of elements have the same number of electronic configuration?

A. 8^{O-2}, $15P^{-3}$, $12Mg^{+2}$, 9^{F-} C. $12Mg^{+2}$, $11Na^{+}$, $2Ca^{+2}$, $13Al^{+3}$

B. $19K^{+}$, $13Al^{+3}$, $14Si^{+4}$, 9^{F-} D. $19k^{+}$, $17Cl^{-}$, $15P^{-3}$, $20ca^{+2}$

136. A certain ion of an atom has a charge of -1 and a valence electron configuration of $4S^2$ $4p^6$, what is the atomic number of the atom?

A. 35 B. 36 C. 26 D. 37

137. An element 'A' has only two naturally occurring isotopes. The first isotope have 29 protons and 34 neutrons with fractional abundance of 70%. If the average atomic mass of the element 'A' is 63.5, the number of neutrons present in the second isotope must be

A. 65 B. 36 C. 35 D. 29

138. Which of the following ideas is introduced by Bohr's model of an atom?

A. The structure of an atom resembles the solar system
B. For atoms of the known elements there are four types of sublevels
C. Electrons revolve around the nucleus in a circular orbit called shell
D. Electrons are embedded in appositively charged sphere

139. The property of the element with atomic number 24 resembles that of the element with atomic number of

A. 42 B. 25 C. 29 D. 37

140. Which of the following species has the largest atomic radii?

A. $_{17}Cl^{-}$ B. $_{15}P^{-3}$ C. 16^{S-2} D. $7N^{-3}$

141. An atom is electrically neutral because it contains

A. An equal number of electrons and protons
B. An equal number of electrons and neutrons
C.More electrons than protons
D. More protons than electrons

142. To which group and period of the periodic table does an elements with atomic number of 31 belongs?

A. Group IA and period 4 C. Group IIIA and period 4
B. Group IIIA and period 2 D. Group IIA and period 4

143. Which of the following statement is <u>not true</u> about the properties of the elements in the periodic table?

A. Elements at the left side of the period have low ionization energy
B. The reason for the increase of atomic radii down in the group is due to the increase in nuclear charge
C. Elements at the left side of the period have large atomic size
D. Electron affinity of the elements increase from right to left across the period

144. In any groups of the periodic table elements

A. Become more reactive in moving down a group
B. Accept electron more readily as atomic number increase
C. Gain electron more readily as ionization energy decrease
D. Lose electron more readily as electron negativity decrease

145. The formula of ionic compound between group IIIA metals "M" and group VIA non-metal "X" will be A.M_3X_2 B.M_2X_3 C.MX_3 D.M_2X

146. The type of bond formed between elements of low ionization energy and highly electron affinity is

A. Ionic bond B. Covalent bond C. Coordinate covalent bond D. Metallic bond

147. In the Lewis structure of PCl_3 Phosphorous is surrounded by ____ bonding pairs and _____lone pair respectively

A. 3 ,10 B.5,1 C.3,1 D.3,10

148. Which of the following molecule is polar covalent molecule?

A.CO_2 B.Ccl_4 C.Ncl_3 D.BF_3

149. Among the following which one contain ionic and covalent bond?

A.Pcl_5 B.Sf_6 C.K_2NO_3 D.Al_2O_3

150. The centeral atom violet an octet rule

A. CO_2 B.H_2S C. SF_4 D. SO_2

151. Which of the following forces is <u>not</u> intermolecular force?

A. Dipole- Dipole force B. Dispersion force

C. Coordinate covalent bond D. Hydrogen bond

152. Hydrogen bond is not present in

A.NH_3 B.CH_3OH C.H_2O D. HCl

153. An element will atomic no. 11 would form ionic bond when bonded with an element with

atomic number of A.13 B.17 C.18 D.20

154. The type of bond formed when NH^3 reacts with H^+ (proton) is

A. Ionic bond B. Covalent bond C. dative bond D. dispersion force

155. Which of the following is no a chemical change?

A. Souring of milk C. heating of sugar

B. Rusting of iron D. dissolving of NaCl in water

156. In every balanced chemical equation all of the following s are conserved except

A. Number of atoms B. Number of mole C. Mass of number D. Number of charge

157. When the reaction :- A. $Al_2(SO_4)_3 + Mgcl_2 \rightarrow Alcl_3 + MgsO_4$ is correctly balanced, the sum of the coefficients of the reactants and product is A.7 B.9 C.13 D.11

158. Assume that the energy of the product in a chemical reaction is 650KJ. This reaction could be endothermic if the energy of the reactants was A.650KJ B.700KJ C.600KJ D.1000KJ

159. Which of the following is an example of synthesis reaction?

A. $Nacl + MgNO_3 \rightarrow NaNO_3 + Mgcl_2$ C. $2kClO_3 \rightarrow 2kcl + 2O_3$

B.$K_2O + H_2O \rightarrow 2KOH$ D.$2Al + 6Hcl \rightarrow 2Alcl_3 + 3H_2$

160. The type of reaction in which two or more product are formed from a single reaction is

A. Combination B. Decomposition C. Metathetical D. Single displacen

161. Give the reaction :- $4Al + 3O_2 \rightarrow 2Al_2O_3$. How many grams of Al_2O_3 are produced when 54g of aluminum reacts with excess oxygen?

A. 51g B. 102g C. 204g D. 78g

162. How many litres of NO_2 gas at STP are required to react with water to form 11.2 litres of No gas according to the equation

$3NO_2 + H_2O \rightarrow 2HNO_3 + NO$

A. 3.73 L B. 33.6L C. 4.31L D. 22.4L

163. In the reaction :- $N_2 + 3H_2 \rightarrow 2NH_3$, if 7 grams of N_2 gas reacts with 2 grams of H_2 gas, which one of the following is not true?

A. hydrogen is the limiting reactant C. only 0.5 gram of the excess reactant is left unreacted

B.8.5 grams of NH_3 is formed D. formation of NH_3 depends on nitrogen

164. When 50g of CaO_3 undergo decomposition by heat, 16g of CO_2 gas was obtained. What was the percentage yield of CO_2? The reaction is caco3 CaO +CO_2

A. 58.4% B. 72.7% C. 66.3% D. 89.27%

165. The oxidation number of phosphorous in $Na4P_2O_7$ is

A. +6 B. +2 C. +5 D. +3

166. What happens to an oxidizing agent in an oxidation- reduction reaction?

A. It is oxidized as it loss electron (s) C. It is oxidized as if gains electron (s)

B. It is reduced as it loses electron (s) D. It is reduced as if gains electron (s)

167. which of the following is not a non- redox reaction?

A. KOH + HCl Kcl+H_2O C. Zn + H_2SO_4 $ZnSO_4$+H_2

B. $CaCO_3$ + $AlCl_3$ $Al_2(CO_3)_3$ +$Cacl_2$ D. Agcl+ $NaNO_3$ $AgNO_3$ +Nacl

168. One of the following is not a pre- condition for a reaction to occur?

A. proper orientation B. activation energy C. nature of the reactant D. effective collision

169. Except one all of the followings can affect the rate of a reaction?

A. surface area B. temperature C. concentration D. solubility

170. Which of the following molecules has no lone pairs of electrons on the central atom?

A. NH_3 B. OF_2 C. SF_2 D. BCl_4^{-}

171. The amount of heat released when one mole of liquid is converted a solid is called

A. the amount of heat released C. molar heat of crystallization

B. Molar heat of fusion D. Molar heat of sublimation

172. Which of the following is not a characteristic of chemical equilibrium?

A. Rate of forward and reverse reactions are constant

B. The macroscopic properties are kept constant

C. The concentration of reactants and products are equal D.The reaction are dynamic

173. Given the reaction $2SO_{2(g)}$ + $O_{2(g)}$ + heat $2SO_{2(g)}$ which change will result in a decrease in the amount of SO_3?

A. Increasing concentration of SO_2 C. Decreasing pressure

B. Increasing temperature D. Decreasing volume

174. Which of the following reactions of equilibrium is not affected by pressure?

A. $N_{2(g)}$ + $3H_{2(g)}$ $2NH_{3(g)}$ C. $H_{2(g)}$ + $F_{2(g)}$ $2HF_{(g)}$

B. $_{2(g)}$ + $O_{2(g)}$ $2H_2O_{(l)}$ D. $PCl_{3(g)}$ + $Cl_{2(g)}$ $PCl_{5(g)}$

175. The equilibrium constant (kc) expression for:-$2H_2O_{(l)}$ $2H_{2(g)}$ +$_{2(g)}$ is

A. [H_2] [O_2] C. [H_2]$_2$ [O_2]

B. [H]^2 + [O_2] D. [H_2]^2 [O_2]

176. 3 moles of $(NH_4)_2HPO_4$ contains

A. 16 moles of nitrogen C. 7 moles of oxygen atoms

B. 27 moles of hydrogen atoms D. 24 moles of hydrogen atoms

177. Which of the following changes will always increase the amount of products at equilibrium?

A. An increase in pressure C. Increase the reactant concentration

B. An increase in temperature D. Addition of catalyst

178. The volume of a certain confined gas is doubled while the pressure is held constant. What will happen to the temperature of this gas?

A. It will decrease by half C. It will increase by four factor

B. It will be doubled D. It will remain the same

179. The average kinetic energy of gas molecules is directly proportional to

A. The total pressure of the gas

B. The volume occupied by the gas

C. The absolute temperature of the gas

D. The number of molecule of the gas

180. The type of physical state which occur at high temperature and low pressure

A. Solid state C. Gaseous state

B. Liquid state D. The number of moles of the gas

181. What is the density of CO_2 gas at 1atm & 25^{o}c? [R=0.082L.atm/mol.k]

A. 21.5g/L B. 1.8g/L C. 0.5g/L D. 1.2g/L

182. Oxygen gas (O_2) diffuses 2 times an unknown gas. What is the molar mass of the unknown gas?

A. 128 B. 64 C. 22.6 D. 8

183. Equal volume of different gasses at constant temperature and pressure have equal number

of molecules. This is the law of stated by

A. Boyle's B. Charle's C. Lussac's D. Avogadro

184. A 10 litres of gas exerts a pressure of 40 atm at constant temperature. What is the new

volume of the gas if the pressure is changed to 80 atm at constant temperature?

