**P-BLOCK ELEMENTS (16, 17th& 18 GROUP)-C16**

1. At ordinary temperature and pressure, chlorine is a gas, bromine is a liquid and iodine is a solid. This is because

1) Of these three, chlorine is the lightest and iodine is the heaviest

2) Chlorine has the lowest specific heat

3 ) Chlorine molecule is the least stable

**4) Intermolecular forces are weakest in chlorine and strongest in iodine.**

**Ans: (4)**

**Chlorine is a gas and iodine is a solid at ordinary temperature and pressure because intermolecular forces are weakest in Cl2 and strongest in iodine.**

1. The correct order of the thermal stability of hydrogen halides (H-X) is

1) HI >HBr>HCl> HF **2) HF >HCl>HBr> HI**

3) HCl< HF <HBr< HI 4) HI >HCl< HF <HBr

**Ans: (2)**

**HF >HCl>HBr> HI (Thermal stability)**

1. The correct order of increasing bond length of F2, N2, Cl2  and O2 is

1)O2< N2<Cl2<F22)N2<O2<F2<Cl2 3)Cl2<O2<N2<F2 4)F2<Cl2<O2<N2

Ans: (2)

As the multiplicity of the bond increases, bond length decreases. Since N, O and F belong to same period their bond length follows the sequence N2< O2<F2. Further, since Cl is bigger than F, therefore bond length in F2 is less than that in Cl2.

1. Which one of the following orders is not in accordance with the property stated against it

1) Electronegativity

**2)** **Bond dissociation energy**

3) Oxidising powder

4) HI >HBr>HCl> HF: Acidic property in water

**Ans: (2)**

1. Which of the following oxoacids of chlorine is the best oxidizing agent?

1)HOCl 2) HClO2 3)HClO3 4)HClO4

Ans: (1)

As the oxidation number of the halogen increases, the halogen-oxygen bond becomes more covalent. As a result, the thermal stability of the acid increases and the oxidizing power decreases. Thus, HOCl in which Cl is present in +1 oxidation state is a stronger oxidizing agent than HClO2, HClO3 and HClO4  in which Cl is present in +3, +5 and +7 oxidation states respectively.

1. The acid employed for etching of glass is

1)H2SO4. 2) HClO4 3) HF 4)Aquaregia

Ans: (3)

HF reacts with sodium silicate present in glass to form sodium fluorosilicate, which in turn dissolves. Na2SiO3 + 6HF → Na2SiF6 + 3H2O

1. The electronic configuration of four elements A, B, C and D are

1.A=1s2  2.B=1s22s22p2 3.C=1s22s22p5  4.D=1s22s22p3

The tendency to form electrovalent bond is largest in

1)D 2)C 3)B 4)A.

Ans(2)

**Element C (1s22s22p5) has the maximum tendency to formelectrovalent bond by accepting an electron. In doing so it will complete its octet and acquire negative charge.The other element by transferring its electron will acquire positive charge and thus an electro valent bond is formed.**

1. What products are expected from the disproportionation reaction of hypochlorous acid

1)  2)3) **4)**

**Ans: (4)**

****

1. The correct order of acidic strength

**1)** 2)

3) 4)

**Ans: (1)**

**Acidic nature of oxide** **non metallic nature of electron.**

**Non metallic nature decreases in the order Cl> S > P.**

1. The correct order of increasing the conjugate base strength is

1) I- <Br-<Cl-<F- 2) F-<Cl-<Br-<I-  3) Cl-<Br-<I-<F- 4)Br-<I-<F-<Cl-

Ans:(1)

Because HI is strongest and HF is the weakest acids, their conjugate basis I-  and F-

are the weakest and strongest respectively. The base strength increases from I- to F-

1. The ease of liquefaction of noble gases decreases in the order

1)He>Ne>Ar>Kr>Xe 2)Xe>Kr>Ar>Ne>He

3)Kr>Xe>He>Ar=Ne 4)Ar>Kr>Xe>He>Ne

Ans:(2)

He has the weakest van der Waals forces of attraction due to its smallest size and hence has lowest B.P. In other words its liquefaction is difficult. As the size of the noble gas increases form He to Xe, van der Waals forces increase and consequently B.P increases and liquefaction becomes easy.

