Exercise-1

Marked Questions may have for Revision Questions.

OBJECTIVE QUESTIONS

Section (A) : Physical and Chemical properties of Group 17th elements

A-1. **Sol.** s-block & p-block elements collectively comprise the representative elements. The valence shell electronic configuration of halogen is $ns^2\ np^5$ and the last electron enters in p-subshell. Thus, halogens belongs to p-block elements.

A-2. All halogens are coloured. This is due to :
(1) Large negative value of electron gain enthalpy.
(2*) Absorption of radiations in visible region.
(3) Large electronegativity and higher ionization enthalpy.
(4) Absorption of radiations in ultra-violet region.

A-6. **Sol.** According to their SRP.

A-7. **Sol.** HF has highest boiling point on account of intermolecular hydrogen bonding. But from HCl to HI the boiling point show a regular increase due to a corresponding increase in the magnitude of van der Waal's force of attraction as the size of the halogen increases.

A-8. **Sol.** As the size of anion increases the distance between the nucleus and valence shell electrons increases resulting into weak force of attraction between them. This leads to increase in the ease of the donation of electrons in the order $F^- < Cl^- < Br^- < I^-$. Hence I^- acts as a strongest reducing agent.

A-13. **Sol.** Bond length $\propto$ 1/(bond dissociaton energy) and bond dissociation energy $\propto$ bond strength.

Section (B) : Halogens and their Compounds

B-1. **Sol.** (1) $2KMnO_4\ (s) + 16\ HCl\ (aq) \longrightarrow 2KCl + 2MnCl_2 + 8H_2O + 5Cl_2$

(2) $4HCl\ (g) + O_2\ (g) \xrightarrow[723]{CuCl_2} 2Cl_2 + 2H_2O$

(3) $4Cl^-\ (s) + Cr_2O_7^{2-} + 6H^+ \longrightarrow 2CrO_2Cl_2 + 3H_2O$

(4) $NaCl\ (s) + MnO_2(s) + H_2SO_4$ (Conc.) (lkUnz) $\longrightarrow MnCl_2 + 4NaHSO_4 + 2H_2O + Cl_2$

B-2. **Sol.** (3) is correct chemical composition of bleaching powder (NCERT).

B-3. **Sol.** (1) $SO_3^{2-} + H^+ \longrightarrow SO_2\uparrow + H_2O$
(2) $CO_3^{2-} + H^+ \longrightarrow CO_2\uparrow + H_2O$
(3) $NH_3 + HCl \longrightarrow NH_4Cl\uparrow$
(4) Conc. H_2SO_4 is used as it does not react with HCl.

B-4. **Sol.** Chlorine gas reacts with CaO, NaOH and NH_3 ; so chlorine gas cannot be dried by passing over these compounds. H_2SO_4 have great affinity for water and therefore it is used for drying Cl_2.

B-7. **Sol.** $2ClO_2 + H_2O \longrightarrow HClO_2 + HClO_3$

B-10. **Sol.** $SiO_2 + 6HF\ \ H_2SiF_6 + 2H_2O$

B-11. **Sol.** $2ClO_3 + H_2O \longrightarrow HClO_3 + HClO_4$

Section (C) : Physical and Chemical properties of Group 18th elements

C-1. **Sol.** In March 1962, Neil Bartlett, then at the University of British Columbia, observed the reaction of a noble gas. First , he prepared a red compound which is formulated as $O_2^+ PtF_6^-$. He , then realised that the first ionisation enthalpy of molecular oxygen (1175 kJ mol $^{-1}$) was almost identical with that xenon (1170 kJ mol $^{-1}$). He made efforts to prepare same type of compound with $Xe^+ PtF_6^-$ by mixing Pt F_6 and Xenon. After this discovery, a number of xenon compounds mainly with most electronegative elements like fluorine and oxygen, have been synthesised.

C-2. **Sol.** XeF_5 does not exist at all.