A. 5L B. 20L C. 2.5L D. 10L

185. The volume of 64g of methane gas (CH_4) at 27^{o}c and 4atm is

A. 11.2L B. 49.2L C. 24.6L D. 2.214L

186. The first organic compound synthesized from inorganic compounds has a molecular formula of

A. NH_4Cl C. AgCNO

B. NH_4CNO D. $(NH_2)_2CO$

187. Isomers are different in all of the following except

A. Physical properties C. Molar Mass

B. Structure D. Arrangement of atoms

188. Which one of the following reaction is a good example of elimination rxn?

A. $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$ C. $CH_2 = CH_2 + H_2O \rightarrow CH_3CH_2OH$

B. $CH_3CH_2CH_3 + Cl_2 \rightarrow CH_3CH_2CH_2Cl + HCl$ D. $CH_3CH_2CH_2CH_3 \rightarrow CH_3CH = CH_2 + CH_4$

189. All of the following reactions can produce alkane except

A. $CH_3COONa + NaOH \rightarrow$ C. $2CH_3Cl + 2Na \rightarrow$

B. $CH_3CH_2CH = CH_2 + H_2 \rightarrow$ D. $CH_2 = CH_2 + H_2ON \rightarrow H_2SO_4$

190. Which one of the following hydro carbon can exhibit cis – trans geometrical isomeris

cis- trans

A. $Cl_2C= Ccl_2$ B. $CH_2= CH_2 = CH_2- CH_3$ C. CHCl = CHBr D. $CHCl= CBr_2$

191. The compound $CH_3CH_2OCH_2CH_2CH3$ is

A. aldehyde C.Ester

B. Ketone D. Ether

192. Which of the following element is found in the most organic compounds combined w carbon atom?

A. Nitrogen C. Hydrogen

B. Oxygen D. Chlorine

193. Which of the following represents aternary acid? A. HF B. H_2SC. HNO_3 D. HCN

194. During electrolysis process

A. Cations lose electrons to form atoms C. Cations are oxidized

B. Anions are attracted to the positive electrodes D. Anions are reduced

195. Suppose that you want to electroplate a spoon made of iron with silver which of following conditions will make the process workout correctly?

A.The electrolyte should be made of any soluble salts of iron

B. The spoon should be made the chathode

C. The electrolyte should be made of any soluble salts of iron and silver

D. The electrolyte can be made from any soluble salts except from iron and silver

196. Which of the following is used as an electrolyte in Leclanche dry cell?

A.NH_4Cl B. MnO_2 C. $ZnCl_2$ D. H_2SO_4

197. Which of the following process uses a Galvanic cell?

A. Purification(refining) of metals C. Lead storage battery

B. Electrolysis of brine solution D. Production of sodium from NaCl

198. Which of the following solution shows current flow in an electronic cell?

A. Molten solution of sugar C. Solid sodium chloride

B. Solution of ethanol D. Hydrochloric acid

199. Compounds that occur widely in glass, cement and ceramics are

A. Carbonates B. Chlorides C. Silicates D. Nitrates

200. What substance is used as a bleaching agent to bleach the brown syrup in the su manufacturing process?

A. Cl_2 B. SO_2 C. H_2O_2 D. O_3

201. Which of the following methods is used to reduce air pollution?

A. Recycling of agricultural wastes C. reducing emission of CO2

B. Increasing use of organic fertilizers D. Recycling of non-biodegradable materials

202. Nitrates and phosphates as water pollutant

A. Causes death of water organisms C. increase the amount of dissolved oxygen

B. Speed up water borne diseases D. accelerate the growth of plants in the water

203. The substance that deplete the ozone layers is A. CO_2 B. CFCs C. Heavy metals oxides of nitrogen

204. Global warming is caused by the high accumulation of --------- in the air. A.SO_2 B. C. CH_4 D. CO_2

205. Which of the following cycles is the slowest cycle?

A. Carbon cycle B. Nitrogen cycle C. Phosphorous cycle D. Sulphur cycle

206. Which of the following process is not included in the sulphur cycle?

A. Mineralization Incorporation C. Assimilation D. Oxidation

207. The permissible level of toxicity in the atmosphere is known by
A. Threshold limit value B. Dissolved oxygen C. Biological oxygen demand D. Dissol organic matter
208. The major source of land, air and water pollutant among the followings is
A. Harmful heavy metals C. Excessive use of fertilizers
B. Non-biodegradable materials D. Un treated wastes
209. Which of the following is not a member of greenhouse gases? A. CO_2 B. CH_4 C. I D. O_2& N_2
210. A way of treating and cleaning wastes after it is generated is
A. Prevention B. Atom economy C. Reduce derivatives D. Design of saferchemicals

211. Which of the following is the best definition of **electro negativity**?
A. Electro negativity is the energy required for a gaseous atom to gain an electron. B. Electro negativity is the attraction of an atom for a bonding pair of electrons. C. Electro negativity is the attraction b/n the nucleus and the valence electrons of an atom. D. Electro negativity is the ability of an atom to attract electrons from another atom.
212. Which of the following electromagnetic radiation has the shortest wave length but has highest frequency and energy?
A. Ultraviolet (UV) rays B. microwaves C. Gamma rays D. Infrared (IR) rays
213. Ionic compounds are formed between elements of:
A. High ionization energy & high electron affinity B. Low ionization energy & low electron affinity C. High ionization energy & low electron affinity D. Low ionization energy& high electron affinity
214. Which one is **not** the property of ionic compounds? Ionic compounds:
A. have high boiling & melting points at room temperature B. do not occur in molecular form
C. are aggregates of positive and negative charges D. can conduct electricity in all physical states
215. An element `**M**` when reacted with oxygen form the compound of the form M_2O_3. Element `M` could be: A. Potassium B. Magnesium C. Aluminum D. Barium
216. Which property generally decreases down a group in the periodic table? A. atomic size valence electron B. Number of energy level C. first ionization energy
217. The energy change when an extra electron is added to an atom or ion is:A. Electro negativityB. Ionization energy C. Electron affinity D. Electro positivity

218. Which of the following element has the lowest first ionization energy?
A. Potassium B. Sodium C. Calcium D. Aluminium

219. Which of the following is not correctly arranged based on their atomic size (radius)? A. Al^{3+},F^{-} ,$Na^{+,}$$Mg^{2+}$,$O^{2-}$B. $Al^{3+}$$Mg^{2+}$, ,$Na^{+,}$ F^{-}, O^{2-}C. O^{2-},F^{-}, $Na^{+,}$ Mg^{2+} ,Al^{3+}D.F^{-} ,$O^{2-,}$$Al^{3+}$, Mg^{2+} , Na^{+}

220. The four possible quantum numbers for the valence shell (last electron) of Potassium ($_{19}$K) is A. n=3, l=2, m_l=2, m_s=+1 B. n=4, l=1, m_l=0, m_s=-1/2 C. n=4, l=0, m_l=0, m_s=+1/2 D. n=4, l=2, m_l=1, m_s = +1/2

221. Copper has two isotopes. These are **^{63}Cu** and **^{65}Cu**. If the average atomic mass copper is 63.546amu, what is the percentage abundance of the two isotopes respectively? A. 69.1% and 30.9%B. 48.67% and 51.33% C. 30.9% and 69.1% D. 51.33% and 48.67% E. None

222. The classification of elements in the modern period table is mainly based on A. mass number B. physical property C. Electron arrangement D. Natural abundance

223. Which of the following ionic compound does not obey the octet rule?
A. $Cacl_2$B. $FeCl_2$C. KClD. $MgCl_2$

224. What is the atomic number of a neutral atoms having outer most shell electron configuration of $4d^7$? A. 45 B.43 C. 51 D. 47

225. For degenerate orbitals, each must be singly occupied with an electron before any one orbital doubly occupied. This statement refers to A. Aufbau principle B. Hund`s rule C. Pauli`s exclusion principle D. Heisenberg`s uncertainity principle

226. Isotopes of an element has the same chemical properties due to:
A. have the same number of proton B. have different number of neutrons C. have the same atomic number D. have the same valence electrons

227. The energy required to remove an electron from an iron atom is $7.21x10^{-19}$J. What is the wave length of light(in nm)? A. 250 B. 300 C. 289 D. 276

228. Which of the following has the lowest electro negativity?
A. Carbon B. Beryllium C. Magnesium D. Boron

229. Which of the following is not a physical property?
A. Dissolving ionic compounds in water B. Reacting NaOH with HCl
C. Boiling of water D. Converting solid sodium to gas

230. An atom has an atomic number of 31 and a mass number of 70. How many electrons will it have in its valence shell? A. 3 B. 2 C. 4 D. 5

231. Which pairs fails to represent atomic number of elements that belong to the same group in the periodic table? A. 20 and 56 B. 39 and 21 C. 33 and 51 D. 18 and 52

232. The electron configuration of the ion M^{2+} ends with $3d^{10}$. Which of the following is true about this element? A. its atomic number is 28 B. its electron configuration is [Ar]$4s^2 3d^8$C. its found in period 3 and group IIB D. it is representative element

233. The subshell that is found in every main shell is A. P B. d C. f D. S

234. Which group of elements is characterized with ns^2np^6 outer electron configuration? A. IVB B. VIIA C. VIA D. VA

235. Which of the following ionic compound has the highest lattice energy?
A. LiCl B. NaCl C. CsCl D.KCl

236. The branch of chemistry that study about oxides, silicates, sulphates, carbonates, nitrates,phosphates and chlorides is A. Physical chemistry B. Analytical chemistry C. Organic chemistry D. Inorganic chemistry

237. The basic criteria for $_{12}Mg^{2+}$ and $_{9}F^{-}$ to be called **iso-electronic**is that:
A. Both have the same number of proton C. Both have the same electron figuration B. Both are found in the same period in the periodic table D. Both are electrically charged

238. Which of the following is not a factor for the formation of ionic bonding?
A. Ionization energy B. Electro negativity C. Lattice energy D. Electron affinity

239. As the value of principal quantum number becomes larger and larger
A. Electrons move from higher to lower orbit B. The radius of the orbit decreases C. Atoms loss more energy
D. The frequency of the atom increases

240. The molecular geometry of a covalent molecule with five sets of electrons from which three are bonding pair and two are lone pair is A. Seesaw B. T shape C. Trigonal bipyramidal D. Linear

241. The expression $X + e- \rightarrow X^{-}$ + energy, where X =nonmetal indicates
A. Electro negativity B. Ionization energy C. Electro positivity D. Electron affinity

242. Which one of the followings electronic configurations is reasonable for the ground state of an atom? A. $1s^2 2s^2 2p^6 3s^1 3p^1$ B. $1s^2 2s^2 2p^6 3s^2 3p^5$ C. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^1$ D. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^8 4p^1$

