Quiz: Chemical Bonding 1

Q1: According to VSEPR theory, the shape of IF5 molecule is:

A) Trigonal bipyramidal
B) Square pyramidal
C) Square planar
D) Octahedral

Q2: Which of the following species has the maximum bond angle?

A) NH3
B) H2O
C) CO2
D) SO2

Q3: The hybridization of central atom in XeF4 is:

A) sp3
B) sp3d
C) sp3d2
D) dsp2

Q4: Which molecule has zero dipole moment?

A) NH3
B) SO2
C) CO2
D) H2O

Q5: The correct order of bond length is:

A) N===N < N=N < N-N
B) N-N < N=N < N===N
C) N=N < N-N < N===N
D) N===N < N-N < N=N

Q6: Which of the following has sp2 hybridization?

A) CH4
B) C2H4
C) C2H2
D) NH3

Q7: The bond angle in H2O is less than that in NH3 due to:

A) Lower electronegativity of O
B) More lone pair repulsion in H2O
C) Higher electronegativity of N
D) Smaller size of O

Q8: Which of the following molecules is paramagnetic?

A) O2
B) N2
C) CO

D) F2

Q9: The bond order of O2- ion is:

A) 1
B) 1.5
C) 2
D) 2.5

Q10: Which of the following has maximum ionic character?

A) NaCl
B) KCl
C) CsCl
D) LiCl

Q11: The geometry of SF6 molecule is:

A) Trigonal bipyramidal
B) Square planar
C) Octahedral
D) Pentagonal bipyramidal

Q12: Which of the following does NOT follow octet rule?

A) CO2
B) BF3
C) CH4
D) NH3

Q13: The hybridization of nitrogen in NO3- ion is:

A) sp
B) sp2
C) sp3
D) dsp2

Q14: Which orbital overlap leads to the strongest covalent bond?

A) s-s
B) s-p
C) p-p (sidewise)
D) p-p (head-on)

Q15: Which of the following has the highest lattice energy?

A) NaCl
B) KCl
C) MgO
D) CaO

Q16: The shape of BrF3 molecule is:

A) Trigonal planar
B) T-shaped
C) Square planar
D) Trigonal bipyramidal

Q17: Which molecule has maximum bond angle?

A) CH_4
B) NH_3
C) H_2O
D) BF_3

Q18: The bond order of N_2 molecule is:

A) 1
B) 2
C) 3
D) 2.5

Q19: Which of the following species is diamagnetic?

A) O_2
B) NO
C) NO^+
D) O_2^-

Q20: The hybridization of carbon in CO_2 is:

A) sp
B) sp^2
C) sp^3
D) dsp^2

Q21: Which of the following has square planar geometry?

A) XeF_4
B) BF_4^-
C) NH_4^+
D) SF_4

Q22: The correct order of bond strength is:

A) sigma < pi < triple
B) pi < sigma < triple
C) triple < sigma < pi
D) sigma < triple < pi

Q23: Which of the following molecules has bent shape?

A) CO_2
B) SO_2
C) BF_3
D) $BeCl_2$

Q24: The formal charge on nitrogen in NH_4^+ ion is:

A) -1
B) 0
C) +1
D) +2

Q25: Which of the following shows hydrogen bonding?

A) HCl
B) NH3
C) PH3
D) H2S

Q26: The hybridization of central atom in ClF3 is:

A) sp2
B) sp3
C) sp3d
D) sp3d2

Q27: Which of the following has maximum bond dissociation energy?

A) F-F
B) Cl-Cl
C) Br-Br
D) I-I

Q28: The dipole moment of BF3 is:

A) High
B) Moderate
C) Low
D) Zero

Q29: Which molecule uses dsp2 hybridization?

A) Ni(CN)42-
B) SF6
C) PF5
D) NH3

Q30: The bond angle in NH3 is approximately:

A) 90 deg
B) 104.5 deg
C) 107 deg
D) 109.5 deg

Q31: Which of the following has the highest covalent character?

A) NaF
B) NaCl
C) NaBr
D) NaI

Q32: The shape of IF7 molecule is:

A) Octahedral
B) Pentagonal bipyramidal
C) Trigonal bipyramidal
D) Square pyramidal

Q33: Which of the following molecules has sp hybridization?