Section (D) : Noble gases and their Compounds

D-3. **Sol.** $XeF_6 + 3H_2O \longrightarrow XeO_3 + 6HF$

D-4. **Sol.** It is factual. ;g rF;kRed gSA

D-6. **Sol.** $2XeF_6 + SiO_2 \longrightarrow SiF_4 + 2XeOF_4$

Among He, Ne, Ar, Kr and Xe, ionization energy of Xe is lowest because down to group ionisation energy decreases.

Exercise-2

Marked Questions may have for Revision Questions.

OBJECTIVE QUESTIONS

Group 17th

1. **Sol.** $F_2 + 2e^- \longrightarrow 2F^-$ $\varepsilon° = +2.87$ V ; $Cl_2 + 2e^- \longrightarrow 2Cl^-$ $\varepsilon° = +1.36$ V

$Br_2 + 2e^- \longrightarrow 2Br^-$ $\varepsilon° = +1.09$ V ; $I_2 + 2e^- \longrightarrow 2I^-$ $\varepsilon° = +0.54$ V

More the value of the SRP, more powerful is the oxidising agent. Hence the order of oxidising power is $F_2 > Cl_2 > Br_2 > I_2$.

2. **Sol.** Fluorine on account of low bond dissociation energy and high enthalpy of hydration of F^- acts as strong oxidising agent ; being the most electronegative, it exhibits only – 1 oxidation state.

3. **Sol.** HBr (or HI) cannot be prepared by heating bromide (iodide) with concentrated H_2SO_4 because HBr and HI are strong reducing agents and reduce H_2SO_4 to SO_2 and get themselves oxidised to bromine and iodine respectively.

$KX + H_2SO_4 \longrightarrow KHSO_4 + HX$

$H_2SO_4 + 2HX \longrightarrow SO_2 + X_2 + 2H_2O$ (X = Br or I)

Hence, HBr and HI are prepared by heating bromides and iodides respectively with concentrated H_3PO_4 .

$3KBr(KI) + H_3PO_4 \longrightarrow K_3PO_4 + 3HBr\ (HI)$

4. **Sol.** ClO_2^- and ClF_2^+ both have 34 electrons and therefore are isoelectronic species.

5. **Sol.** (1) 64 < 99 < 114 < 133 – covalent radius/pm down the group size increases due to addition of new shells.

(2) 515 > 391 > 347 > 305 – $\Delta_{hyd}H(X^-)$ KJ mol^{-1}

Degree of hydration $\propto \frac{1}{\text{size of anion}}$

(3) 158.8 < 242.6 > 192.8 > 1.51 |-Bond dissociation enthalpy | (kJ mol^{-1}) F–F < Cl–Cl on account of large repulsion between non-bonded pairs of electron due to small F-F bond length.

(4) 143 < 199 < 228 < 266 – X – X distance/pm as size of element increases the X-X distance increases.

7. **Sol.** (1), (2) and (3) are correct statements.

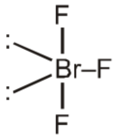
8. **Sol.** Halide ion is derived from the smaller halogen and a hypohalite (when XX'), halite (when XX'_3), halate (when XX'_5) and perhalate (when XX'_7).

9. **Sol.** Due to strong H–F bond proton in not easily removed. So, HF is not a stronger acid than HCl. Order of halogen acids is HI > HBr > HCl > HF.

10. **Sol.** In BrF_3 molecule, Br is sp^3d hybrid, but geometry is T-shaped due to distortion of geometry from trigonal-bipyramidal to T-shaped by the involvement of lone pair-lone pair repulsion. Here

lp-lp repulsion = 4

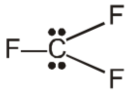
lp-bp repulsion = 2
bp-bp repulsion = 0



11. **Sol.** The correct order of electron gain enthalpy

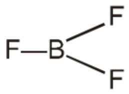
(electron affinity) is	O	<	S	<	F	<	Cl
(electron affinity in eV)	O	<	S	<	F	<	Cl
	1.48		2.07		3.45		3.61

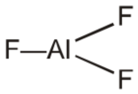
13. **Sol.** In ClF_3 all bonds are not equal due to trigonal-bipyramidal (sp^3d-hybridisation) geometry of ClF_3 molecule.