243. The correct increasing order of energy of 4f, 5p, 6s and 5d orbital is:
A. 4f <5p <5d <6s B. 4f <6s< 5d< 5p C. 5p <6s <4f< 5d D. 5p< 5d <6s <4f

244. Which of the following atom in the ground state has two half filled orbital?
A. Oxygen B. Silicon C. Phosphorous D. Nitrogen

245. Which of the following quantum number is **not** allowed for an electron of n, l, m_l and m_s respectively? A. 3, 2, -1, ½ B. 3, 0, -1, ½ C. 1, 0, 0, ½ D. 6, 5, -4, ½

246. Which sub shells with the following designations cannot exist in an atom? A. 3S B. 3P C. 3f D. 3d

247. Which sub shell notation is written correctly for a given n and l - values
A. n=4, l=2 is 4p B. n=3, l=1 is 3s C. n=4, l=2 is 4d D. n=3, l=1 is 3s

248. If an electron undergoes all the possible transitions from higher n- orbit to the second excited state(n=3),the line produced is A.Lyman series B. Paschen series C. Balmer series D. Bracket series

249. An electron drops from n=5 to n=1 and produce a continuous spectral lines called Lyman series which is equal to A. Ultraviolet series B. Visible series C. Infrared series D. Microwaves series

250. Except one all of the following molecules are correctlrly written with its type of hybridization A. SO_2→ Octahedral B.BF_4^-→Tetrahedral C. $COCl_2$ → Trigonal planar D. CS_2 →Linear

251. The wave length of a photon emitted during a transition from n_i =5 State to n_f = 2 state in the hydrogen atom is A.434nm B.242nm C. 138nm D. 327nm

252. If an electron makes a transition from n =2 to n= 3 in the Bohr model of the hydrogen atom, the energy of the hydrogen line that corresponds to this transition is A.$4.58x10^{-19}$ J
B. $3.03x10^{-19}$J C. $2.76x10^{-19}$J D. $1.96x10^{-19}$J

253. The velocity of an electron is $1x10^6$ m/s.What is the de Broglie wave length?
A.$3.27x10^{-9}$m B.$6.17x10^{-14}$ m C. $7.27x10^{-10}$m D. $4.25x10^{-10}$m

254. Which of the following elements has the lowest first ionization energy?
A. Potassium B. Aluminium C. Magnesium D. Sodium

255. The type of a molecule containing four bonding pairs and 2 lone pairs electrons on the central atom is likely to be A. AX_2E_3 B. AX_4E_2 C. AX_3E_3 D. AX_2E_4

256. Except one all have a linear molecular geometry A.CO_2 B. XeF_2 C. ClF_3 D. IF_2

257. If element A has low ionization energy and element **B** has high electron affinity. The type of bond formed between element A and B is
A. Coordinat covalent bond B. Covalent bond C. Ionic bond D. Metallic bond

258. How many possible values of the azimuthal quantum numbers are there for an electron on 6P? A. 0,1,2,3,4,5 B.6 C. 1,2,3,4,5 D.7

259. Which set of quantum number (n, l, ml, ms) is not permitted by the rules of quantum numbers respectively? A. 3,1,0,1/2 B. 3,2, -2, ½ C. 4 , 2, -1, ½ D. 2 , 2, 1 , ½

260. For a 5p orbital, the value of n and l respectively are A. 5 , 2 B. 5, 1 C. 4, 2 D. 4 , 1

261. Which molecule is **not** correctly matched with its dominant intermolecular force?
A. NH_3 –hydrogen bond B. Cl_2 –dispersion force
C. HCl – dipole-dipole force D. CH_3CH_2OH- London force

262. Which statement **is correct** among the followings
A. SO_2, H_2O, NH_3 and SF_4 are all polar molecules B. the total number of electrons in CO_3^{-2} are 20 C.Cu_2O, LiF, $FeCl_3$ and KF all violet octet rule D. H_2O, NH_3, HI, CH_3OH all contain hydrogen bond

263. Which statement is **not** true for the reason why atoms combine together?
A. to get a nearest noble gas electron configuration B. to become electrically unstable C. to lower their energy D. to produce new substances wit new properties

264. All of the followings are characteristics of ionic compounds in their solid phase except A. high melting and boiling point B. solubility in water C. high electrical conductivity D. insolubility in organic solvents

265. The change in enthalpy that occurs when an ionic solid is separated in to an isolated ions in the gas phase is A. Ionization energy B. Sublimation energy C. Electron affinity D. Lattice energy

266. Which of the following pairs of energies are totally endothermic?
A. heat of sublimation and lattice energy B. ionization energy and dissociation energy C. electron affinity and lattice energy D. ionization energy and electron affinity

267. Which of the following species represent a molecule? A. CO_2 B. CuO C. NaCl D. Li_2O

268. As the number of electrons shared between two atoms increase
A. number of bonds formed decreases B. strength of bond increases
C. bond length increase D. more number of lone pairs left on the central atom

269. Which of the following atom in the ground state has **two unpaired** electrons?
A. Oxygen B. aluminum C. Phosphorous D. Nitrogen

270. Which of the following electronic configurations for the electrons in P-orbital of nitrogen atom satisfies Hund`s rule? A. ↑ ↓ ↑ B.↑ ↓ ↑ C.↑ ↑ ↑ D. ↑ ↑ ↓

271. Which of the following quantum number is **not** allowed for an electron of n, l, m_l and m_s respectively? A. 3, 2, -1, ½ B. 3, 0, -1, ½ C. 1, 0, 0, ½ D. 6, 5, -4, ½

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275. Ifan electron drops from n=5 to n=1in the Bohr model of the hydrogen atom, the possible number of transitional spectral lines formed areequal to A. 5 B. 10 C, 15 D. 21

276. The wave length of a photon emitted during a transition from n_i =5 energy state to n_f = 2 energy state in the hydrogen atom is A.434nm B.242nm C. 138nm D. 327nm

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279. How many possible values of the **azimuthal quantum** numbers are there for an electron for n=6? A. 0,1,2,3,4,5 B.6 C. 1,2,3,4,5,6 D.7

280. Which one of the following compound contains ionic bond? A.PCl_5 B. H_2O C. Li_2O D. CO_2

281. Which statement is **not** true for the reason why atoms combine together?
A. to get a nearest noble gas electron configuration B. to lower their energy C. to produce new substances wit new properties D. to become electrically unstable

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283. Which of the following pairs of energies are totally endothermic?
A. heat of sublimation and lattice energy B. ionization energy and dissociation energy C. electron affinity and lattice energy D. ionization energy and electron affinity

284. All of the following species in the central atom **do not** obey the octet rule except
A. $FeCl_3$ B. BeF_2 C. K_2O D. BF_3

285. How many 3d electrons are present in the ground state of chromium (Cr)? A. 5 B. 4 C. 3 D. 10

286. Which of the following periodic properties of elements **decrease** down a group in main group elements? A.Nuclear charge B. atomic size C. Electro negativity D. metallic character

287. The correct electronic configuration of $\mathbf{P^{-3}}$ is?
A.$1s^2 2s^2 2p^6 3s^2 3p^3$ B. $1s^2 2s^2 2p^6 3s^2$ C. $1s^2 2s^2 2p^6 3s^2 3p^6$ D. $1s^2 2s^2 2p^6 3s^2 3p^1$

288. Which of the following is not a factor for the formation of ionic bonding?
A. Ionization energy B. Electro negativity C. Lattice energy D. Electron affinity

289. The electron configuration of the ion $\mathbf{M^{2+}}$ ends with $\mathbf{3d^{10}}$. Which of the following is true about this element?
A. its atomic number is 28 B. its electron configuration is $[Ar]4s^2 3d^8$
C. its found in period 3 and group IIB D. it is representative element

290. The subshell that is found in every main shell is A. P B. d C. f D. S

291. Which group of elements is characterized with ns^2np^6 outer electron configuration? A. IVB B. VIIA C. VIA D. VIIIA

292. Which of the following is not a physical property?
A. Dissolving ionic compounds in water B. Reacting NaOH with HCl
C. Boiling of water D. Converting solid sodium to gas

293. An atom has an atomic number of 31 and a mass number of 70. How many electrons will it have in its valence shell? A. 3 B. 2 C. 4 D. 5

294. A certain neutral atom has outer most shell electron configuration of $4d^7$. What is the atomic number of this atom? A. 45 B.43 C. 51 D. 47

295. Which of the following is not correctly arranged based on their atomic size (radius)? A. Al^{3+},F^- ,Na^+, Mg^{2+} , O^{2-} B. $Al^{3+}Mg^{2+}$, ,Na^+, F^-, O^{2-} C. O^{2-},F^-, Na^+, Mg^{2+} ,Al^{3+} D.F^- ,O^{2-},Al^{3+}, Mg^{2+} , Na^+

296. The four possible quantum numbers for the valence shell (last electron) of Potassium ($_{19}K$) is A. n=3, l=2, m_l=2, m_s=+1 B. n=4, l=1, m_l=0, m_s=-1/2 C. n=4, l=0, m_l=0, m_s=+1/2 D. n=4, l=2, m_l=1, m_s = +1/2

297. Ionic compounds are formed between elements of:

A. High ionization energy & high electron affinity B. Low ionization energy & low electron affinity

C. High ionization energy & low electron affinity D. Low ionization energy& high electron affinity

298. What is the scientific notation of a number 0.004851 in two significant figures?
A. 4.8×10^{-3} B. 4.8×10^{-2} C. 4.9×10^{-3} D. 4.851×10^{-3}

299. Which of the following is not a base SI unit?
A. Kelvin B. second C. Joule D. Ampere

300. Daltons was correct in his statement that states as

A. Atoms of different element have different chemical properties

B. Matter is made up of very small particles called atoms

C. Atoms are indivisible and indestructible

D. Atoms of the same elements are alike

301. The information obtained from the following quantum number is **not correctly** related in A. Principal quantum number → size of the orbital

B. Azimuthal quantum number → number of sub shells present with in any shell

C. Magnetic quantum number → Shape of the orbitals

D. Electron spin quantum number → direction of the electron

302. A compound always contains the same element in the same proportion by mass. This statement refers to _____
A. The law of conservation of mass C. The law of indestructibility of matter
B. The law of multiple proportion D. The law of constant composition

303. In which one of the following numbers are all of the zeros significant?
A. 0.0201 B. 200.080 C. 1040 D. 0.1000

304. In the titration process, an acid or base with the **unknown concentration** is called
A. analyte B. titrant C. end point D. equivalent point

305. In which of the following acid- base titration, the resulting solution will have a **P^H less than seven (7)** at the equivalence point?