A) CO_2
B) NH_3
C) CH_4
D) H_2O

Q34: The bond order of NO molecule is:

A) 2
B) 2.5
C) 3
D) 1.5

Q35: Which of the following molecules is linear?

A) SO_2
B) NO_2^-
C) CO_2
D) O_3

Q36: Which bond is strongest?

A) C-C
B) C=C
C) C≡≡≡C
D) C-H

Q37: The correct order of increasing bond angle is:

A) $CH_4 < NH_3 < H_2O$
B) $H_2O < NH_3 < CH_4$
C) $NH_3 < H_2O < CH_4$
D) $CH_4 < H_2O < NH_3$

Q38: Which of the following molecules has sp^3 hybridization?

A) C_2H_2
B) C_2H_4
C) CH_4
D) CO_2

Q39: The molecular orbital configuration of O_2 shows paramagnetism due to:

A) Paired electrons in sigma orbitals
B) Unpaired electrons in pi* orbitals
C) High bond order
D) Lone pairs on oxygen

Q40: Which of the following statements is correct?

A) Higher bond order means longer bond length
B) Higher bond order means weaker bond
C) Higher bond order means shorter bond length
D) Bond length is independent of bond order

Q41: According to VSEPR theory, the shape of SF4 molecule is:

A) Tetrahedral
B) Square planar
C) Seesaw
D) Trigonal bipyramidal

Q42: Which of the following species has maximum bond order?

A) O2
B) O2-
C) O2+
D) O22-

Q43: The hybridization of central atom in PF5 is:

A) sp3
B) sp3d
C) sp3d2
D) dsp2

Q44: Which of the following molecules has trigonal planar geometry?

A) NH3
B) BF3
C) CH4
D) SF4

Q45: Which of the following has maximum dipole moment?

A) CO2
B) BF3
C) NH3
D) CCl4

Q46: The bond angle in SO2 molecule is close to:

A) 120 deg
B) 109.5 deg
C) 104.5 deg
D) 180 deg

Q47: Which of the following molecules has lone pair-lone pair repulsion?

A) NH3
B) H2O
C) CH4
D) BF3

Q48: Which molecule has the highest bond angle among the following?

A) H2O
B) NH3
C) CH4
D) BeCl2

Q49: The bond order of NO+ is:

A) 2
B) 2.5
C) 3
D) 1.5

Q50: Which of the following molecules is diamagnetic?

A) O2
B) NO
C) B2
D) N2

Q51: The shape of PCl5 molecule is:

A) Trigonal planar
B) Trigonal bipyramidal
C) Square pyramidal
D) Octahedral

Q52: Which of the following molecules has sp3d2 hybridization?

A) SF4
B) XeF4
C) PF5
D) BF3

Q53: The bond length is maximum for:

A) C===C
B) C=C
C) C-C
D) C-H

Q54: Which of the following shows hydrogen bonding in liquid state?

A) HF
B) HCl
C) HBr
D) HI

Q55: The shape of XeF2 molecule is:

A) Bent
B) Linear
C) Trigonal planar
D) T-shaped

Q56: Which of the following ions has the highest lattice energy?

A) NaCl
B) KCl
C) MgCl2
D) AlCl3

Q57: The hybridization of boron in BF3 is:

A) sp
B) sp2
C) sp3
D) dsp2

Q58: Which of the following has maximum covalent character?

A) LiF
B) LiCl
C) LiBr
D) LiI

Q59: The molecular orbital configuration of B2 shows:

A) Diamagnetism
B) Paramagnetism
C) Zero bond order
D) Bond order 3

Q60: Which of the following molecules is nonpolar despite polar bonds?

A) NH3
B) H2O
C) CO2
D) SO2

Q61: The formal charge on oxygen in O3 molecule is:

A) -1
B) 0
C) +1
D) Depends on resonance structure

Q62: Which of the following has square pyramidal geometry?