Trigonal-bipyramidal geometry

BF_3 and AlF_3 show trigonal symmetry structure due to sp^2-hybridisation.





NF_3 shows pyramidal geometry due to sp^3 hybridiation.

14. **Sol.** Incorrect order of bond dissociation energy $F_2 > Cl_2 > Br_2 > I_2$ due to following order of size I > Br > Cl > F.

16. **Sol.** As the size of the anion increases from F^- to I^-, the covalent character increase and hence the solubility in non-polar solvent increases. LiI > LiBr > LiCl > LiF.

17. **Sol.** $2Na_2S_2O_3 + I_2 \longrightarrow Na_2S_4O_6 + 2NaI$

18. **Sol.** $3X_2 + 8NH_3 \longrightarrow N_2 + 6NH_4X$

(X : F, Cl, Br)

19. **Sol.** all statement are correct.

20. **Sol.** X is HCl.

HCl has lowest boiling point used is the most volatile.

$X + NaHCO_3 \rightarrow NaCl + H_2O \mid CO_2\uparrow$

21. **Sol.** In I_2 opposite reaction of F_2 occurs

$HI + O_2 \longrightarrow I_2 + H_2O$

22. **Sol.** (1) As O.N. increases, acidic strength increases.

(2) As non-metalic character increases, acid strength increases

(3)

Oxyacid	No. of $p\pi - p\pi$ bond
$HClO_4$	3
$HClO_3$	2
$HClO_2$	1
$HClO$	0

(4) All are sp^3 hybridised, therefore same percentage s-character :

23. **Sol.** FCl_3 is not possible due to unavailability of d-orbitals in fluorine.

Group 18th

25. **Sol.** (I) They do not form compounds readily as they are chemically inert on account of stable electron configuration.

(II), (III) & (IV) are correct statement.

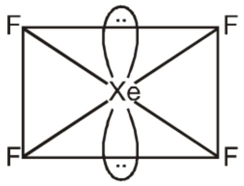
26. **Sol.** Group No. 18 general valence shell electron configuration is ns^2np^6.

27. **Sol.** It is argon which is used for creating inert atmosphere in Kroll and I.C.I process.

28. **Sol.** $XeO_3 + 2XeF_6 \longrightarrow 3XeOF_4$

29. **Sol.** $2[HXeO_4]^- + 2OH^- \longrightarrow [XeO_6]^{4-} + Xe + O_2 + 2H_2O$

30. **Sol.** Structure of XeF_4 as follows :



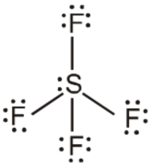
It involves sp^3d^2 hybridisation in Xe atom. The molecule has square planar structure. Xe and four F atoms are coplanar. The lone pairs present on axial positions, minimise electron pair repulsion.

31. **Sol.** SiF_4 and SF_4 are not isostructural becuase SiF_4 is tetrahedral due to sp^3-hybridisation of Si.

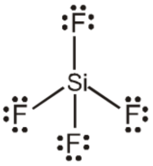
$_{14}Si = 1s^2, 2s^22p^6, 3s^13p^3$ (in excited state)

Hence, four equivalent sp^3 hybrid orbitals are obtained and they are oberlapped by four p-orbitals of four fluorine atoms on their axes. Thus it shows following structure :

SF_4



SiF_4



While SF_4 is not tetrahedral but it is distorted tetrahedral because in it S is sp^3d hybrid.

$_{16}S = 1s^2, 2s^22p^6, 3s^23p^2_x3p^1_y3p^1_z$

(In groud state)

$= 1s^2, 2s^22p^6, 3s^23p^2_x3p^1_y3p^1_z, 3d^1_{xy}$

(sp^3d - hybridisation)

(In first excitation state)

32. **Sol.** Noble gases are used in discharge tubes to give different colours. Reddish orange glow is due to Ne.

33. **Sol.** $XeOF_4$, square planar (sp^3d^2 hybridisation)

Trigonal pyramidal Distorted octahedral

(sp^3 hybridisation) (sp^3d^3 hybridisation)

34. **Sol.** Xe and Kr being bigger in size trapped in the cavities formed by the water molecules while He and Ne being smaller escape from the cavities.