A. Strong acid- strong base titration C. weak acid- strong base titration
B. Strong acid- weak base titration D. non e of the above

306. What is the ionization constant (Ka) for a weak acid (HA) that is 1.60% ionized in a 0.005M solution? A.$1.28x10^{-6}$ B. $8\ x10^{-5}$ C. $3.5\ x10^{-8}$ D. $2.52\ x10^{-4}$

307. Salt of a weak acid with strong base when dissolved in water gives:-
A. Acidic solution B. Basic solution C. Neutral solution D. strongly acidic solution

308. How many milliliters (Ml) of water are required to dilute 100mL of $2.5MH_2SO_4$ to $2MH_2SO_4$? A. 125 B. 25 C. 80 D. 150

309. What grams of calcium metal must react with 100mL of 2MHCl according to the balanced reaction $Ca + 2HCl \rightarrow CaCl_2 + H_2$ A. 4g B. 0.4g C. 40g D. 0.04g

310. According to an Arrhenius concept, an acid is defined as any substance that
A. Donates a pair of electrons C. Donates a proton to abase
B. Releases hydrogen ion in water D. Increases the concentration of hydroxide ion in water solution

311. A solution of weak base "B" has P^H of 9. If we add small amount of a salt containing the conjugate acid of "BH^+", which of the following statement is true about the solution?
A. The P^H increase and the P^{OH} decrease C. the P^H decrease and the P^{OH} increase
B. Both the $[OH^-]$ and P^{OH} increase D. $[OH^-]$ increase and P^H decrease

312. The conjugate acid of $C_6H_5NH_2$ is
A. $C_6H_5NH^-$ B. $C_6H_5NH^+_2$ C. $C_6H_5NH_3$ D. $C_6H_5NH^+_3$

313. The P^H of a solution containing 0.1M HF is ($Ka= 6.8x10^{-4}$)
A. 3.43 B. 0.89 C. 1.74 D. 2.08

314. HF($Ka= 6.8\ x10^{-4}$) is a weak acid and NH_3($K_b= 1.8x10^{-5}$) is a weak base. A salt solution of NH_4F would be A. Strongly acidic B. weakly basic C. neutral D. weakly acidic

315. Consider the following acids with their Ka values

Acids	Ka values
CH_3COOH	$1.8x10^{-5}$
HCN	$4.9X10^{-10}$
HF	$6.8\ x10^{-4}$

HNO_2 $4.5\ x10^{-4}$Which of the following aqueous solutions of these acids will have the **smallest**P^Hvalue? A. $1MCH_3COOH$ B. $1MHCN$ C. $1MHF$ D. $1MHNO_2$

316. The hydrogen ion concentration for a solution with $\mathbf{P^{OH}}$ of 9 at 25^0C is
A. $1x10^{-9}M$ B. $1x10^{-7}M$ C. $1x10^{-5}M$ D. $1x\ 10^{-14}M$

317. Which of the following is a conjugate acid /base pair?
A. HCl/OCl^- B. H_2SO_4/HSO^-_3 C. $H_2O/\ H_3O^+$ D. $NH^+_4|NH^-_3$

318. Which of the following combination **cannot** produce a buffer solution?

A. HCN/NaCN B. $HNO_3/NaNO_3$ C. $HNO_2/NaNO_2$ D. NH_3/NH_4Cl

319. Which of the following statement is **true**?

A. Addition of NaOH to a solution of HNO_3 will increase the P^{OH} of the solution

B. Addition of HCl to a solution of NaOH will decrease the P^{OH} of the solution

C. Addition of HNO_3 to a solution of H_2SO_4 will decrease the P^{OH} of the solution

D. Addition of NaOH to a solution of HCl will decrease the P^{OH} of the solution

320. What is the conjugate base of $HPO_4^{2-¿¿}$? A. H_3PO_4 B. $H_2PO_4^{-¿¿}$ C. $HPO_4^{2-¿¿}$ D. $PO_4^{3-¿¿}$

321. What is the concentration of hydroxide ions (OH^-) in solution with PH= 4at 25^0C?

A.4 x 10^{-4}B. 1 x10^{-10} C. 1 x 10^{-4} D. 4x 10^{-10}

322. Which of the following is conjugate acid- base pairs for the reaction

$H_2PO_4^{-¿¿}$ (aq) + H_2O (l) → H_3O^+ (aq) + $HPO_4^{2-¿¿}$

A. $H_2PO_4^{-¿¿}/PO_4^{3-¿¿}$ B.$H_2O/HPO_4^{2-¿¿}$ C.$H_2PO_4^{-¿¿}/HPO_4^{2-¿¿}$ D.$HPO_4^{2-¿¿}/PO_4^{3-¿¿}$

323. All of the following can act as Bronsted- Lowry base **EXCEPT**;-

A. I^- B. NH_3 C. $HCO_3^{-¿¿}$ D. $NH_4^{+¿¿}$

324. Which one of the following is **not** the correct feature of the strong acid- weak base titration?

A. The P^{OH} is less than seven before equivalence point

B. The P^H is less than seven at equivalence point

C. The P^H continues its sharp rise after equivalence point

D. Has a decreasing titration curve

325. Which of the following species can **NOT** act as a Lew's acid?

A. Fe^{2+} B. $BeCl_2$ C. BF_3D. NH_3

326. What is the molarity of a solution containing 20g of sulphuric acid (H_2SO_4)in 200ml of solution respectively?

A. 0.4M B. 1.25M C. 0.1M D. 0.5M

327. Which of the following aqueous solution will be basic ?

A. NaCl B. Na_2CO_3 C. Na_2SO_4 D. KNO_3

328. Consider the following: PO_4^{3-}, HPO_4^{2-}, $H_2PO_4^-$, H_3PO_4. The term amphiprotic can be used to describe:

A. PO_4^{3-} only C. HPO_4^{2-} and $H_2PO_4^-$ only

B. PO_4^{3-}, HPO_4^{2-}, $H_2PO_4^-$ only D.HPO_4^{2-}, $H_2PO_4^-$, H_3PO_4 only

329. What is the $[H_3O^+]$ at the equivalence point for the titration between HCl and KOH? A. $1.0x10^{-9}$ M B. $1.0x10^{-7}$ M C. $1.0x10^{-5}$ M D. 0.01 M

330. When equal volumes of the following four 0.1M aqueous solutions are arranged in order of increasing P^H value, what is the correct order?

A. $CH_3COOH < HNO_3 < CH_3COONa < KOH$
B. $HNO_3 < CH_3COOH < CH_3COONa < KOH$
C. $CH_3COONa < HNO_3 < CH_3COOH < KOH$
D. $KOH < CH_3COONa < CH_3COOH < HNO_3$

331. Which of the following classes of chemistry studies about inter conversion between electrical and chemical energies? A. Thermochemistry B. Electrochemistry Thermodynamics D. Physical chemistry

332. Which of the following chemical reaction shows oxidation reaction?
A. $SN^{+4} + 2e^- \rightarrow Sn^{+2}$ B. $Cl_2 \rightarrow 2Cl^- - 2e^-$ C. $S^{-2} - 2e^- \rightarrow S$ D. $Mg \rightarrow Mg^{+2} + 2e^-$

333. A non-redox reaction among the followings is
A. $Ca + H_2SO_4 \rightarrow CaSO_4 + H_2$ B. $2KClO_3 \rightarrow 2KCl + 3O_2$
C. $Cl_2 + H_2O \rightarrow HCl + HClO$ D. $AgCl + KNO_3 \rightarrow AgNO_3 + KCl$

334. Reactions in which the same compound can serve as both reducing agent and oxidizing agent is called
A. Spectators B. Non-redox reactions C. Disproportionation reaction D. Overall reaction

335. In the reaction:- $2H_2S + SO_2 \rightarrow 3S + 2H_2O$, the reducing agent is
A. H_2S B. SO_2 C. S D. H_2O

336. The oxidation number of chlorine is large in A. HClO B. $HClO_2$ C. $HClO_3$ D. $HClO_4$

337. After the reaction : $P + HNO_3 \rightarrow H_3PO_4 + NO_2 + H_2O$ is completely balanced, the coefficients of the reactants and products respectively are:
A. 1,5,2,5,2 B. 2,5,1,5,2 C. 2,5,2,5,2 D. 1,5,1,5,1

338. Methane (CH_4) undergoes combination reaction to form CO_2 and H_2O. What is the ratio of the coefficients of oxygen to methane when the reaction is completely balanced? The reaction is: $CH_4 + O_2 \rightarrow CO_2 + H_2O$
A. 1:2 B. 2:1 C. 5:2 D. 1:1

339. Which of the following reaction is not balanced?
A. $Cr_2O_7^{-2} + 3H_2S + 8H+ \rightarrow 2Cr+3 + 3S + 7H_2O$
B. $5SO_3^{-2} + 2MnO_4^- + 3H_2O \rightarrow 5SO_4^{-2} + 2Mn^{+2} + 6OH^-$
C. $2I^- + 2NO_2^- + 4H^+ \rightarrow I_2 + 2NO + 2H_2O$
D. $5Fe + MnO_4^- + 8H^+ \rightarrow 5Fe^{+3} + Mn^{+2} + 4H_2O$

340. Which one of the following solutions **shows current flow** in an electrolytic cell?
A. water solution of sodium chloride B. solution of glucose
C. solution of sugar D. solid forms of ionic compounds

341. Which one of the following is not correct about voltaic cells?

A. anode is negative B. cathode is positive

C. oxidation takes place at the anode D. redox reaction produce electricity in the cell

342. Electrolysis is not used for

A. Production of metals and non-metals B. Production of electricity

C. Purification of metals D. Electroplating of metals

343. The charge carriers in metallic (electronic) conductors are

A. freely moving ions B. anions only C. delocalized electrons D. Cations and anions

344. During the electrolysis of brine solution, the anode half reaction involves

A. the oxidation of sodium atoms in to ions

B. the reduction of chlorine atoms to give chloride ions

C. the oxidation of hydroxide ion (OH^-) in to hydrogen and oxygen

D. the oxidation of chloride ions to elemental chlorine.

345. Voltaic cells and electrolytic cells are differ in that

A. anode is positive and cathode is negative in both types of cells

B. both types of cells contain two electrodes in contact with electrolysis

C. Reduction half reactions occurs at the anode and oxidation half reactions occurs at the cathode in both types of cells

D. reduction half reactions occurs at the anode in both types of cells.

346. The conduction of electricity through each of the following substances is caused by the migration of ions except in one case. The exception is

A. molten NaCl B. fused $PbBr_2$ C. aqueous solution of KCl D. copper metal

347. Four different solutions of equal concentration (1M) were prepared as an electrolyte. The conduction of electricity is least in the solution containing A. CH_3COOH B. HCl C. H_2SO_4 D. HNO_3

348. If Cl_2 and Br_2 are added into an electrolytic cell contains an aqueous solution of Cl^- and Br^-, what amount of potential will be produced by the cell?