1. The correct order of increasing hydration energy of the following conjugate basses of oxoacids of chlorine is

**1)** 2)

3) 4) 

**Ans: (1)**

**Smallest cation is heavily hydrated.** **has smallest central atom as it has +7 charge on it followed By** **,** **. So, the order of hydration energy is** **.**

1. The geometry of XeF6 molecule and hybridization are

1) Tetrahedral,sp3 2) Pentagonal bipyramidal,sp3 d3

3) Octahedral,sp3 d2 4) Square planar,sp3 d2

Ans: (2)

Sp3d hybridization will give pentagonal bipyramid geometry with one trans position occupied by a lone pair and shape of the molecule will be distorted octahedral.

1. Among the following oxoacids, the correct decreasing order of acid strength is

1)  2) 

**3) ** 4) 

**Ans: (3)**

**Decreasing order of strength of oxoacids.**



****

**Consider the structure of conjugate bases negative change more delocalized on  due to resonance, hence is more stable and less basic.**

1. XeF4 on partial hydrolysis produces

1) XeF2 2) XeOF2 3) XeOF4 4) XeO3

Ans: (2)

XeF4 on partial hydrolysis produces XeOF2 as shown below

XeF4 + H2 O → XeOF2+ 2HF

1. The reason that only xenon fluorides are known but the corresponding chlorides have not been reported is

1) High bond energy of Xe─F and low dissociation energy of F2 molecules

2) Smaller bond energy of Xe─Cl bond and larger bond dissociation energy of Cl2 molecule

3) Both 1.and2.

4) None of the above

Ans:(3)

Stability of the new compounds formed depends upon the high bond energy of the bond formed in new compound and low dissociation energy of the compound from which the new compound is formed. Both these condtions are met in Xe- fluorides formed form F2 molecule and not in Xe-chlorides

1. Argon is used in arc welding because of its

**1) Low reactivity with metal**

2) Ability to lower the melting point of metal

3) Flammability

4) High calorific value

**Ans: (1)**

**Argon is used for providing inert atomsphere in the welding of metal or alloy that are easily oxidized as it is very reactive towards metal.**

1. Which of the following is a explosive compound?

1) XeOF4 2)XeOF2 3)XeF2 4) XeO3

Ans(4)

XeO3 is an explosive compound when dry and the explosion power is 22 times more than TNT.

1. A degenerate gas is

1) He 2) He I 3) He II 4) 2 He3

Ans: (3)

He II is liquid form of helium which is obtained on cooling gaseous He to 2.2 L at 1atmosphere pressure. It is able to flow uphill like a gas and thus has properties of a degenerate gas.

1. Which of the following is used as an anaesthetic due to the formation of aqueous clathrates in physiologically strategic spots?

1) Rn 2) Xe 3) CO2 4) N2 O

Ans: (2)

It is thought that the anesthetic action of xenon is due to aqueous clathrate formation in physiologically strategic spots. When the anesthetic supply is stopped, the clathrate equilibrium is destroyed, the clathrate decomposes and the consciousness retains.

1. Which one of the following reactions of Xenon compounds is not feasible

**1)** 

2) 

3) 

4) 

**Ans: (1)**

**This reaction is not feasible Because** **formed will get hydrolysed according to the following reaction** 

1. The T shaped halogen compound is

1) ClF3 2) ICl 3) ClF5  4) IF5

Ans: (1)

ClF3  whereCl is sp3d hybridized has a T – shape structure with two loan pairs of electrons on Cl atom.

1. Which of the following chemical contains chlorine

1) Fischer salt 2) Epsom salt 3) Fremy’s salt **4) Spirit salt**

**Ans: (4)**

**An obsolete name for HCl.**

1. Which of the following halogen has metallic(basic) character?

1)Fluorine 2)Chlorine 3)Bromine 4)Iodine

Ans: (4)

Iodine because of its lowest ionization enthalpy has more tendency to lose its electron nd shows electropositive and metallic character.

1. Correct order of size of iodine species is

1) I>I->I+  2) I>I+>I- 3) I+>I->I 4) I->I>I+

Ans: (4)

When derived from the element, an anion is larger and cation is smaller in sizes than the corresponding atoms.