35. **Sol.** (1) $XeF_6 + H_2O \longrightarrow XeOF_4 + 2HF$ (2) $2XeF_6 + SiO_2 \longrightarrow 2XeOF_4 + SiF_4$

(3) $XeF_4 + O_2F_2 \longrightarrow XeF_6 + O_2$ (4) $XeO_3 + 2XeF_6 \longrightarrow 3XeOF_4$

36. **Sol.** **Asserion :** Both acts as bleaching agents in textile and food industries.

Reason : Bleaching action of chlorine is through oxidation while it is through reduction with SO_2.

$Cl_2 + H_2O \longrightarrow 2HCl + [O]$; $SO_2 + 2H_2O \longrightarrow H_2SO_4 + 2H$

37. **Sol.** $\overset{+6}{XeF_6} + H_2O \longrightarrow \overset{+6}{XeOF_4} + 2HF$

$XeF_6 + 6H_2O \longrightarrow XeO_3 + 6HF$

Exercise-3

PART - I : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

OFFLINE JEE-MAIN

1. **Sol.** In phosphorous the vacant 3d-orbitals are available. So it can increase its covalence beyond three.

2. **Sol.** $4HCl + O_2 \rightarrow 2Cl_2 + 2H_2O$ white fumes cloud

3. **Sol.** The spontaneous combustion of phosphine is technically used in Holme’s signals. Containers containing calcium carbide and calcium phosphide are pierced and thrown in the sea when the gases evolved burn and serve as a signal.

4. **Sol.** Dilute nitric acid converts chromate into dichromate according to the following chemical reaction.

$2K_2CrO_4 + 2HNO_3 \rightarrow K_2Cr_2O_7 + 2KNO_3 + H_2O$.

5. **Sol.** Helium is twice as heavy as hydrogen. But it is a non-inflammable gas has 92% lifting power to that of hydrogen.

6. **Sol.** The bond dissociation energy of F–F bond is very low. The weak F–F bond makes fluorine the strongest oxidising halogen.

7. **Sol.** As the size of the halogen atom increases from F to I, H – X bond length in HX molecules also increases from H–F to H–I (H–F < H–Cl < H–Br < H–I). The increase in H–X bond length decreases the strength of H–X bond from H–F to H–I. The decrease in the strength of H–X bond is evident from the fact that H–X bond dissociation energies decrease from H–F to H–I. Due to successive decrease in the strength of H–X bond from H–F to H–I, thermal stability of HX molecules also decreases from HF to HI (HF > HCl > HBr > HI).

8. **Sol.** Higher is the oxidation state of the central atom, greater is the acidity.
Hence, $HClO_4$ is a stronger acid than $HClO_3$. HNO_3 is a stronger acid than HNO_2.
Now greater is the electronegativity and higher is the oxidation state of the central atom, greater is the acidity. Hence H_2SO_3 is a stronger acid than H_3PO_3.
Due to higher dissociation energy of H–F bond and molecular association due to hydrogne bonding in Hf, HF is a weaker acid than HCl.

9. **Sol.** +2 +5 –1
$3HClO\,(aq) \rightarrow HClO_3\,(aq) + 2HCl\,(aq)$.
It is disproportionation reaction of hypochlorus acid where the oxidation number of Cl changes from +1 (in ClO^-) to +5 (in ClO_3^-) and –1 (in Cl^-).

10. **Sol.** $3Br_2 + 6NaOH \rightarrow 5NaBr + NaBrO_3 + 3H_2O$
$O_3 + SO_2 \rightarrow O_2 + SO_3$
$Si + 2NaOH + O_2 \rightarrow NaSiO_3 + H_2O$
Cl_2 reacts with excess of ammonia to produce ammonium chloride and nitrogen.

$$\begin{array}{l} 2NH_3 + 3Cl_2 \rightarrow N_2 + 6HCl \\ 6NH_3 + 6HCl \rightarrow 6NH_4Cl \\ \hline 8NH_3 + 3Cl_2 \rightarrow N_2 + 6NH_4Cl \end{array}$$

11 **Sol.** This reaction is not feasible because XeF_6 formed will get hydrolysed according to the following reaction,
$XeF_6 + 3H_2O \rightarrow XeO_3 + 6HF$

12. **Sol.** In general, interhalogen compounds are more reactive than halogens except fluorine (as per NCERT)

13. **Sol.** $Cl_2 + 2NaOH \longrightarrow Cl^- + ClO^- + Na^+ + H_2O$
Cold & dil.
Disproportionation reaction.