Given: $Cl_2 + 2e^- \longrightarrow 2Cl^-$, $E^o = +1.36V$

$Br_2 + 2e^- \longrightarrow 2Br^-$, $E^o = +1.08V$

A. -0.28V B. 0.28V C.2.44V D. -2.44V

349. Which of these processes is **NOT** spontaneous process?

A. The cooling of a block of hot metal to the temperature of its surroundings.

B. The expansion of a gas into a vacuum.

C. The boiling of water in an open pot at a very hot day.

D. The flow of viscous oil out of an overturned bottle.

350. What amount of electric current is needed to deposit 0.52g of chromium metal from a solution of Cr^{3+} in a period of 965 sec?

A. 0.408A B. 7.9A C.3A D. 0.79A

351. Which one of the following reaction represents the following cell notation?

$Co_{(s)}/Sn^{4+}{}_{(aq)}//Co^{2+}{}_{(aq)}/Sn^{2+}{}_{(aq)}$

A. $Co^{2+}{}_{(aq)} + Sn^{2+}{}_{(aq)} \longrightarrow Co_{(s)} + Sn^{4+}{}_{(aq)}$

B. $Co^{2+}{}_{(aq)} + Sn^{4+}{}_{(aq)} \longrightarrow Co_{(s)} + Sn^{2+}{}_{(aq)}$

C. $Co_{(s)} + Sn^{4+}{}_{(aq)} \longrightarrow Co^{2+}{}_{(aq)} + Sn^{2+}{}_{(aq)}$

D. B and C

352. Which of the following electrolysis have the same cell reaction with the electrolysis of dilute aqueous H_2SO_4?

A. Electrolysis of brine solution B. Electrolysis of concentrated lead chloride salt C. Electrolysis of concentrated HCl solution D. Electrolysis of dilute NaCl solution

353. Which of the following is not always correct?

A. Active metals are prepared by electrolytic reduction of their salt solutions

B. Metals prepared by chemical reduction of their ores are purified by electrolysis method

C. Elements with higher reduction potential are strong oxidizing agents

D. Electrolytic cells convert electrical energy to chemical energy

354. In an operating Galvanic cell, the function of a **salt bridge** is to

A. allow hydrolysis to occur

B. allow a non-spontaneous reaction to occur

C. allow electrical neutrality between the solutions

D. transfer electrons from the cathode to the anode

355. For the reaction: $Mg(s) + Ni^{+2}(aq) \rightarrow Ni(s) + Mg^{+2}(aq)$ $E^0Mg^{+2}/Mg = -2.37V$ and $E^oNi^{+2}/Ni = -0.25v$. What is the **E^ocell** for this reaction? A. +1.12V B. -2.62V C. -1.12v D. +2.26v

356. The correct **cell notation** for the balanced reaction : $Fe(s) + Cu^{+2}(aq) \rightarrow Fe^{+3}(aq) + Cu(s)$ A. $Cu(s)/Cu^{+2}(aq)$ // $Fe^{+2}(aq)/Fe(s)$ B. $Fe(s)/Fe^{+2}(aq)$// $Cu^{+2}(aq)(s)/Cu(s)$

C. $Fe^{+2}(aq)/Fe(s)$// $Cu/Cu^{+2}(aq)$ D. $Fe(s)/Fe^{+2}(aq)$ //$Cu(s)/Cu^{+2}(aq)$

357. What makes a Galvanic cell different from an electrolytic cell? In a Galvanic cell:-

A. The cell reaction is spontaneous. .

B. The transformation of electrical energy into chemical energy takes place.

C. External source of battery is needed.

D. The reaction is non-redox reaction

358. Which one of the following is not correct about voltaic cells?

A. anode is negative B. cathode is positive C. oxidation takes place at the anode D. redox reaction produce electricity in the cell

359. Which of the following is not the industrial application of electrolysis?

A. Production of metals and non-metals B. Production of electricity

C. Purification of metals D. Electroplating of metals

360. The charge carriers in metallic (electronic) conductors are

A. freely moving ions B. anions only C. delocalized electrons D. Cations and anions

361. What amount of electric current is needed to deposit 2.7g of aluminum metal from a solution of Al^{3+} in a period of 9650 sec? A.0.308A B. 1.9A C.3A D. 0.003A

362. What will happen during the electrolysis of aqueous solution of $CuSO_4$ in the presence of Cu electrodes?

A. Hydrogen gas will evolve at cathode. B. sulphate will deposit at anode

C. Oxygen gas will be released at anode. D. Copper will deposit at anode.

363. Using the data given below, $E^0\, Cr_2O_7^{2-}/Cr^{3+} = 1.33V$, $E^0\, Cl_2/Cl^- = 1.36V$, $E^0 MnO_4^-$ / $Mn^{2+} = 1.51V$, $E^0\, Cr^{3+}/\, Cr$, **=** -0.74v**,** Which one of the following substances is the strongest reducing agent? A.Cr^{3+} B. Cl^- C. Mn^{2+} D. Cr

364. Which of the following is **not** the function of salt bridge in the galvanic cell?

A. It allows the electrical contacts in the cell.
B. It allows the electrical neutrality in the process.
C. It prevents the mixing of two solutions.
D. It allows the hydrolysis reaction to occur.

365. Which one of the following statements is **not** true about the cell notation,

$Mg / Mg^{2+} // Cu^{2+} / Cu$? ($E^0_{Cu2+/\,Cu} > E^0_{Mg2+/\,Mg}$)

A. The spontaneous cell reaction is: $Mg + Cu^{2+} \rightarrow Cu + Mg^{2+}$
B. The non-spontaneous cell reaction is: $Cu + Mg^{2+} \rightarrow Mg + Cu^{2+}$
C. Copper acts as cathode in cell notation
D. The copper acts as cathode in electrolytic cell.

366. When the net ionic equations: $Fe^{2+} + Cr_2O_7^{2-} \rightarrow Cr^{3+} + Fe^{3+}$ isbalanced by ion electromethodin acidic medium , the coefficient of : Fe^{2+}, $Cr_2O_7^{-2}$, Cr^{3+}, Fe^{3+} become respectively A.6,1, 2, 6 B.3,1,2,3 C.5,1,2,5 D. 1, 1, 2, 1

367. What will happen during the electrolysis of aqueous solution of $CuSO_4$ in the presence of Cu electrodes?

A. Hydrogen gas will evolve at cathode. C. Copper will dissolve at anode

B. Oxygen gas will be released at anode. D. Copper will deposit at anode.

368. Which of the following is the strongest reducing agent?

A. Al B. Cu C. Zn D. Mg

369. In the electrolysis of dilute K2SO4, what is formed at the cathode?

A. O_2 gas B. H_2 gas C. K_2SO_4 D. H_2SO_4

370. In the electrolysis of molten ZnCl2, using carbon electrode, the anodic half reaction is

A. $Zn \rightarrow Zn^{+2} + 2e^-$ B. $Zn^{+2} + 2e^- \rightarrow Zn$

C. $2Cl^- \rightarrow Cl_2 + 2e^-$ D. $Cl_2 + 2e^- \rightarrow 2Cl^-$

371. What are the substances formed at the anode and cathode during the electrolysis of molten brine (NaCl)? A. O_2 & H_2 B. Na & Cl_2 C. Cl_2 & H_2 D. Cl_2 & Na

372. In the electrolysis of molten NaI, which is true?

A. I^- migrates to anode and gain electrons B. I^- migrates to anode and lose electrons

C. Na^+ migrates to anode and lose electrons D. Na^+ migrates to cathode and gain electrons

373. When the cations Cu^{+2}, Cd^{+2} and Zn^{+2} are listed from strongest to weakest oxidizing agent, the order is

A. Cd^{+2}, CU^{+2}, Zn^{+2} B. CU^{+2},Cd^{+2}, Zn^{+2}

C. Zn^{+2} , Cd^{+2}, CU^{+2} D. CU^{+2}, Zn^{+2} , Cd^{+2}

374. The product of the electrolysis of concentrated MgCl2 using inert electrode are

A. H_2 & O_2 B. Mg & O_2 C. H_2 & Cl_2 D. Mg & Cl_2

375. Which of the following reactions show the overall cell reaction?

A. $2Ag + Cu^{+2} \rightarrow Cu + 2Ag^+$ B. $2Ag + Cu \rightarrow Cu^{+2} + 2Ag^+$

C. $2Ag^+ + Cu^{+2} \rightarrow Cu + 2Ag$ D. $2Ag^+ + Cu \rightarrow Cu^{+2} + 2Ag$

376. Which of the followings are produced at the anode and cathode respectively during the electrolysis of aqueous Na_2SO_4 using carbon electrode?

A. Na & O_2 B. H_2 & O_2 C. O_2 & H_2 D. S & Na

377. Which half-cell reaction correctly represents reduction (cathodic reaction)?

A. $Zn \rightarrow Zn^{+2} + 2e^-$ B. $Zn^{+2} \rightarrow Zn + 2e^-$

C. $Zn + 2e^- \rightarrow Zn^{+2}$ D. $Zn^{+2} + 2e^- \rightarrow Zn$

378. What are the expected products of the electrolysis of an aqueous solution of molten $CaCl_2$?

A. Ca & H_2 are deposited at cathode and Cl_2 and O_2 are deposited at anode

B. Ca is deposited at cathode and Cl_2 at anode

C. Ca and H_2 are deposited at cathode and only Cl_2 is at anode

D. Ca is deposited at cathode and Cl_2 and O_2 at anode

379. Which of the following is an active electrode?

A. Pt B. graphite C. Gold D. Zinc

380. The best oxidizing agent among the following is

A. K^+ B. Ba^{+2} C. Pb^{+2} D. Cd^{+2}

381. Which of the following represents the same cell reaction with the electrolysis of aqueous H_2SO_4?

A. electrolysis of concentrated HCl B. electrolysis of dilute NaCl

C. electrolysis of brine solution D. electrolysis of molten NaCl

382. Given the reaction: $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$, which is the reducing agent in this reaction?