1. The lowest value of 0.53V for the electrode potential (E°) for the reaction X2 (solution) + 2 e−= 2 X- (aq) may be assigned to

1)F2 2)Cl2  3)Br2 **4)I2.**

**Ans: (4)**

**As I2 is the weakest oxidizing agent.**

1. Fluorine reacts with dilute NaOH solution to give

1) Sodium fluoride and oxygen 2) Sodium fluoride and oxygendifluoride

3) Sodium fluoride and Ozone 4) Fluoride, Oxygen and Ozone

Ans: (2)

F2 reacts with dilute NaOH solution to give sodium fluoride and oxygen difluoride 2F2 + 2NaOH → OF2 + 2NaF + H2O**.**

1. Noble gases are sparingly soluble in water due to

1)Dipole-dipole interactions 2)Dipole-induced dipole interactions

3)Induced dipole-induced dipole interactions 4) Hydrogen bonding

Ans: (2)

Dipole of water induces dipole in noble gases which interact and cause solubility in water.

1. The maximum number of compounds are formed by

1)He 2)Ne 3)Ar 4)Xe

Ans:(4)

Xe because of its lower ionization enthalpy, forms maximum number of compounds.

1. Shape of XeOF4 is

1) Octahedral 2) Square pyramid 3) Pyramidal 4) T-Shaped

Ans: (2)

Shape of XeOF4 is square pyramidal where Xe is sp3 d2 hybridized with one lone pair on one of the trans position

1. Which of the following compounds cannot be stored in glass vessels?

1) XeF4 2) XeO3 3) XeF2 4) XeF6

Ans: (4)

XeF6 cannot be stored in glass vessels because it reacts with SiO2 of glass to give highly explosive XeO3

2XeF6 + 3SiO2 → 2XeO3 + 3SiF4

1. Which of the following light is effective in formation of chlorophyll?

1) Na lamp 2) Ne lamp 3) Hg lamp 4) Ar lamp

Ans: (2)

When an electric discharge is passed through neon gas in a tube at low pressure, an intense orange red light is produced which is effective in the formation of chlorophyll and is used in green houses.

1.  on hydrolysis gives

**1)** 2) XeO 3) 4) Xe

**Ans: (1)**



1. Hydrogen bonding is strongest in

1) O─H….S 2) S─H….O 3) F─H….F 4) F─H….O

Ans: (3)

Hydrogen bonding is strongest between H atom of one molecule and most electronegative atom F of the other molecule.

1. Which of the following is the life saving mixture for an asthama patient?

1) Mixture of He and oxygen 2) Mixture of Ne and oxygen

3) Mixture of Xe and Nitrogen 4) Mixture of Ar and oxygen

Ans :(1)

Mixture of He and oxygen(4:1 ratio) is used for treatment of asthama

1. Caliche is

1) Impure Indian salt petre 2) Chile salt petre(Crude)

3) Pure nitre 4) None of these.

Ans: (2)

Caliche is crude chile salt petre(NaNO3) which contains iodine as sodium iodate(NaIO3)

1. Which member of the halogen family(X2) does not show positive oxidation state(X2+)?

1)Fluorine 2)Chlorine 3)Bromine 4)Iodine

Ans: (1)

Due to non- availability of the d- orbitals F does not show positive oxidation state.

1. The correct order of electron gain enthalpy (nega­tive value) of halogens is

1) F > CI > Br > I 2) CI> Br > F > I **3) CI > F > Br > I** 4) I > Br > CI > F

**Ans: (3)**

**Due to the inter-electronic repulsion in the relatively small F atom, its negative electron gain enthalpy is lower than that of Cl.**

1. The spectrum of helium is expected to be similar to that of

1)H+ 2)Li+ 3)Na 4)He

Ans:( 2)

Both He (1s2 ) and Li(1s2 ) have two electrons(dielectron species) and thus their spectrum would be similar.