A) BrF5
B) XeF4
C) SF6
D) IF7

Q63: The bond angle in H2S compared to H2O is:

A) Greater
B) Equal
C) Smaller
D) 180 deg

Q64: Which orbital overlap results in formation of pi bond?

A) s-s
B) s-p
C) p-p sidewise
D) p-p head-on

Q65: The bond order of O22- ion is:

A) 0
B) 1
C) 1.5
D) 2

Q66: Which of the following molecules violates octet rule due to expanded octet?

A) BF3
B) NH3
C) SF6
D) CH4

Q67: The shape of NO2- ion is:

A) Linear
B) Bent
C) Trigonal planar
D) Tetrahedral

Q68: Which of the following has maximum bond energy?

A) H-H
B) Cl-Cl
C) N===N
D) O=O

Q69: The dipole moment of CCl4 is:

A) High
B) Moderate
C) Low
D) Zero

Q70: Which molecule shows sp3 hybridization with two lone pairs?

A) NH3
B) H2O
C) CH4
D) BF3

Q71: The correct order of increasing bond polarity is:

A) H-H < C-H < O-H < Na-Cl
B) C-H < H-H < O-H < Na-Cl
C) Na-Cl < O-H < C-H < H-H
D) H-H < Na-Cl < C-H < O-H

Q72: Which of the following molecules has trigonal pyramidal shape?

A) NH3
B) BF3
C) CO2
D) BeCl2

Q73: The bond order of He2 molecule is:

A) 0
B) 0.5
C) 1
D) 2

Q74: Which of the following species has linear shape?

A) NO_2
B) NO_2^-
C) NO_2^+
D) SO_2

Q75: The hybridization of sulfur in SO_3 is:

A) sp
B) sp^2
C) sp^3
D) sp^3d

Q76: Which of the following compounds shows maximum hydrogen bonding?

A) NH_3
B) H_2O
C) HF
D) CH_3OH

Q77: The shape of ClF_5 molecule is:

A) Square planar
B) Square pyramidal
C) Octahedral
D) Trigonal bipyramidal

Q78: Which of the following has the highest melting point?

A) NaCl
B) KCl
C) MgO
D) CaO

Q79: The bond angle order is:

A) $H_2O < NH_3 < CH_4$
B) $NH_3 < H_2O < CH_4$
C) $CH_4 < NH_3 < H_2O$
D) $H_2O < CH_4 < NH_3$

Q80: Which statement is correct regarding covalent bonds?

A) Formed by transfer of electrons
B) Formed by sharing of electrons
C) Occur only between metals
D) Always polar

Q81: Which of the following molecules has the highest bond angle?

A) NH_3
B) H_2O
C) CH_4
D) BeF_2

Q82: The bond order of O_2 molecule according to molecular orbital theory is:

A) 1
B) 1.5
C) 2
D) 2.5

Q83: Which of the following species is paramagnetic?

A) N_2
B) O_2^{2-}
C) NO
D) CO

Q84: The hybridization of carbon atom in ethyne (C_2H_2) is:

A) sp
B) sp^2
C) sp^3
D) dsp^2

Q85: Which of the following does NOT obey octet rule?

A) NH_3
B) H_2O
C) PCl_5
D) CO_2

Q86: The shape of ICl_3 molecule is:

A) Trigonal planar
B) T-shaped
C) Bent
D) Trigonal bipyramidal

Q87: Which of the following has the maximum bond dissociation energy?

A) H-H
B) F-F
C) Cl-Cl
D) Br-Br

Q88: The dipole moment of NH_3 molecule is due to:

A) Trigonal planar shape
B) Tetrahedral shape
C) Pyramidal shape
D) Linear shape

Q89: Which molecule has sp3d hybridization?

A) BF3
B) PF5
C) SF6
D) XeF4

Q90: The bond angle in NH3 is smaller than in CH4 due to:

A) Larger size of nitrogen
B) Higher electronegativity of carbon
C) Lone pair-bond pair repulsion
D) Bond pair-bond pair repulsion

Q91: Which of the following ions has zero bond order?

A) He2+
B) He2
C) H2+
D) Li2+

Q92: The geometry of XeF6 molecule is best described as:

A) Octahedral
B) Distorted octahedral
C) Pentagonal bipyramidal
D) Trigonal bipyramidal

Q93: Which of the following molecules is linear?