A. Fe B. CO C. CO_2 D. Fe_2O_3

383. If NO_2 acts as a reducing agent, a possible product formed is

A. NO B. N_2O C. N_2O_4 D. N_2O_5

384. Which of the following can act as an oxidizing agent but not as a reducing agent?

A. Cr B. Cl^- C. Cu^{+1} D. Na^+

385. The strongest oxidizing agent among the following is A. Na B. Al C. S D. Cl

386. Which of the following molecule is easily reduced? A. Br_2 B. Cl_2 C. F_2 D. I_2

387. Which of the following is more difficult to reduce than H^+ ion?

A. Cl_2 B. Ag^+ C. Zn^{+2} D. Cu^{+2}

388. The best oxidizing agent among the followings is

A. Na^+ B. Al^{+3} C. Ag^+ D. Cu^{+2}

389. If NO_2 undergo reduction, which one may be formed?

A. NO B. N_2O_4 C. N_2O_5 D. HNO_3

390. Which of these processes is **NOT** spontaneous?

A. The cooling of a block of hot metal to the temperature of its surroundings.

B. The expansion of a gas into a vacuum.

C. The boiling of water in an open pot at a very hot day.

D. The flow of viscous oil out of an overturned bottle.

391. Use these given data

Reaction	**E^0 (V)**
$O_2 + 2H_2O + 4e^- \longrightarrow 4OH^-$	+0.4
$H_2O_2 + 2H_3O^+ + 2e^- \longrightarrow 4H_2O$	+1.77
$PbSO_4 + 2e^- \longrightarrow Pb + SO_4^{2-}$	-0.356
$2H_2O + 2e^- \longrightarrow H_2 + 2OH^-$	-0.827

The correct order of the substance in increasing ability of functioning as oxidizing agent is:

A. $H_2O_2<O_2<PbSO_4<H_2O$ C. $PbSO_4<H_2O<H_2O_2<O_2$

B. $H_2O<PbSO_4<O_2<H_2O_2$ D. $O_2<H_2O<PbSO_4<H_2O_2$

392. If Cl_2 and Br_2 are added into an electrolytic cell contains an aqueous solution of Cl^{-1} and Br^{-1}, what amount of potential will be produced by the cell?

Given: $Cl_2 + 2e^- \longrightarrow 2Cl^-, E^o = +1.36V$

$Br_2 + 2e^- \longrightarrow 2Br^-, E^o = +1.08V$

A. -0.28V B. 0.28V C. 2.44V D. -2.44V

393. What amount of electric current is needed to deposit 0.52g of chromium metal from a solution of Cr^{3+} in a period of 965 sec?

A. 0.408A B. 7.9AV C. 3A D. 0.79A

394. Which one of the following reaction represent the following cell notation?

$Co_{(s)}/Sn^{4+}_{(aq)}//Co^{2+}_{(aq)}/Sn^{2+}_{(aq)}$

A. $Co^{2+}_{(aq)} + Sn^{2+}_{(aq)} \longrightarrow Co_{(s)} + Sn^{4+}_{(aq)}$

B. $Co^{2+}_{(aq)} + Sn^{4+}_{(aq)} \longrightarrow Co_{(s)} + Sn^{2+}_{(aq)}$

C. $Co_{(s)} + Sn^{4+}_{(aq)} \longrightarrow Co^{2+}_{(aq)} + Sn^{2+}_{(aq)}$

D. B and C

395. Two cells (KNO_3 & $AlCl_3$) are connected in series. If 120g of Aluminum is deposited on one of the cell how much potassium is deposited on the other cell? [use mass of K=39, N=14, O=16, Al=27 & Cl=35.5]A. 13.33g B. 0.075g C. 4.44g D. 0.225g E. None of the above

396. How many grams of copper are produced when 60 amperes of current are passed through copper (II) sulphate solution for 2 hours? A. 142.13g B. 284.27g C. 46g D. 126.4g E. None

397. The anode reaction is the same in all of the ff electrolytic cells except one:

A. Elctrolysis of brine solution
B. Electrolysis of fused lead chloride
C. Electrolysis of concentrated HCl solution D. Electrolysis of dilute NaCl solution

398. Which of the ff is not correct?

A. Up on electrolysis of $CuSO_4$ solution using copper electrodes, the solution remains unaffected
B. The products formed at the anode from the electrolysis of acidified water or dilute H_2SO_4 are the same
C. Active metals are prepared by electrolytic reduction of their salt solutions
D. Metals prepared by chemical reduction of their ores are purified using electrolysis method
E. Electrolytic cells convert electrical energy to chemical energy

399. During cathodic protection, the sacrificial anode

A. accepts electrons from the protected metal
B. reacts spontaneously with the protected metal
C. oxidizes more readily than the protected metal
D. causes the protected metal to become an anode

400. In order for an electrolytic cell to operate, it must have

A. voltmeter B. salt bridge C. power supply D. an aqueous solution

401. For the reaction: $Ni^{+2}(aq) + Fe(s) \rightarrow Ni(s) + Fe^{+2}(aq)$,

$E^oNi^{+2}/Ni = -0.25V$ and $E^oFe^{+2}/Fe = -0.44V$. What is the value of E^oCell?

A. -0.19V B. 0.19V C. -0.69V D. 0.69V

402. If $E^o\ Zn^{+2}/Zn = -0.76V$, $E^0Cu^{+2}/Cu = 0.34V$ $E^oSn^{+2}/Sn = -0.14V$ and $E^0Ni^{+2} = -0.25V$ which one is the most easily reduced? A. Zn^{+2} B. Cu^{+2} C. Ni^{+2} D. Sn^{+2}

403. If $E^oAl^{+3}/Al = -1.66V$ and $E^oCu^{+2}/Cu = 0.34V$, then E^ocell is A. 1.32V B. 4.34v C. 2.0V D. 2.3V

404. Given the following reactions with reduction potentials as follows: $E^oAg^+/Ag = 0.8V$, $E^oPb^{+2}/Pb = -0.126V$ and $E^oV^{+2}/V = -1.18V$. Which of the following reaction will occur spontaneously?

A. V^{+2} _ $2Ag \rightarrow V + 2Ag^+$ B. $Pb + V^{+2} \rightarrow Pb^{+2} + V$

C. $Pb + 2Ag^+ \rightarrow Pb^{+2} + 2Ag$ D. $2Ag^+ + Pb^{+2} \rightarrow 2Ag + Pb$

405. Consider the following half reaction

$Fe(OH)_2 + 2e^- \rightarrow Fe + 2OH^-$, $E^o = -0.88V$

$NiO_2 + 2H_2O + 2e^- \rightarrow Ni(OH)_2 + 2OH^-$, $E^0 = 0.49V$. What is E^ocell for the above reaction? A. -1.37V B. -0.39V C. 0.49V D. 1.37V

406. The reaction: Cu^{+2} + M ➔ Cu + M^{+2} has E^ocell = 0.75V. If E^ored for Cu^{+2} is 0.34V, what is E^ored for M^{+2}? A. -1.09V B. -0.41V C. 0.41V D. 1.09V

407. A solution at 25^0C contains the metal ions Ni^{+2}, Pt^{+2} and Pd^{+2} all at 1M concentrations. Consider the following standard reduction potentials E^oNi^{+2}/Ni = -0.25V, E^0Pt^{+2}/Pt = 1.2V and E^oPd^{+2}/Pd = 0.99V. Which metal(s) to be plated out first when the solution is electrolyzed?

A. Ni B. Pd C. Pt D. Ni and Pd

408. Which metal can react spontaneously with Zn^{+2} ion at 25°C?

A. Cu B. Ag C. Al D. Au E. Pb

409. Given the reaction: Al + $3Ag^+$ ➔ Al^{+3} + 3Ag if E^oAl^{+3}/Al = -1.66V and E^oAg^+/Ag = 0.8V, then E^ocell is A. 0.86V B. 1.78V C. 2.46V D. 3.38V

410. What is the standard cell potential for the reaction: 2Cr + $3Cu^{+2}$ ➔ $2Cr^{+3}$ + 3Cu if E^oCu/Cu = 0.34V and E^oCr^{+3}/Cr = -0.74V? A. -1.08V B. 0.4V C. 1.08V D. 2.5V

411. Which of the following metal ions can be reduced by Cd under standard conditions? A. Mg^{+2} B. Al^{+3} C. Ag^+ D. K^+

412. For the reaction: $2Au^{+3}$ + 3Ni ➔ 2Au + $3Ni^{+2}$, if E^oAu^{+3}/Au = 1.5 and $EoNi^{+2}/Ni$ = -.25V, what is E^ocell? A. 3.75V B. 2.25V C. 1.75V D. 1.25V

413. What is the standard potential of the cell containing Fe^{+2}/Fe and Br_2/Br^- couples if E^oFe^{+2}/Fe = -0.44V and E^oBr_2/Br- = 1.08V? A. -1.52V B. 2.34V C. 1.52V D. -2.34V

414. Consider the following standard voltaic cell: Fe, Fe^{+2} versus Au, Au^{+3}. Which answer identifies the cathode and gives the E^ocell for the reaction if Au^{+3}/Au = 1.5V and Fe^{+2}/Fe = -0.44V?

