

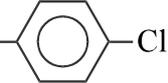
14. Sulphur shows a maximum covalency of :
 (A) 5 (B) 7 (C) 6 (D) 3
15. Anhydrous AlCl_3 is covalent but $\text{AlCl}_3 \cdot 6\text{H}_2\text{O}$ is ionic because :
 (A) AlCl_3 has a plane triangular structure
 (B) the ionization energy of Al is very low
 (C) the hydration energy of AlCl_3 is very high
 (D) the hydration energy of AlCl_3 compensates for the high ionization energy of aluminium
16. Which of the following oxyacids of sulphur contain no sulphur – sulphur (S – S) bonds ?
 (A) $\text{H}_2\text{S}_2\text{O}_4$ (B) $\text{H}_2\text{S}_2\text{O}_5$ (C) $\text{H}_2\text{S}_2\text{O}_7$ (D) $\text{H}_2\text{S}_2\text{O}_3$
17. The correct O – O bond order in O_3 , O_2 and H_2O_2 is
 (A) $\text{H}_2\text{O}_2 < \text{O}_3 < \text{O}_2$ (B) $\text{O}_2 < \text{O}_3 < \text{H}_2\text{O}_2$ (C) $\text{H}_2\text{O}_2 > \text{O}_2 > \text{O}_3$ (D) $\text{O}_3 < \text{H}_2\text{O}_2 > \text{O}_2$
18. The hybrid state of B-atom in boron-hydride is sp^2 , while in its dimer it has sp^3 hybrid state because
 (A) one of the empty orbitals of boron takes part in hybridisation
 (B) overlapping between s and p-orbitals of H and B forms a p bond
 (C) B_2H_6 is an electron rich compound
 (D) B_2H_6 is less stable than BH_3
19. Correct order of electronegative difference between bonded atom is :
 (A) $\text{AlCl}_3 < \text{MgCl}_2 < \text{NaCl}$ (B) $\text{NaCl} < \text{AlCl}_3 < \text{MgCl}_2$
 (C) $\text{NaCl} < \text{MgCl}_2 < \text{AlCl}_3$ (D) $\text{MgCl}_2 < \text{NaCl} < \text{AlCl}_3$
20. Bond order of Be_2 is
 (A) 1 (B) 2 (C) 3 (D) 0
21. The shape of methyl cation (CH_3^+) is likely to be :
 (A) linear (B) pyramidal (C) planar (D) spherical
22. The structure XeF_2 involves hybridization of the type :
 (A) sp^3 (B) dsp^2 (C) sp^3d (D) sp^3d^2
23. NH_3 and BF_3 combine readily because of the formation of :
 (A) a covalent bond (B) a hydrogen bond (C) a coordinate bond (D) an ionic bond
24. Iron is harder than sodium because
 (A) iron atoms are smaller (B) iron atoms are more closely packed
 (C) metallic bonds are stronger in sodium (D) metallic bonds are stronger in iron
25. KF combines with HF to form KHF_2 . The compound contains the species
 (A) K^+ , F^- and H^+ (B) K^+ , F^- and HF (C) K^+ and $[\text{HF}_2]^-$ (D) $[\text{KHF}]^+$ and F^-
26. Which one of the following does not have intermolecular H-bonding
 (A) H_2O (B) o-nitrophenol (C) HF (D) CH_3COOH
27. Which of the following sets of characteristics leads to the increase in solubility of ionic substances
 (A) High dipole moment, strong attraction by an ion and large solvation energy
 (B) Low dipole moment, weak attraction by an ion and high solvation energy
 (C) High dipole moment, strong attraction by an ion and low solvation energy
 (D) High dipole moment, weak attraction by an ion and large solvation energy