A) SO2
B) NO2
C) CO2
D) H2O

Q94: The bond order of O2+ ion is:

A) 1
B) 1.5
C) 2
D) 2.5

Q95: Which of the following compounds shows maximum ionic character?

A) LiF
B) LiCl
C) LiBr
D) LiI

Q96: The number of sigma (sigma) and pi (pi) bonds in C2H4 molecule are:

A) 4 sigma, 1 pi
B) 5 sigma, 1 pi
C) 6 sigma, 1 pi
D) 5 sigma, 2 pi

Q97: Which of the following has square planar geometry?

A) Ni(CN)42-
B) SF4
C) XeF2
D) PCl5

Q98: The bond length is shortest in:

A) C-C
B) C=C
C) C===C
D) C-H

Q99: Which of the following molecules shows hydrogen bonding?

A) CH4
B) H2S
C) NH3
D) PH3

Q100: The shape of ClF3 molecule is:

A) Trigonal planar
B) T-shaped
C) Seesaw
D) Linear

Q101: Which of the following molecules has sp2 hybridization?

A) CH4
B) NH3
C) C2H4
D) C2H2

Q102: The formal charge on oxygen atom in CO32- ion is:

A) -1
B) -2
C) 0
D) Depends on resonance structure

Q103: Which orbital overlap results in formation of sigma (sigma) bond?

A) Sidewise p-p
B) End-on p-p
C) d-d sidewise
D) p-d sidewise

Q104: Which of the following is a polar molecule?

A) CO2
B) BF3
C) CCl4
D) SO2

Q105: The bond order of NO molecule is:

A) 2
B) 2.5
C) 3
D) 1.5

Q106: Which molecule uses dsp3 hybridization?

A) PF5
B) SF6
C) XeF4
D) BrF5

Q107: The correct order of bond angle is:

A) CH4 > NH3 > H2O
B) H2O > NH3 > CH4
C) NH3 > CH4 > H2O
D) CH4 > H2O > NH3

Q108: Which of the following has the highest lattice energy?

A) NaCl
B) KCl
C) MgO
D) CaO

Q109: The shape of BrF5 molecule is:

A) Square planar
B) Square pyramidal
C) Octahedral
D) Trigonal bipyramidal

Q110: Which of the following species is isoelectronic with N2?

A) CO
B) NO
C) O2
D) CN-

Q111: The hybridization of sulfur in SF6 is:

A) sp3
B) sp3d
C) sp3d2
D) dsp2

Q112: Which bond is the weakest?

A) C-C
B) C=C
C) C===C
D) N===N

Q113: The bond angle in H_2O is approximately:

A) 90 deg
B) 104.5 deg
C) 107 deg
D) 109.5 deg

Q114: Which of the following molecules has zero dipole moment?

A) NH_3
B) H_2O
C) CO_2
D) SO_2

Q115: The bond order of B_2 molecule is:

A) 0
B) 1
C) 2
D) 3

Q116: Which of the following molecules has trigonal pyramidal shape?

A) BF_3
B) NH_3
C) CO_2
D) $BeCl_2$

Q117: The number of pi (pi) bonds in benzene is:

A) 2
B) 3
C) 4
D) 6

Q118: Which of the following compounds shows maximum hydrogen bonding?

A) H_2O
B) HF
C) NH_3
D) CH_3OH

Q119: The shape of XeF_4 molecule is:

A) Square planar
B) T-shaped
C) Trigonal bipyramidal
D) Octahedral

Q120: Which statement is correct?

A) Higher bond order means longer bond length
B) Higher bond order means weaker bond
C) Higher bond order means shorter bond length
D) Bond order does not affect bond length

Q121: Which of the following molecules has maximum number of lone pairs on the central atom?

A) NH3
B) H2O
C) XeF2
D) SF4

Q122: The hybridization of central atom in XeF2 is:

A) sp
B) sp2
C) sp3
D) sp3d

Q123: Which of the following species has the highest bond order?