A. Au, 1.06V B. Fe, -0.44V C. Au, 1.94V D. Fe, 1.94V

415. If E^oAl^{+3}/Al = -1.66V, E^oSn^{+2}/Sn = -0.14V, E^oZn^{+2}/Zn = -0.76V and E^oMg^{+2}/Mg = -2.37V, the best reducing and oxidizing agents respectively are: A. Al, Mg^{+2} B. Zn, Sn^{+2} C. Sn, Mg^{+2} D. Mg, Sn^{+2}

416. Given the potential reduction of Fe^{+2}/Fe = -0.44V, Cu^{+2}/Cu = 0.34V, Zn^{+2}/Zn = -0.76V and Ni^{+2}/Ni = -0.25V. Which metal is used as a sacrificial anode to prevent iron from rusting? A. Cu B. Ni C. Zn D. Cu & Zn

417. For the cell notation: **Al(s)/Al^{+3}(aq)//Ag^+(aq)/Ag(s),** the correct balanced equation is:

A. Al^{+3}(aq) +$3Ag^+$(aq)→ Al(s) + 3Ag(s) B. Al^{+3}(aq) + 3Ag(aq)→ Al(s) + $3Ag^+$(aq) C. Al(s) + Ag^+(aq)→ Al^{+3}(aq) + Ag(s) D. Al(s) +3 Ag^+(aq)→ Al^{+3}(aq) + 3Ag(s)

418. The correct **cell notation** for the balanced reaction : $Fe(s) + Cu^{+2}(aq) \rightarrow Fe^{+3}(aq) + Cu(s)$ A. $Cu(s)/Cu^{+2}(aq)$ // $Fe^{+2}(aq)/Fe(s)$ B. $Fe(s)/Fe^{+2}(aq)$// $Cu^{+2}(aq)(s)/Cu(s)$ C.$Fe^{+2}(aq)/Fe(s)$// $Cu/Cu^{+2}(aq)$ D. $Fe(s)/Fe^{+2}(aq)$ //$Cu(s)/Cu^{+2}(aq)$

419. Which element is used as a **reference** to measure the standard reduction potential of other the elements? A. Carbon B. phosphorous C. Oxygen D. hydrogen

420. For the reaction: $Mg(s) + Ni^{+2}(aq) \rightarrow Ni(s) + Mg^{+2}(aq)$ $E^0Mg^{+2}/Mg = -2.37V$ and $E^oNi^{+2}/Ni = -0.25v$. What is the **E^ocell** for this reaction? A. +1.12V B. -2.62V C. -1.12v D. +2.26v

421. How many faradays are needed to produce 2.7g of aluminum? A. 0.1F B. 0.3F C. 1F D. 9F

422. The number of faraday`s required to produce 3.2g of oxygen is A. 0.025F B. 2.3F C. 2.5F D. 0.4F

423. How many grams of zinc will be deposited from a solution of ZnSO4 by a current of 4A flowing for 3hours? A. 2.5g B. 4.5g C. 3.8g D. 1.76g

424. For how long must a current of 2milliamper (2mA) be passed in electrolysis to form 0.3g of copper from Cu^{+2}? A. 125.7hr B.235.4hr C. 623.56hr D. 123.7hr

425. How many moles of a trivalent metal (M) would be deposited at the cathode by the electrolysis of molten salt in a cell operated at 20A for 3hrs? A. 1.5 moles B. 2.3 moles C. 0.52 moles D. 0.75 moles

426. An aqueous solution of platinum salt is electrolyzed by passing a current of 2.5A for 2hrs. as a result 9.09g of metallic platinum are formed at the cathode. What is the charge on the platinum ion in the solution if the molar mass of platinum is 195g/mol? A. 1 B. 2 C. 3 D. 4

427. A current of 1.26A is passed through an electrolytic cell containing an aqueous solution of H_2SO_4 for 7.44hrs. What volume of the gas is generated at the anode at STP? (use P= 1atm, T= 273K and R= 0.082L.atm/mol.k) A. 2.3L B. 1.96L C. 0.76L D. 4.76L

428. During the electrolysis of aqueous Cu(NO3)2, what would happen to the mass of Cu^{+2} if the current is doubled and time is halved of its initial? A. Stay the same B. doubled C. decreased by a factor of ½ D. increased by a factor of ½

429. A current of 15A flowing for 1hr deposits 12g of copper at the cathode. What is the equivalent mass of copper? A. 21.4g B. 0.05g C. 26.8g D. 5.63g

430. A lamp draws a current of 2A. What is the charge used by the lamp in 3 minutes? A. 6C B. 360C C. 3600C D. 7200C

431. When electricity is passed through aqueous solution of $AlCl_3$, 20.23g of Al are deposited. What must be the number of Faraday`s required? A. 3.74F B. 0.56F C. 2.25F D. 4.76F

432. Two cells, $Al(NO_3)_3$ and $CuCl_2$ are connected in series. If 27g of copper is deposited on one of the cell, how much of Al is deposited on the other cell? A. 6.43g B. 7.6g C. 13.7g D. 3.27g

433. Two cells are connected in series. One contains $LiNO_3$ and the other contains MCl_3. If 5g of Li was deposited in the cell containing $LiNO_3$ whereas 6.43g of the unknown metal M was deposited in the cell containing MCl_3, what is the molar mass of M? A. 9g B. 21g C. 54g D. 27g

434. The rate of a reaction is expressed by unit

A. $Mol^{-}L^{-}$ B. $Mol^{-}L^{-}S^{-}$ C. $MolL^{-}S^{-}$ D. $MolLS^{-}$

435. For gaseous substances, Increase in pressure shifts the equilibrium position to the

A. Right B. Left C. Sometimes right and sometimes left D. no any effect

436. Catalysts have no any effect on the position of the Equilibrium. A.True B. False

437. Esterification is the reaction between

A. alcohols and ketones B. Carboxylic acids and aldehydes

C. Aldehydes and alcohols D. Alcohols and carboxylic acids

438. Which of the following is not a precondition for a reaction to occur?

A. Activation energy B. Proper orientation C. Concentration D. Effective collision

439. Reduction of esters can produce

A. aldehydes B. Carboxylic acids C. primary alcohols D. Ketones

440. **Quick vinegar fermentation process** is the industrial preparation method for

A. Ethanol B. Acetic acid C. Propanol D. butanoic acid

441. In which of the following orders of reactions, the rate of half-life reaction is **independent** on the concentration of reactants?

A. First order B. Second order C. Third order D. Zero order

442. The decomposition of AB to A and B ($AB \rightarrow A + B$) is first order reaction with rate constant of $2x10^{-7}sec^{-1}$. What is the half-life of this reaction at the same temperature?

A. $2.9\ x10^{7}sec$ B. $4.7\ x10^{6}\ sec$ C. $3.8\ x10^{5}\ sec$ D. $3.5\ x10^{6}\ sec$

443. For the reaction: 2A + 3B → 4D + 5E, the rate of the reaction in terms of Δ [D] would be written as:

A. + 4 Δ[D] /Δt B. +1/4 Δ[D] /Δt C. -1/4 Δ[D] /Δ D. + Δ[D] /Δt

444. A mixture of NaCl in water is

A. Abivariant system C. a monovariant system

B. invariant system D. a one phase system

445. Consider the equilibrium reaction: $Cl_2(g) + 2NO(g) \rightleftharpoons 2NOCl(g)$, $K_c = 4$. At Equilibrium $[Cl_2] = 1.0$ M and $[NO] = 2.0$M. What is the [NOCl] at equilibrium A. 16M B. 8.0M C. 4.0M D. 2.0M

446. For the reaction X➔ Y if we double the concentration of X, the rate is quadrupled (increase four times), then the reaction is A. Zero order B. first order C. third order D. Se order

447. Which of the following is **not** a characteristic of a chemical equilibrium?

A. The concentration of reactants and products are generally equal

B. The reaction takes place in a closed vessel

C. The macroscopic properties do not change with time

D. The rate of forward reaction is equal to the rate of backward reaction

448. For the reaction:- $2C(s) + O_2(g) \rightleftharpoons 2CO(g)$, the Kc expression is

A. $\frac{2[CO]^2}{2[C][O_2]}$ B. $[CO]^2\frac{}{[C]^2[O_2]}$ C. $2[CO]^2\frac{}{[O_2]}$ D. $[CO]^2\frac{}{[O_2]}$

449. The reaction 2A→ B is a second order reaction in A with rate constant of $20 M^{-1}S^{-1}$. What is the half- life of this reaction if the initial concentration of A is 0.05M in a uni second?

A. 8.3 B. 0.12 C. 4.2 D. 1.0

450. Consider the mechanism for a reaction given below, which of the following statemer **not** correct?

Step-1: $NO_2 + F_2 \rightarrow NO_2F + F$ (slow)

Step-2: $NO_2 + F \rightarrow NO_2F$ (fast)

A. Step-1 is the rate determining step C. F is an intermediate

B. the overall equation (reaction) is $2NO_2 + F_2 \rightarrow 2NO_2F$

D. the molecularity of the overall reaction is bimolecular

451. How a catalyst does increase the rate for a given chemical reaction? It is by

A. lowering the activation energy C. Shifting the reaction to the right

B. Shifting the reaction to the left D. increasing the volume of the reactants and prod

452. Consider the following reaction at equilibrium

$CH_4(g) + H_2O(g) \rightleftharpoons CO(g) + 3H_2(g)$, $\Delta H = +260kJ$.

Which of the following is **not** the true effect on the reaction?

A. Increasing temperature favors the formation of products

B. Adding CO decreases the amount of H_2

C. Removal of H_2 decreases the amount of CO

D. Decreasing pressure increases the amount of CO

453. For the reaction, $H_2(g) + Br_2(g) \rightleftharpoons 2HBr(g)$, $K_c = 4 \times 10^4$ at 700 k. what is the value o

Kc for the reaction. $2HBr(g) \rightleftharpoons H_2(g) + Br_2(g)$ at the same temperature

A. 1.4×10^{-6} B. 5.04×10^{9} C. 1.6×10^{-5} D. 2.5×10^{-5}

454. For the reaction:- $C(s) + CO_2(g) \rightleftharpoons 2\,CO(g)$, if the partial pressure of CO_2 and CO are 2 atm & 4 atm respectively, what is the value of Kp at equilibrium for this reaction?

A. 8atm B. 4atm C. 0.5atm D. 32atm

455. Which of the following is likely to be happen when pressure is applied to the following reaction at equilibrium? $A(s) \rightleftharpoons A(l)$

A. More water will be formed C. water will evaporate

B. More ice will be formed D. no change occurs

456. Interms of temperature and pressure, solid state is characterized by

A. Low temperature and low pressure C. high temperature and high pressure

B. High temperature and low pressure D. low temperature and high pressure

457. The reaction between: NO and O_2 [$2NO(g) + O_2(g) \rightarrow 2NO_2(g)$] is second order in NO a first order in O_2. What change occurs in the rate of the reaction if the concentration of is

tripled and concentration of O_2 is doubled?

A. 5 times in creased B.8 times increased C.18 times increased D. 27 ti increased

458. Nitrosyl bromide (NOBr) decomposes slowly to NO & Br_2 as shown below

$2NOBr \rightarrow 2NO + Br_2$, Rate= $k[NOBr]^2$. The rate constant (k) is $0.6 M^{-1}S^{-1}$. If the in concentration of NOBr is 0.1M, what will be its concentration after 5 minutes?