40. The volatility of HF is low because of
 (A) its low polarizability
 (B) the weak dispersion interaction between the molecules
 (C) its small molecular mass
 (D) its strong hydrogen bonding
41. Which of the following has been arranged in order of decreasing dipole moment ?
 (A) $\text{CH}_3\text{Cl} > \text{CH}_3\text{F} > \text{CH}_3\text{Br} > \text{CH}_3\text{I}$ (B) $\text{CH}_3\text{F} > \text{CH}_3\text{Cl} > \text{CH}_3\text{Br} > \text{CH}_3\text{I}$
 (C) $\text{CH}_3\text{Cl} > \text{CH}_3\text{Br} > \text{CH}_3\text{I} > \text{CH}_3\text{F}$ (D) $\text{CH}_3\text{F} > \text{CH}_3\text{Cl} > \text{CH}_3\text{I} > \text{CH}_3\text{Br}$
42. Which of the following compounds on reaction with NaOH and H_2O_2 gives yellow colour?
 (A) $\text{Zn}(\text{OH})_2$ (B) $\text{Cr}(\text{OH})_3$ (C) $\text{Al}(\text{OH})_3$ (D) None of these
43. Acetylene does not form hydrogen bond because :
 (A) absence of lone pair of electron in higher electronegative carbon atom
 (B) absence of more electronegative atom
 (C) size of more electronegative atom is large
 (D) None of these
44. The hybridisation of P in PO_4^{-3} is same as in :
 (A) I in ICl_4^- (B) S in SO_3 (C) N in NO_3^- (D) S in SO_4^{-2}
45. Inert pair effect is prominent characteristic of :
 (A) s - block (B) d - block (C) p - block (D) f - block
46. Which of the following is linear ?
 (A) XeF_2 (B) XeF_4 (C) SO_2 (D) ClF_3
47. The second I.P. of Na, third I.P. of Mg and fourth I.P. of Al are very high because
 (A) the ion Na^+ , Mg^{2+} and Al^{3+} have high ionic potential
 (B) these ions are isoelectronic
 (C) these ions have outer ns^2np^6 configuration
 (D) these ions are of normal elements
48. Which of the following processes does not involve a catalyst :
 (A) Thermite process (B) Ostwald's process
 (C) Contact process (D) Haber's process
49. For $\text{Be}(\text{NO}_3)_2$ anhydrous which is correct .
 (A) starting material is $\text{Be}(\text{NO}_3)_2 \cdot 2\text{H}_2\text{O}$ with N_2O_4
 (B) $\text{Be}(\text{NO}_3)_2$ (anh.) on heating upto 125°C gives basic beryllium nitrate $[\text{Be}_4\text{O}(\text{NO}_3)_6]$
 (C) $\text{Be} + \text{HNO}_3$ (dil.) $\rightarrow \text{Be}(\text{NO}_3)_2$ (anh.) + H_2O
 (D) all of these are correct
50. Highly pure dilute solution of sodium in liquid ammonia :
 (A) shows blue colour
 (B) exhibits electrical conductivity & act as reducing agent
 (C) produces sodium amide
 (D) All of these

61. How many bonded electrons pairs are present in IF_7 molecule :
 (A) 6 (B) 7 (C) 5 (D) 8
62. The bond angle and hybridization in ether (CH_3OCH_3) is :
 (A) $106^\circ 51'$, sp^3 (B) $104^\circ 31'$, sp^3 (C) 110° , sp^3 (D) none of these
63. How many unpaired electrons are present in N_2^+
 (A) 1 (B) 2 (C) 3 (D) 4
64. Na_2CO_3 can be manufactured by Solvay process but K_2CO_3 can not be prepared because –
 (A) K_2CO_3 is more soluble (B) K_2CO_3 is less soluble
 (C) KHCO_3 is more soluble than NaHCO_3 (D) KHCO_3 is less soluble than NaHCO_3
65. MgBr_2 and MgI_2 are soluble in acetone because of –
 (A) Their ionic nature (B) Their o-ordinate nature
 (C) Their metallic nature (D) Their covalent nature
66. The purification method used for mineral $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$ is –
 (A) Froth floatation (B) Leaching
 (C) Liquefaction (D) Magnetic separation
67. A metal X on heating in nitrogen gas gives Y. Y on treatment with H_2O gives a colourless gas which when passed through CuSO_4 solution gives a blue colour. Y is
 (A) $\text{Mg}(\text{NO}_3)_2$ (B) Mg_3N_2 (C) NH_3 (D) MgO
68. From gold amalgam, gold may be recovered by :
 (A) Addition of Zn metal (B) Electrolytic refining
 (C) Distillation (D) Dissolving Hg in HNO_3
69. Van Arkel method of purification of metals involves converting the metal to a :
 (A) Volatile stable compound (B) Volatile unstable compound
 (C) non volatile stable compound (D) none of the above
70. When copper is placed in the atmosphere for sufficient time, a green crust is formed on its surface the composition of green crust is :
 (A) $\text{Cu}(\text{OH})_2$ (B) CuO (C) CuCO_3 (D) $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$
71. In the metallurgy of iron when lime stone is added to the blast furnace, the calcium ion ends up in
 (A) Slag (B) Gangue (C) Metallic calcium (D) Calcium carbonate
72. In comparison of ferrous salt, ferric salt is :
 (A) More stable (B) Less stable (C) Equally stable (D) None of these
73. The slag obtained during the smelting process in the extraction of copper from copper pyrites is composed mainly of :
 (A) Cu_2S (B) FeSiO_3 (C) CuSiO_3 (D) SiO_2