A) N2
B) O2
C) O2+
D) O2-

Q124: Which of the following has zero bond order?

A) He2
B) He2+
C) H2
D) Li2

Q125: The geometry of I3- ion is:

A) Bent
B) Linear
C) Trigonal planar
D) T-shaped

Q126: Which of the following molecules has sp3 hybridization but is non-polar?

A) NH3
B) H2O
C) CH4
D) PCl3

Q127: The bond angle in IF3 molecule is closest to:

A) 90 deg
B) 120 deg
C) 180 deg
D) Less than 90 deg

Q128: Which of the following shows maximum back-bonding?

A) BF3
B) BCl3
C) BBr3
D) BI3

Q129: The bond order of O_2^{2+} ion is:

A) 1
B) 2
C) 2.5
D) 3

Q130: Which of the following molecules has trigonal bipyramidal electron geometry but different molecular shape?

A) PCl_5
B) SF_4
C) PF_5
D) BeF_3^-

Q131: The correct order of increasing bond length is:

A) C≡≡C < C=C < C-C
B) C=C < C≡≡C < C-C
C) C-C < C=C < C≡≡C
D) C=C < C-C < C≡≡C

Q132: Which of the following molecules has square planar geometry due to lone pair repulsion?

A) XeF_4
B) BF_4^-
C) NH_4^+
D) SF_4

Q133: The hybridization of nitrogen atom in NO_2^+ ion is:

A) sp
B) sp^2
C) sp^3
D) dsp^2

Q134: Which molecule has the highest dipole moment?

A) NH_3
B) NF_3
C) PH_3
D) SbH_3

Q135: The bond order of NO^- ion is:

A) 2
B) 2.5
C) 3
D) 1.5

Q136: Which of the following molecules shows resonance?

A) NH_3
B) CO_2
C) O_3
D) CH_4

Q137: The shape of SF5- ion is:

A) Square pyramidal
B) Trigonal bipyramidal
C) Octahedral
D) T-shaped

Q138: Which of the following has maximum lattice energy?

A) NaF
B) MgO
C) Al2O3
D) CaO

Q139: The number of sigma bonds in benzene molecule is:

A) 6
B) 9
C) 12
D) 15

Q140: Which of the following molecules has bent shape despite sp2 hybridization?

A) CO2
B) BF3
C) SO2
D) BeCl2

Q141: The hybridization of iodine in IF7 is:

A) sp3d2
B) sp3d3
C) d2sp3
D) sp3

Q142: Which of the following species is diamagnetic?

A) B2
B) O2
C) NO
D) CO

Q143: The bond angle order is:

A) H2O < NH3 < CH4
B) NH3 < H2O < CH4
C) CH4 < NH3 < H2O
D) H2O < CH4 < NH3

Q144: Which molecule has zero formal charge on all atoms?

A) NH4+
B) CO2
C) NO3-
D) O3

Q145: The bond order of CN- ion is:

A) 1
B) 2
C) 2.5
D) 3

Q146: Which of the following has maximum covalent character?

A) NaF
B) NaCl
C) NaBr
D) NaI

Q147: The shape of XeF6 molecule is:

A) Octahedral
B) Distorted octahedral
C) Pentagonal pyramidal
D) Trigonal bipyramidal

Q148: Which of the following molecules is planar?

A) NH3
B) CH4
C) BF3
D) H2O

Q149: The number of pi bonds in naphthalene is:

A) 5
B) 6
C) 7
D) 10

Q150: Which statement is correct regarding sigma and pi bonds?

A) pi bond is stronger than sigma bond
B) sigma bond is formed by sidewise overlap
C) sigma bond allows free rotation
D) pi bond allows free rotation

Q151: The bond order of O2 molecule decreases on conversion to:

A) O2+
B) O2-
C) O22+
D) O22-

Q152: Which molecule has maximum number of resonance structures?

A) NO2-
B) CO32-
C) SO2
D) O3

Q153: The shape of BrF3 molecule is determined mainly by:

A) Bond pair-bond pair repulsion
B) Lone pair-bond pair repulsion
C) Lone pair-lone pair repulsion
D) All repulsions equally

Q154: Which of the following has sp hybridization?