1. XeF4 and XeF6 are expected to be

**1) Oxidizing**  2) Reducing 3) Unreactive 4) Strongly basic

**Ans: (1)**

**All xenon fluoride are strongly oxidising.**

1. The coloured discharge tubes for an advertisement mainly contain

1) Xe 2) He 3) Ne 4) Ar

Ans(3)

Neon gives brilliant orange red glow in discharge tubes and is widely used for advertisement purposes.

1. Clathrates are

1) Non-stoichiometric compounds 2) Complex compounds

3) Interstitial compounds 4) Normal salts

Ans:(1)Clathrates are non-stoichiometric compounds where the ratio of guest and host molecule doesn’t correspond to the ideal chemical formulae.

1. Halogens are coloured because

1) Their atoms have high electronegativity

2) Their molecules are held together by weak van der waals forces

**3) Their molecules absorb visible light causing the excitation of outer electrons to higher energy levels**

4) Their atoms absorb energy causing the excita­tion of outer electrons to higher energy levels

**Ans: (3)**

1. Beaching mixture is

1) Cl2 +ClO2 2) NaCl + NaOCl

3) Bleaching powder + Chlorine 4) SO2 +Cl2

Ans: (2)

Bleaching mixture is formed by passing Cl2 through dilute NaOH solution below 24°C

2NaOH + Cl2→ NaCl + NaOCl +H2 O (Below 24°C)

1. Iodine flasks when rubbed with liquor ammonia give dark brown precipitate of

1) NI3 2) NH4 I 3) NI3 .NH3 4) NH4 .NI3

Ans: (3)

2NH3 + 3I2 → NI3 .NH3 + 3HI

1. In BrF3 molecule, the lone pairs occupy equatorial positions to minimize

1) lp─bp repulsion only 2) bp─bp repulsion only

3) lp─lp repulsion and lp─bp repulsion 4) lp─lp repulsion only

Ans: (4)

BrF3 has a T-shaped structure in which lone pairs occupy equatorial positions to minimize lp─lp repulsion

1. The electronic configuration, 1s2 2s2 2p5 3s1 represents which one of the following

1) An excited state of fluorine atom 2) The ground state of neon

3) An excited state of O2- ion 4) The ground state of F- ion.

Electronic configuration of oxygen in ground state = 1s2 2s2 2p4

Electronic configuration of oxide ion in ground state = 1s2 2s2 2p6

Electronic configuration of oxide ion in excited state = 1s2 2s2 2p5 3s1

1. The decreasing tendency to exist in puckered 8-membered ring structure is

1)S > Se >Te> Po  2) Se > S >Te> Po

3) S >Te> Se > Po 4) Te> Se > S > Po

**Ans :**

**As the size increases down the group, the element - element bond strength decreases and**

**therefore, the tendency to exist in 8-membered puckered ring structure decreases down the**

**group from** S **to Po.**

1. Which one of the following has the highest tendency towards catenation
2. *Sulphur* 2) *Tellurium* 3)*.Oxygen 4) Selenium*

**Ans(1)**

**The greater the element—element bond strength, the higher is the tendency towards catenation. As the size increases from S to Te, the bond dissocia­tion energy decreases. O—O bond energy is, how­ever, smaller than that of S—S because of inter electronic repulsions within the smaller size of oxygen atoms. Thus sulphur has the maximum ten­dency towards catenation.**

1. The increasing thermal stability of the hydrides of group 16 follows the sequence

1)H2O , H2S , H2Se , H2Te 2)H2Te, H2Se, H2S, H20

3)H2S , H20 , H2 Se, H2Te 4)H2Se, H2S , H20 , H2Te.

**Ans(2)**

**As the size of the central atom M in H2M increases from O to Te, the H—M bond becomes**

**weaker and breaks easily on heating. Thus H20 is most stable and H2Te is least stable.**

1. Which one of the following compounds is the strongest reducing agent?

1) H2O 2) H2S 3) H2Se 4) H2Te.