83. In a research lab a scientist is doing an experiment. He takes two test tubes one containing $\text{Ba}(\text{NO}_3)_2$ solution and other contains salts of chloride, fluoride and iodide. Now he mixed test tube Ist with test tube IInd. then what happens
 (A) chloride is precipitate BaCl_2 form
 (B) fluoride is precipitated in BaF_2 form
 (C) iodide is precipitated in BaI_2 form
 (D) all are precipitate in BaCl_2 , BaF_2 and BaI_2 form
84. Salt (A) gives black colour precipitate with H_2S in acidic medium. The precipitate dissolves in HNO_3 and gives solution (B). (B) on reaction with $\text{K}_4[\text{Fe}(\text{CN})_6]$ gives brown colour (C). What is (B) ?
 (A) CuS (B) $\text{Cu}(\text{NO}_3)_2$ (C) $\text{Cu}_2[\text{Fe}(\text{CN})_6]$ (D) CuSO_4
85. CuSO_4 solution when heated with P_4 is reduced into :
 (A) Cu (B) Cu_2SO_4 (C) Cu_3P (D) None of these
86. Salt (A) on decomposition gives basic gas, acidic gas, neutral gas along with H_2O . (A) is :
 (A) $(\text{NH}_4)_2\text{SO}_4$ (B) $(\text{NH}_4)_2\text{C}_2\text{O}_4$ (C) $(\text{NH}_4)_2\text{CO}_3$ (D) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$
87. A greenish yellow gas reacts with an alkali metal hydroxide to form a halate which can be used in fireworks and safety matches. The gas and halate respectively are
 (A) Br_2 , KBrO_3 (B) Cl_2 , KClO_3 (C) I_2 , NaIO_3 (D) Cl_2 , NaClO_3
88. Which of the following is not orange coloured compound ?
 (A) $\text{K}[\text{BiI}_4]$ (B) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ (C) PbI_2 (D) $\text{Na}_2\text{Cr}_2\text{O}_7$
89. CaNH on hydrolysis will give gas (A) which on oxidation by CaOCl_2 will convert into (B). What are (A) and (B) ?
 (A) $\text{A} = \text{NH}_3$, $\text{B} = \text{N}_2$ (B) $\text{A} = \text{N}_2$, $\text{B} = \text{NH}_3$
 (C) $\text{A} = \text{NH}_3$, $\text{B} = \text{NH}_3$ (D) $\text{A} = \text{N}_2$, $\text{B} = \text{N}_3\text{H}$
90. An acid among the following is -
 (A) $\text{B}(\text{OH})_3$ (B) $\text{Al}(\text{OH})_3$ (C) NaOH (D) None
91. The correct lewis acid order for boron halides is -
 (A) $\text{BF}_3 > \text{BCl}_3 > \text{BBr}_3 > \text{BI}_3$ (B) $\text{BCl}_3 > \text{BF}_3 > \text{BBr}_3 > \text{BI}_3$
 (C) $\text{BI}_3 > \text{BBr}_3 > \text{BCl}_3 > \text{BF}_3$ (D) $\text{BBr}_3 > \text{BCl}_3 > \text{BI}_3 > \text{BF}_3$
92. The main factor responsible for weak acidic nature of B - F bond in BF_3 is ;
 (A) Large electronegativity of F
 (B) Three centred two electron bond in BF_3
 (C) $\text{P}\pi - \text{d}\pi$ back bonding
 (D) $\text{P}\pi - \text{P}\pi$ back bonding
93. Ferric ions form a Prussian blue coloured precipitate with $\text{K}_4\text{Fe}(\text{CN})_6$ due to the formation of -
 (A) $\text{K}_3[\text{Fe}(\text{CN})_6]$ (B) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$ (C) $\text{Fe}(\text{OH})_3$ (D) $\text{KFe}[\text{Fe}(\text{CN})_6]$
94. The name of the blue product of the reaction between ferrous ion and ferricyanide ion is -
 (A) thenard blue (B) turnbull's blue (C) Prussian blue (D) ultramarine blue