A) CO
B) NH3
C) CH4
D) H2O

Q155: The dipole moment of NF3 compared to NH3 is:

A) Greater
B) Equal
C) Smaller
D) Zero

Q156: Which of the following compounds shows hydrogen bonding in solid state?

A) NaCl
B) HF
C) HCl
D) CH4

Q157: The shape of ClO2- ion is:

A) Linear
B) Bent
C) Trigonal planar
D) Tetrahedral

Q158: Which of the following molecules has maximum bond polarity?

A) H-F
B) H-Cl
C) H-Br
D) H-I

Q159: The bond order of N2+ ion is:

A) 2
B) 2.5
C) 3
D) 1.5

Q160: Which statement best explains resonance?

A) Atoms vibrate between structures
B) Actual structure is hybrid of canonical forms
C) Only one structure is correct
D) Electrons are localized

Q161: Which of the following molecules has maximum number of bond pairs around the central atom?

A) NH3
B) PF5
C) SF6
D) XeF4

Q162: The hybridization of the central atom in BrF3 is:

A) sp2
B) sp3
C) sp3d
D) sp3d2

Q163: Which of the following has the highest bond order?

A) C2
B) N2
C) O2
D) F2

Q164: The geometry of XeF2 is linear due to:

A) Maximum bond pair repulsion
B) Minimum lone pair repulsion
C) Equatorial positioning of lone pairs
D) Axial positioning of lone pairs

Q165: Which molecule has the smallest bond angle?

A) CH4
B) NH3
C) H2O
D) H2S

Q166: The bond order of O22- compared to O2 is:

A) Greater
B) Equal
C) Smaller
D) Double

Q167: Which of the following species is paramagnetic?

A) O22-
B) N2
C) B2
D) CO

Q168: The shape of ClF3 molecule is mainly due to:

A) Bond pair-bond pair repulsion
B) Lone pair-bond pair repulsion
C) Lone pair-lone pair repulsion
D) Equal repulsions

Q169: Which of the following has maximum dipole moment?

A) CH3Cl
B) CH2Cl2
C) CHCl3
D) CCl4

Q170: The number of sigma bonds in ethyne (C2H2) is:

A) 2
B) 3
C) 4
D) 5

Q171: Which of the following violates octet rule due to incomplete octet?

A) BF3
B) PCl5
C) SF6
D) XeF4

Q172: The hybridization of nitrogen in NH4+ ion is:

A) sp
B) sp2
C) sp3
D) dsp2

Q173: Which of the following molecules has zero formal charge on all atoms?

A) NH3
B) CO
C) CO2
D) NO3-

Q174: The strongest hydrogen bonding is observed in:

A) NH3
B) H2O
C) HF
D) CH3OH

Q175: Which of the following molecules is planar?

A) NH3
B) CH4
C) BF3
D) H2O

Q176: The bond order of N2+ ion is:

A) 3
B) 2.5
C) 2
D) 1.5

Q177: Which of the following orbitals overlap leads to formation of a pi bond?

A) s-s head-on
B) s-p head-on
C) p-p head-on
D) p-p sidewise

Q178: The shape of SF5- ion is:

A) Square pyramidal
B) Trigonal bipyramidal
C) Octahedral
D) T-shaped

Q179: Which of the following has the highest lattice energy?

A) NaCl
B) MgO
C) Al2O3
D) KCl

Q180: The bond angle in H2O is less than that in H2S because:

A) O is smaller than S
B) More lone pairs on oxygen
C) Higher electronegativity of oxygen
D) Greater lone pair-bond pair repulsion in H2O

Q181: Which molecule has sp3 hybridization with one lone pair?

A) NH3
B) H2O
C) CH4
D) BF3

Q182: The bond order of CN- ion is:

A) 1
B) 2
C) 2.5
D) 3

Q183: Which of the following molecules shows resonance?

A) NH3
B) CH4
C) O3
D) H2O

Q184: The hybridization of central atom in XeF4 is:

A) sp3d
B) sp3d2
C) dsp2
D) sp2

Q185: Which of the following molecules is nonpolar despite having polar bonds?