A. 5.5×10^{-4}M B. 2.3×10^{-4} M C. 7.69×10^{-2} D. 1.82×10^{-2}M

459. For a one component system (C = 1), a system with three phases (P=3) is called A. Mono variant system B. bi-variant system

C. Invariant system D. Zero variant system

460. Which one of the following statement is **not correct**?

A. A mixture of $CaCO_3$ and Nacl has two phases

B. A mixture of oil and water has two phases.

C. A mixture NaCl in water has two components.

D. Ice floating on water has two components

461. For the reaction, $H_2(g) + Br_2(g) \leftrightharpoons 2HBr(g)$, Kc = 7.1 x 10^4 at 700 k. what is the value of Kc for the reaction. $2HBr(g) \leftrightharpoons H_2(g) + Br_2(g)$ at the same temperature

A. 1.4 x 10^{-5} B. 5.04 x 10^9 C. 1.4 x 10^{-3} D. 1.4 x 10^{-6}

462. Which statement explains why the rate of a chemical reaction is increased when the temperature of the reactant is increased? Because this change increases

A. The concentration of the reactant
B. The activation energy of the reactant
C. The collision between the reacting particle
D. the average kinetic energy of the reactant

463. For the reaction:- $C_5H_{12}(l) + 8O_2(g) \rightarrow 5\ CO_2(g) + 6H_2O(l)$, if the rate of appearance CO_2 is 2x $10^{-3} MS^{-1}$, what is the rate for the appearance of H_2O a disappearance of O_2 respectively?

A. 2.4 x 10^{-3}& 3.2 x10^{-3}
B.1.5 x 10^{-3}∧¿ 1.67 x10^{-3}
C. 1.67 x 10^{-3}& 1.25 x 10^{-3}
D. 1.33 x 10^{-3}& 2.5 x 10^{-3}

464. Which state of matter exists at very high temperature and small force of attraction between particles? A. the Liquid state B. the Gaseous state C. the solid state D. the Plasma state

465. Ammonia (NH_3) can be prepared industrially by the Haber process according to the following reaction $N_2(g) + 3H_2(g) \leftrightharpoons 2NH_3(g)$, ΔH= -92.1 KJ/mol. What conditions are favoured to maximize the yield of Ammonia.

A. low temperature and high pressure
B. high temperature and high pressure
C. high temperature and low pressure
D. low temperature and low pressure

466. Which of the following rate expressions is valid for the gas reaction,

$N_2O_5 \rightarrow 2NO_2 + \frac{1}{2}O_2$?

A. $\frac{\Delta[N_{2O_5}]}{\Delta t} = -2\ \frac{\Delta[O_2]}{\Delta t}$
B. $\frac{\Delta[NO_2]}{\Delta t} = 4\ \frac{\Delta[O_2]}{\Delta t}$
C. $\frac{\Delta[N_{2O_5}]}{\Delta t} = \frac{1}{2}\frac{\Delta[O_2]}{\Delta t}$
D. $\frac{\Delta[O_2]}{\Delta t} = 2\ \frac{\Delta[N_{2O_5}]}{\Delta t}$

467. The equilibrium constant (Kc) for the reaction:
$3H_2(g) + CO(g) \leftrightarrow CH_4(g) + H_2O(g)$ is $2.5M^{-2}$. If $[CO] = 2x10^{-3}M$, $[H_2] = 0.1M$ and $[H_2O] = 0.1M$, what is the $[CH_4]$ at equilibrium? A. 0.0421M B. 0.0452M C. 0.0481M D. 0.125M

468. For the rxn:- $PCl_5(g) \leftrightarrow PCl_3(g) + Cl_2(g)$, ΔH = 92.5KJ at equilibrium. One can increase the yield of $PCl_3(g)$ and $Cl_2(g)$ by

A. Increase in temperature
B. Increasing in pressure
C. Decreasing the concentration of PCl_5
D. Increasing the concentration of Cl_2

469. The reaction: 2C + D ➔ F was studied and the following data were obtained

Experiments	[A] in M	[B] in M	$(Rate)_o$
1	4.0	4.0	1.8
2	4.0	2.0	0.9
3	2.0	2.0	0.45

What is the proper rate equation expression?

A. Rate = $K[C]^2[D]$ B. Rate = $K[C][D]$ C. Rate = $K[C][D]^2$ D. Rate = $K[C]^2[D]^2$ E. None

470. Which one is not a method of preparing carboxylic acids?

A. Oxidation of primary alcohols B. Oxidation of aldehydes

C. Oxidation of esters D. Oxidation of alkyl benzene

471. When carboxylic acids react with active metals, which one of the following gases is evolved? A. Chlorine B. Nitrogen C. Hydrogen D. Carbon dioxide

472. Compounds that can be used to make artificial flavors and perfumes are

A. Alcohols B. Esters C. Ethers D. Carboxylic acids

473. the basic difference between fats and oils is that fats are

A. Saturated B. solid or semi-solid at room temperature C. obtained from animals D. all

474. Which base is used to prepare soft soaps? A. NaOH B. KOH C. $Ca(OH)_2$ C. $Al(OH)_3$

475. Which one of the following is not the derivative of hydrocarbons?

A. Alcohols B. Aldehydes C. Ketones D. Alkynes

476. The reaction of acid chlorides with primary alcohols produce

A. Aldehydes B. Fats and oils C. Esters D. Ketones

477. Base hydrolysis of esters is called

A. hydrolysis B. esterification C. saponification D. Emulsification

478. The commonest method of preparing esters is

A. Hydrolysis B. reduction C. esterification D. saponification

479. Of the following organic compounds which one has dual functional groups?

A. Alcohols B. carboxylic acids C. Ketones D. Esters

480. Among the followings which one has a pleasant smell and flavor odor?

A. CH_3CH_2OH B. CH_3CH_2COOH C. $CH_3CH_2COCH_3$ D. $CH_3CH_2COOCH_3$

481. The chemical which is used in ants as a defensive mechanism is

A. Acetic acid B. Formic acid C. Butanoic acid D. Propanoic acid

482. When beverages like `tella` and `teji` are kept for a long periods, they become sour due to the formation of A. CH_3CH_3OH B. HCOOH C. CH_3COOCH_3 D. CH_3COOH

483. Which one of the followings has the highest boiling points?

A. $CH_3(CH)_2CH_3$ B. $CH_3(CH_2)_2CHO$ C. $CH_3(CH_2)_2OH$ D. $CH_3(CH_2)_2COOH$

484. The volume of a certain confined gas is doubled while the pressure is held constant. What will happen to the temperature of this gas?
C. It will decrease by half C. It will increase by four factor
D. It will be doubled D. It will remain the same

485. The average kinetic energy of gas molecules is **directly proportional** to
A. The total pressure of the gas
B. The volume occupied by the gas
C. The absolute temperature of the gas
D. The number of molecule of the gas

486. The type of physical state which occur at high temperature and low pressure
A. Solid state B. Liquid state C. Gaseous state D. Plasma state

487. If a sample of 10 litres volume of gas is heated from -73°C to 127°C at constant pressure, the new volume is A. 5L B. 20L C. 15L D. 10L

488. Oxygen gas (O_2) diffuses 2 times an **unknown** gas. What is the molar mass of the **unknown** gas? A. 128 B. 64 C. 22.6 D. 8

489. Equal volume of different gasses at constant temperature and pressure have equal number

of molecules. This is the law of stated by
A. Boyle's B. Charle's C. Lussac's D. Avogadro`s

490. A 10 litres of gas exerts a pressure of 40 atm at constant temperature. What is the new
volume of the gas if the pressure is changed to 80 atm at constant temperature?
A. 5L B. 20L C. 2.5L D. 10L

491. The volume of 64g of methane gas (CH_4) at 27°c and 4atm is
A. 11.2L B. 49.2L C. 24.6L D. 2.214L

492. The amount of heat released when one mole of liquid is converted in to a solid is called
A. the amount of heat released C. molar heat of crystallization
B. Molar heat of fusion D. Molar heat of sublimation

493. which of the following is not related correctly with its method of preparation
A. Ammonia ➔ Haber process C. sodium carbonate ➔ Bosch process
B. B. sulfuric acid ➔ contact process D. nitric acid ➔ Ostwald process

494. The raw material used in the industrial preparation of nitric acid is
A. NO B. N_2O_5 C. NH_3 D. NO_2

495. A method of preparing sodium hydroxide (NaOH) by the electrolysis of brine solution is
A. Castner-kellner process C. Loewig`s process
B. Nelson diaphragm cell process D. Reacting sodium oxide with water

496. A mixture of Na_2SiO_3 and $CaSiO_3$ is used to make
A. Cement B. Ceramics C. Glass D. Pulp and paper

497. A method of preserving foods by keeping the original shape, taste and flavor is
A. Freezing B. Irradiation C. Vacuum packing D. Freeze-drying
A. In the preparatory stage of tannery industry, the step where the missed hair and fat are removed using dull knife is A. Curing B. Scudding C. deliming D. soaking

498. Chemicals used to digest trees in the sulphite process of making pulp and paper are
A. NaOH and Na_2S C. H_2SO_4 and HNO_3
B. $NaHSO_4$ and $MgHSO_4$ D. Na_2CO_3 and NH_3

499. Which of the following process is responsible for causing rain?
A. Evaporation B. Condensation C. Evaporation and condensation D. Filtration

500. Acid rain is mainly due to
A. presence of dust in air C.presence of water vapor in air
B. presence of carbon dioxide in air D.presence of oxides of sulfur and nitrogen in air

501. What happens to the soil after prolonged application of fertilizers and pesticides?
A. The soil retains its fertility C. The soil become alkaline
B. B. The soil becomes acidic D. The soil becomes barren of life forms

502. In the electroplating process, an external voltage is applied across a pair of electrodes causing
A. A current to flow through an electrolyte
B. An electroplate to form on an electrolyte
C. An alternating voltage in a magnetic chemical
D. A chemical to produce a negative voltage on a positive electrode

503. Chemists permit secondary cell to be rechargeable by
A. Reversing the polarity of the discharged cell
B. Alternating the electrodes with a primary cell at the same type
C. Replacing the lost chemicals in the electrolyte
D. Reversing the current flow using another energy source

504. Which of the following are characteristics of thermosetting polymers?
A. Heavily branched three dimensional cross-linked polymers.
B. Linear slightly branched long-chain molecules.
C. Become fusible on moulding so can be re -used.
D. Soften on heating and harden on cooling and hence can be re-used.

505. The synthesis of which of the following polymers necessitates the loss of tiny molecules like water on a regular basis?
A. Polythene B. Nylon-6,6 C. polyvinyl chloride D. Teflon

506. Which of the following criteria does not apply to the classification of polymers?
A. Source B. Structure C. Method of preparation **D.** Number of monomers

507. Which of the following is not a thermoplastic example?
A. Polyvinyl chloride B. Bakelite C. Polyesters D. Nylon