MULTIPLE CHOICE QUESTIONS

- 106.** Which of the following have planar structure ?
 (A) I_3^- (B) H_2O_2 (C) $Ni(CO)_4$ (D) $[Ni(CN)_4]^{2-}$
- 107.** Which have odd-order bond ?
 (A) O_2^+ (B) O_2^- (C) NO (D) H_2^+
- 108.** Which has (have) zero value of dipole moment
 (A) $[Ni(CN)_4]^{2-}$ (B) $CHCl_3$ (C) CO_2 (D) 
- 109.** Which of the following statements (s) is/are correct regarding ionic compounds ?
 (A) they are good conductors at room temperature
 (B) they are generally soluble in polar solvents
 (C) they consist of ions
 (D) they generally have high melting and boiling points
- 110.** Which of the following compounds possesses zero dipole moment ?
 (A) water (B) benzene
 (C) carbon tetrachloride (D) boron trifluoride
- 111.** Which of the following compound is/are predominantly ionic ?
 (A) KCl (B) Na_2S (C) H_2 (D) CaO
- 112.** Which of the following statements is/are true ?
 (A) covalent bonds are directional
 (B) ionic bonds are non directional
 (C) A polar bond is formed between two atoms which have the same electronegativity value
 (D) The presence of polar bonds in polyatomic molecule suggests that it has zero dipole moment
- 113.** Which of the following statement is/are correct
 (A) the peroxide ion has a bond order of 1 while the oxygen molecule has a bond order of 2
 (B) the peroxide ion has a weaker bond than the dioxygen molecule has
 (C) the peroxide ion as well as the dioxygen molecules are paramagnetic
 (D) the bond length of the peroxide ion is greater than that of the dioxygen molecules
- 114.** Colour of which of the following is attributed to charge transfer spectrum ?
 (A) $KMnO_4$ (B) KO_2 (C) $K_2Cr_2O_7$ (D) AgI
- 115.** Three centre-two electron bonds exist in –
 (A) B_2H_6 (B) $Al_2(CH_3)_6$ (C) $BeH_2(s)$ (D) $BeCl_2(s)$
- 116.** $p\pi - d\pi$ bonding occurs between oxygen and
 (A) phosphorus in P_4O_{10} (B) chlorine in $HClO_4$
 (C) nitrogen in N_2O_5 (D) carbon in CO_2