A) NH3
B) H2O
C) CO2
D) SO2

Q186: The bond order of NO molecule is:

A) 1.5
B) 2
C) 2.5
D) 3

Q187: Which of the following has maximum covalent character?

A) LiF
B) LiCl
C) LiBr
D) LiI

Q188: The shape of XeF6 molecule is:

A) Octahedral
B) Distorted octahedral
C) Pentagonal bipyramidal
D) Trigonal bipyramidal

Q189: Which of the following has maximum bond dissociation energy?

A) H-H
B) C-C
C) O=O
D) N===N

Q190: The number of pi bonds in benzene is:

A) 2
B) 3
C) 4
D) 6

Q191: Which of the following ions is linear?

A) NO2-
B) NO2
C) NO2+
D) SO2

Q192: The dipole moment of NF3 compared to NH3 is:

A) Greater
B) Equal
C) Smaller
D) Zero

Q193: Which of the following compounds exhibits hydrogen bonding in solid state?

A) NaCl
B) HF
C) HCl
D) CH4

Q194: The bond angle order is:

A) H2O < NH3 < CH4
B) NH3 < H2O < CH4
C) CH4 < NH3 < H2O
D) H2O < CH4 < NH3

Q195: Which of the following molecules has square planar geometry?

A) XeF4
B) SF4
C) PCl5
D) NH3

Q196: The hybridization of carbon in CO is:

A) sp
B) sp2
C) sp3
D) dsp2

Q197: Which of the following has zero dipole moment?

A) NH3
B) SO2
C) CO2
D) H2O

Q198: The bond order of O2+ ion is:

A) 1.5
B) 2
C) 2.5
D) 3

Q199: Which statement is correct regarding sigma and pi bonds?

A) pi bond is stronger than sigma bond
B) sigma bond is formed by sidewise overlap
C) sigma bond allows free rotation
D) pi bond allows free rotation

Q200: The hydrogen spectrum supports the concept of:

A) Continuous energy levels
B) Quantized energy levels
C) Random electron motion
D) Nuclear instability

Q201: Which of the following molecules has maximum number of lone pairs on the central atom?

A) SF6
B) XeF4
C) IF5
D) NH3

Q202: The hybridization of the central atom in IF5 is:

A) sp3d
B) sp3d2
C) dsp2
D) sp3

Q203: Which of the following species has the highest bond order?

A) O2
B) O2+
C) O2-
D) O22-

Q204: The geometry of XeF2 molecule is linear because:

A) Lone pairs occupy axial positions
B) Lone pairs occupy equatorial positions
C) Bond pairs repel more strongly
D) Hybridization is sp

Q205: Which molecule has the smallest H-X-H bond angle?

A) H2O
B) H2S
C) H2Se
D) H2Te

Q206: The bond order of N22+ ion is:

A) 1
B) 2
C) 2.5
D) 3

Q207: Which of the following molecules is paramagnetic?

A) C2
B) N2
C) O2
D) F2

Q208: The shape of BrF5 molecule is:

A) Square planar
B) Trigonal bipyramidal
C) Square pyramidal
D) Octahedral

Q209: Which molecule has the highest dipole moment?

A) CH3F
B) CH3Cl
C) CH3Br
D) CH3I

Q210: The total number of sigma bonds in ethene (C2H4) is:

A) 4
B) 5
C) 6
D) 7

Q211: Which of the following violates octet rule due to expanded octet?

A) BF3
B) NH3
C) SF6
D) CH4

Q212: The hybridization of nitrogen in NO3- ion is:

A) sp
B) sp2
C) sp3
D) dsp2

Q213: Which of the following molecules has zero formal charge on all atoms?

A) NH4+
B) CO2
C) NO3-
D) O3

Q214: The strongest hydrogen bonding is observed in:

A) NH3
B) H2O
C) HF
D) CH3OH

Q215: Which of the following molecules is planar?

A) NH3
B) CH4
C) BF3
D) H2O

Q216: The bond order of N2- ion is:

A) 3
B) 2.5
C) 2
D) 1.5

Q217: Which overlap leads to formation of sigma (sigma) bond?