**Ans(4)**

**Reducing character of hydrides of group 16 elements increases as the thermal**

**stability decreases from H2S to H2Te. H20 does not behave as a reducing agent**

1. Ozone tails mercury. The reaction involves

1) Reduction 2) Oxidation 3) Substitution 4) None of the above

**2Hg + 03 gives Hg20 + 02 (tailing of Hg is due to Hg20 formation)**

1. Which of the following is used to purify air in crowded places ?

1) SO2 2) Cl2  3) O2 4) O3

**Ans(4)**

**O3 acts as a germicide and disinfectant and purifies air.**

1. The total number of single covalent bonds and lone pairs of electrons present in one S8 molecule are

1) 4, 8 2) 6,4 3) 8,16 4) 10,12

**Ans(3)**

**In S8 puckered ring structure, there are total eight single bonds and sixteen lone pairs of electrons.**

1. The halogen showing maximum coordination number of sulphur in SXn halides is

1) F 2) Br 3) I 4) Cl

**Ans(1)**

**F due to its very high electronegativity oxidises S to its highest oxidation state and**

**thusforms SF6 where S shows its maximum coordination number**

1. The acid containing S-O-O-S bond is

1) H2SO5 2) H2S206  3) H2S2O7 4) H2S2O8

**Ans(4)**

**Peroxodisulphuric acid or per disulphuric acid also called Marshall's acid**

**(H2S2O8) contains four S=O, two S — OH and one S—O — O —S bonds**

1. Oxidation state of S in H2SO5

1) + 4 2) + 6 3) + 7 4) + 5.

**Ans(2)**

**H2SO5 (per monosulphuric acid or peroxomonosulphuric acid also called Caro's acid)**

**contains one S—O—O—H bond, two S = O bonds and one S—OH bond.**

**Therefore,**

**H2+1Sx03 2-02 1- shows oxidation state of S + 2+ x - 6 - 2 = 0 or x = + 6**

1. Which of the following is a monobasic acid

1) H2SO3 2) H2SO4 3) H2SO5 4) H2S2O8

**Ans(3)**

**H2SO5, there is one S—OH and one S—OOH groups present besides two S = O groups. As only one replaceable hydrogen is available from one S—OH group, it is a monobasic acid**

1. Oxygen is more electronegative than sulphur. Yet H2S is acidic while H20 is neutral. This is because

1) Water is a highly associated compound

2) Molecular mass of H2S is more than that of H20

3) H2S is gaseous under ordinary conditions while H20 is a liquid

4) H—S bond is weaker than H—O bond.

**Ans(4)**

**H2S is acidic in aqueous solution because H—S bond is weaker and has more tendency to release a proton while H20 is neutral because O—H bond is stronger and has a little tendency to release a proton**

1. When a colourless gas is passed through bromine water only decolourisation takes place. The gas is

1) SO2 2) HBr 3) HCl 4) H2S.

**Hint:Bromine water is an oxidising agent. It oxidises S02 to S03 and itself is reduced to colourlessHBr.**

**Br2+H2Oà2HBr+ | O|**

**SO2 + | O| àSO3**

**H2O + SO3àH2SO4**

**No other compound is oxidised by bromine water except H2S but in this case decolourisation is also accompanied by the formation of sulphur.**

**H2S + | O | à H2O+S**

1. The acid which has a peroxy linkage is

1) Sulphurous acid 2) Pyrosulphuric acid 3) Dithionic acid 4) Caro's acid.

**Hint;Caro's acid is H2SO5 which contains one S—O— OH peroxy linkage**

1. Which has maximum number of oxo groups?

1) H2S04 2) H2SO3 3) H3P03 4) H3P04.

**Hint;Oxo group means M = 0. H2S04 has two S = O groups whereas H2S03 has one S = O**

**group,H3P04 and H3P03 also have one P = 0 group each**

1. Photoconductors of xerox machine use

1) Mercury 2) Black phosphorus 3) Selenium 4) Tellurium

**Ans(3)**

1. Which oxide of nitrogen is used as a catalyst in the lead chamber process for the manufacture

ofH2S04?

1) NO 2) N2O3 3) NO2 4) N2O5

**Ans(1)**

**SO2+O2+2H2 H2SO4+NO**

1. An element X burns in air to form corresponding dioxide A. On bubbling hydrogen through moltens state of X, a gaseous hydride B is formed. A and B react to give back X. A and B are respectively

1) H2S, SO2 2) SO3, SO2 3) SO2, H2S 4) CO2, CH4

Ans : 3