128. Which of the following statements about alkaline earth metals are correct ?
 (A) Hydration energy of Sr^{2+} is greater than that of Be^{2+}
 (B) CaCO_3 decomposes at a higher temperature than BaCO_3
 (C) $\text{Ba}(\text{OH})_2$ is stronger base than $\text{Mg}(\text{OH})_2$
 (D) SrSO_4 is less soluble in water than CaSO_4
129. The metal which gives amphoteric oxide is :
 (A) Zn (B) Cu (C) Sn (D) Ga
130. Which of the following compounds are isostructural :
 (A) CO_2 , N_3^- (B) NO_2^- , O_3 (C) CO_3^{2-} , NO_3^- (D) CO_2 , NO_3^-
131. Which of the statement is correct ?
 (A) In PCl_5 hybridisation is sp^3d and it has trigonal bipyramidal structure.
 (B) The angle between the P and Cl is 90° which is same for all the P and Cl present in PCl_5
 (C) The bond length of P—Cl in axial position is higher than in equatorial position.
 (D) PCl_5 is ionic in solid phase
132. From the Given species : N_2 , CO , CN^- and NO^+ . Which of the following statements are true for these .
 (A) all species are paramagnetic (B) the species are isoelectronic
 (C) all the species have dipole moment (D) all the species have bond order 3
133. Which of the following pairs of elements will give superoxides and peroxides respectively when heated in excess of air
 (A) K, Ba (B) Na, Rb (C) K, Rb (D) Na, Ba
134. In Alkali metal family cesium is
 (A) Used in photoelectric cells (B) Lightest of all
 (C) Less electropositive than francium (D) Soft and has low melting and boiling points.
135. The pairs of compounds which cannot exist together in aqueous solution are
 (A) NaH_2PO_4 and Na_2HPO_4 (B) Na_2CO_3 and NaHCO_3
 (C) NaOH and NaH_2PO_4 (D) NaHCO_3 and NaOH
136. Alkali metals are characterised by
 (A) Good conductor of heat and electricity (B) high oxidation potentials
 (C) High melting points (D) Solubility in liquid ammonia.
137. Which of the following superoxides are orange coloured
 (A) RbO_2 (B) CsO_2 (C) KO_2 (D) None of these
138. All the following substances react with water, in which of the cases same gaseous product is obtained?
 (A) Na (B) Na_2O_2 (C) KO_2 (D) NaH
139. Epsom salt is used
 (A) As a purgative
 (B) As a mordant in dyeing
 (C) As a stimulant to increase the secretion of bile
 (D) For removal of S from petroleum

150. Which options are true for Pattinson's process
- (A) This process is based on the fact that silver-lead system has an eutectic mixture with 2.6% silver
 - (B) This eutectic mixture has M. Pt. 303°C whereas pure Pb has M. Pt. 327°C
 - (C) Further purification is done by cupellation process
 - (D) Argentiferous lead contains 2% Ag.
151. Bessemer converter which is used for the extraction of copper -
- (A) hot air acts as oxidising agent & Cu_2S acts as self-reducing agent
 - (B) slag is CaSiO_3
 - (C) SiO_2 lining is used in Bessemer converter
 - (D) the copper obtained in this process is blister copper.
152. For Dow's process which is/are correct?
- (A) For extraction of Mg by sea water
 - (B) Ca(OH)_2 is used to ppt Mg
 - (C) Mg is precipitated in form of Mg(OH)_2
 - (D) ppt. of Mg(OH)_2 is treated with HCl & then electrolysis for extraction of 'Mg'
153. Which of the following statement/s is/are correct?
- (A) The structure of carborundum is as same that of diamond
 - (B) Carbogen is a mixture of O_2 and CO_2 (5–10%) which is used for artificial respiration in pneumonia patients
 - (C) SnCl_2 is a strong oxidizing agent.
 - (D) PbO a yellow coloured powder is known as litharge.
154. Nitrogen (I) oxide is produced by :
- (A) thermal decomposition of ammonium nitrate
 - (B) disproportionation of N_2O_4
 - (C) thermal decomposition of ammonium nitrite
 - (D) interaction of hydroxylamine and nitrous acid
155. In which of the following compound have nearly zero dipole-moment value:
- (A) SF_6
 - (B) PCl_5
 - (C) BF_3
 - (D) cis-2-butene

Write-up III

Lattice enthalpy: The lattice enthalpy of an ionic solid is defined as the energy required to completely separate one mole of a solid ionic compound into gaseous constituent ions. For e.g., the lattice enthalpy of NaCl is 788 kJ mol^{-1} . This means that 788 kJ of energy is required to separate to an infinite distance 1 mole of solid NaCl into 1 mole of $\text{Na}^+(\text{g})$ and one mole of $\text{Cl}^-(\text{g})$.

This process involves both the attractive forces between ions of opposite charges and the repulsive forces between ions of like charge. The solid crystal being three-dimensional; it is not possible to calculate lattice enthalpy directly from the interaction of forces of attraction and repulsion only. Factors associated with the crystal geometry have to be included.