A) p-p sidewise
B) p-p head-on
C) d-d sidewise
D) p-d sidewise

Q218: The shape of I3- ion is:

A) Bent
B) Trigonal planar
C) Linear
D) T-shaped

Q219: Which compound has the highest lattice energy?

A) NaCl
B) KCl
C) MgO
D) CaO

Q220: The bond angle in H2O is less than NH3 because:

A) Oxygen is smaller
B) More lone pairs on oxygen
C) Greater electronegativity of oxygen
D) Stronger lone pair-lone pair repulsion

Q221: Which molecule has sp3 hybridization with one lone pair?

A) NH3
B) H2O
C) CH4
D) BF3

Q222: The bond order of CN- ion is:

A) 1
B) 2
C) 2.5
D) 3

Q223: Which molecule shows resonance?

A) NH3
B) CH4
C) O3
D) H2O

Q224: The hybridization of central atom in XeF4 is:

A) sp3d
B) sp3d2
C) dsp2
D) sp2

Q225: Which molecule is nonpolar despite having polar bonds?

A) NH3
B) H2O
C) CO2
D) SO2

Q226: The bond order of NO molecule is:

A) 1.5
B) 2
C) 2.5
D) 3

Q227: Which compound has maximum covalent character?

A) LiF
B) LiCl
C) LiBr
D) LiI

Q228: The shape of XeF6 molecule is:

A) Octahedral
B) Distorted octahedral
C) Pentagonal bipyramidal
D) Trigonal bipyramidal

Q229: Which bond has the highest bond dissociation energy?

A) H-H
B) C-C
C) O=O
D) N===N

Q230: The number of pi bonds in benzene is:

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B) 3
C) 4
D) 6

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B) NO2
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D) SO2

Q232: The dipole moment of NF3 compared to NH3 is:

A) Greater
B) Equal
C) Smaller
D) Zero

Q233: Which compound shows hydrogen bonding in solid state?

A) NaCl
B) HF
C) HCl
D) CH4

Q234: Correct order of bond angle is:

A) H2O < NH3 < CH4
B) NH3 < H2O < CH4
C) CH4 < NH3 < H2O
D) H2O < CH4 < NH3

Q235: Which molecule has square planar geometry?

A) XeF4
B) SF4
C) PCl5
D) NH3

Q236: The hybridization of carbon in CO is:

A) sp
B) sp2
C) sp3
D) dsp2

Q237: Which molecule has zero dipole moment?

A) NH3
B) SO2
C) CO2
D) H2O

Q238: The bond order of O2+ ion is:

A) 1.5
B) 2
C) 2.5
D) 3

Q239: Which statement about sigma and pi bonds is correct?

A) pi bond is stronger than sigma bond
B) sigma bond is formed by sidewise overlap
C) sigma bond allows free rotation
D) pi bond allows free rotation

Q240: The hydrogen spectrum supports the concept of:

A) Continuous energy levels
B) Quantized energy levels
C) Random electron motion
D) Nuclear instability

Q241: Which molecule has trigonal planar geometry?

A) NH3
B) BF3
C) CH4
D) SF4

Q242: The bond order of He2+ ion is:

A) 0
B) 0.5
C) 1
D) 2

Q243: Which molecule has seesaw shape?

A) SF4
B) XeF4
C) PCl5
D) IF7

Q244: The hybridization of sulfur in SO2 is:

A) sp
B) sp2
C) sp3
D) sp3d

Q245: Which species has the highest bond energy?

A) F2
B) Cl2
C) Br2
D) I2

Q246: Which of the following is diamagnetic?

A) O2
B) NO
C) CO
D) B2

Q247: The shape of NO3- ion is:

A) Bent
B) Linear
C) Trigonal planar
D) Tetrahedral

Q248: Which bond is most polar?

A) H-F
B) H-Cl
C) H-Br
D) H-I

Q249: The bond order of N2 molecule is:

A) 1
B) 2
C) 2.5
D) 3

Q250: Which statement correctly explains resonance?

A) Atoms oscillate between structures
B) Actual structure is hybrid of canonical forms
C) Electrons are localized
D) Only one structure exists