The first theoretical interpretation of lattice enthalpy was given by Born and Lande. They gave a simple equation for the calculation of lattice enthalpy.

$$U_0 = \frac{AN_A |z^+||z^-|e^2}{4\pi\epsilon_0 r_0} (1 - 1/n)$$

Where U_0 is the lattice enthalpy; A , the Madelung constant (this take care of interaction with all the other ions besides the nearest neighbours) N_A , the Avogadro constant; z^+ , charge on the positive ion; z^- , the charge on the negative ion; e , charge on the electron; π , constant (3.14159); ϵ_0 ; vacuum permittivity; r_0 inter-ionic distance, n is the born exponent in the repulsion terms.

On moving up to down lattice energy decreases in groups. Same for hydration energy also. If lattice energy is less than hydration energy, means that salt will be soluble in water.

162. Which one has highest melting point among the following ?
(A) NaCl (B) KCl (C) CsCl (D) RbCl
163. Which of the following order is correct for lattice energy (U) .
(A) $\text{Fe}_2\text{O}_3 > \text{FeO}$ (B) $\text{Fe}_2\text{O}_3 < \text{FeO}$ (C) $\text{Fe}_2\text{O}_3 = \text{FeO}$ (D) none of these
164. BaSO_4 is inosluble in water because :
(A) lattice energy is greater than hydration energy
(B) lattice energy is less than hydration energy
(C) lattice energy is almost same its hydration energy
(D) None of these

Write-up IV

Valence shell electron-pair repulsion theory predicts the shape of a molecule by considering the most stable configuration of the bond angles in the molecule. The main points of the theory are :

- i) Electron pairs in the valence shell of the central atom of a molecule, whether bonding or lone pairs are regarded as occupying localised orbitals. These orbitals arrange themselves in so as to minimise the mutual electronic repulsions.
- ii) The magnitude of the different types of electronic repulsions follow the order given below: lone pair-lone pair > lone pair-bonding pair > bonding pair-bonding pair. These repulsive forces alter the bond angles of the molecule or ion.
- (iii) The electron repulsion between two pairs of electrons will be minimum if they are as far apart as possible . On this basis, the following geometrical arrangements are most suited.

- 183.** State true or false .
- (i) A.B.M.O. are formed by the linear combination of two atomic orbitals when their wave functions are added
 - (ii) The electron density increases between the nuclei of B.M.O.
 - (iii) A.B.M.O. has no nodal plane
 - (iv) The energy of B.M.O. is always more than energies of the combining atomic orbitals
- (A) TFTF (B) TFTF
(C) FTFF (D) TTFF
- 184.** Match the following :
- | | |
|---|--|
| (A) He ₂ is not formed | (i) electron will be removed from the B.M.O. |
| (B) O ₂ ²⁻ is diamagnetic in nature | (ii) due to zero bond order |
| (C) H ₂ ⁺ exists | (iii) due to presence of paired electrons |
| (D) In the formation of N ₂ ⁺ from N ₂ | (iv) due to presence of one electron and is paramagnetic |
- (A) a-iii, b-ii, c-i, d-iv (B) a-i, b-iii, c-iv, d-ii
(C) a-ii, b-iii, c-iv, d-i (D) a-iv, b-iii, c-i, d-ii
- 185.** In the following compounds (i) O₂⁰ (ii) O₂⁺ [AsF₄]⁻ (iii) K⁺[O₂]⁻
Pick out the incorrect statement .
- (A) O-O bond length = ii < i < iii
 - (B) bond order = iii < i < ii
 - (C) bond energy = ii < iii < i
 - (D) unpaired electron in A.B.M.O. of i, ii, iii are 2, 1, 1 respectively

Write-up XI

Read the following passage based on applications of crystal field theory to explain magnetic and spectral properties of complexes carefully and answer the questions .

With the help of CFT number of unpaired electrons in a compound can be calculated and we can calculate its paramagnetic moment (due to spin only) by the formula, $\mu = \sqrt{n(n+2)}$ Bohr magneton (BM), where 'n' is the number of unpaired electron in the complex. For spectral analysis the separation between t_{2g} and e_g orbitals called ligand field splitting. Parameter Δ₀ (for octahedral complexes) should be known to us, which can be easily calculated by observing the absorption spectrum of one electron complex. Figure shows the optical absorption spectrum of the hexaaquatitanium (III) ion [Ti(H₂O)₆]³⁺. The CFT assigns the first absorption maximum at 20,300 cm⁻¹ to the transition e_g ← t_{2g}. For multielectronic (d² to d¹⁰) system, the calculation of Δ₀ by absorption spectrum is not that easy as the absorption spectrum will also be affected by electron-electron repulsions.

MATCH THE FOLLOWING

188. Match the following columns

Column I

- (A) $V(CO)_6$
- (B) $[NiCl_2(PPh_3)_2]$
- (C) $[Ni(NH_3)_4]^{2+}$
- (D) $Ni(CO)_4$

Column II

- (P) Paramagnetic with 1 unpaired electron
- (Q) Paramagnetic with 2 unpaired electrons
- (R) sp^3 hybridization
- (S) Diamagnetic

189. Match the following columns

Column I

- (A) NaCl
- (B) AgCl
- (C) $CdCl_2$
- (D) $FeSO_4$

Column II

- (P) Soluble in water
- (Q) Lattice energy > Hydration energy
- (R) Lattice energy < Hydration energy
- (S) Cation has Pseudo inert ($18 e^-$ in valence shell) gas configuration

190. Match the following columns

List I

- (A) NH_3
- (B) XeF_6
- (C) B_2H_6
- (D) NH_4^+

List II

- (P) sp^3 hybridisation
- (Q) 1 lone pair are present
- (R) multi centre bond are present
- (S) pyramidal shape

191. Match the following columns

List I

- (A) Arsenic
- (B) Chlorine
- (C) Fluorine
- (D) Lithium

List II

- (P) highest electron affinity (among list I)
- (Q) strongest reducing agent (among list I)
- (R) p-block element (among list I)
- (S) highest ionisation energy (among list I)

192. Match the following

List I

- (A) chalcopyrites (or) copper pyrites
- (B) Chalcocite (or) copper glance
- (C) Bornite
- (D) Cuprite (red)

List II

- (P) $CuFeS_2$
- (Q) Cu_3FeS_3
- (R) Cu_2S
- (S) Cu_2O

193. Match the following

List – I

- (A) Cyanide process
- (B) Floation process
- (C) Electrolytic reduction
- (D) Zone refining

List – II

- (P) Ultrapure Ge
- (Q) Pine oil
- (R) Extraction of Al
- (S) Extraction of Au

199. Match the following

Column I

- (A) Electronegativity
- (B) ΔH_f (Heat of formation)
- (C) percentage ionic character
- (D) Dipole moment

Column II

- (P) $16\Delta + 3.5\Delta^2$
(Δ = electronegativity difference)
- (Q) $e \times d$
- (R) $X_A = \frac{0.359(Z_{\text{eff}})}{r^2} + 0.774$
- (S) Energy absorbed – energy evolve

200. Match the following

Column I

- (A) Elements with electronic configuration
as $ns^2 np^{1-6}$
- (B) $M(g) + \text{energy} \rightarrow M^+(g) + e^-$
- (C) $X(g) + e^- \rightarrow X^-(g) + \text{Energy}$
- (D) Electrons present in the outermost shell

Column II

- (P) Ionization energy
- (Q) Valence electrons
- (R) Electron affinity
- (S) p-Block elements

- (ii) When an aqueous solution of (X) is added to an aqueous solution of SnCl_2 , a white ppt. is produced which becomes soluble when (X) is added in excess.
- (iii) Compound (X) is used for the preparation of washing soap on reaction with fat and oils.
- (iv) (X) is not a primary standard hence its standard solution is prepared by titrating against oxalic acid using phenolphthalein indicator.
- (v) Aqueous solution of (X) precipitates hydroxides of Al^{3+} and Cr^{3+} , which dissolves in its excess, the former giving colourless solution while the latter a yellow solution in presence of Br_2 water. Find the molecular weight of X.

210. A given metal (X) on heating strongly in the presence of O_2 gives an oxide which is also a constituent of a white paint. Metal (X) on treatment with dil. H_2SO_4 evolves the lightest gas (Y) and the resultant solution on crystallisation gives a vitriol (Z). The metal is also used as a protective coating on iron. Find the molecular weight of vitriol Z.