ONLINE JEE-MAIN

3. **Sol.** Fluorine only forms HOF as it cannot show multiple oxidation states.

4. **Sol.** $Cl_2 + H_2O \rightarrow HCl + HOCl$

5. **Sol.** $XeF_6 + H_2P \longrightarrow XeOF_4 + 2HF$

$2XeF_6 + SiO_2 \longrightarrow 2XeOF_4 + SiF_4$

PART - II : JEE (ADVANCED) / IIT-JEE PROBLEMS (PREVIOUS YEARS)

1. **Sol.** As charge dispersion increases, the stability of conjugated base increases and thus acidity increases.

2. **Sol.** It is a type of disproportionation reaction because an ion is oxidised as well as reduced in the reaction.

$$3\overset{+3}{Cl}O^- \rightarrow \overset{+5}{Cl}O_3^- + 2Cl^- \text{ (aq)}$$

3. **Sol.** $Cl_2 \text{ (X)} + H_2O \longrightarrow HCl + HOCl$;

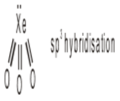
$HCl + AgNO_3 \longrightarrow AgCl \downarrow$ (white) 'osr $+ HNO_3$;

$2HCl + Mg \longrightarrow MgCl_2 + H_2$ (y)

Section (D) : Group 18th

4. **Sol.** Argon is used to provide an inert atmosphere in arc welding without interaction with metal.

5. **Sol.** The number of electron pairs around Xe are four There are three bond pairs (with double bonds) and one is lone pair. So according to VSEPR theory, to minimise the repulsions between them, XeO_3 acquire pyramidal shape.



sp^3 hybridisation

pyramidal.

6. **Sol.** XeF_4 & XeF_6 both are strong oxidising agents. These can oxidise H_2 to H^+, Cl^- to Cl_2, I^- to I_2 and Ce(III) to Ce(IV).

$$XeF_4 + 4I^- \longrightarrow 2I_2 + 4F^- + Xe.$$

Paragraph for Question Nos. 7 to 8

The reactions of Cl_2 gas with cold-dilute and hot-concentrated NaOH in water give sodium salts to two (different) oxoacids of chlorine, **P** and **Q**, respectively. The Cl_2 gas reacts with SO_2 gas, in presence of charcoal, to give a product **R. R** reacts with white phosphours to give a compound **S**. On hydrolysis, **S** gives an oxoacid of phosphours **T**.

8. **Sol.** **(7 & 8)**

Cl_2 + cold dil. NaOH $\longrightarrow$ NaOCl + NaCl

Cl_2 + hot conc. NaOH $\longrightarrow$ $NaClO_3$ + NaCl

NaOCl is salt of hypochlorous acid = P.

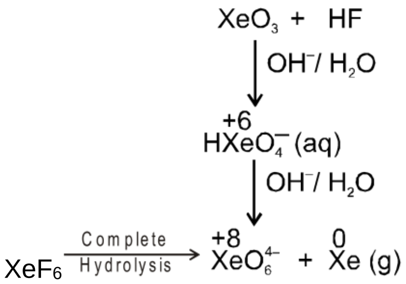
$NaOCl_3$ is salt of chloric acid = Q.

$Cl_2 + SO_2 \xrightarrow{\text{Charcoal}} SO_2Cl_2$ (R) **(NCERT, Pg. No. - 188)**

$SO_2Cl_2 + P_4 \longrightarrow PCl_5$ (S) + SO_2 **(NCERT, Pg. No.- 177)**

$PCl_5 + H_2O \longrightarrow H_3PO_4$ (T) + HCl

9. **Sol.**



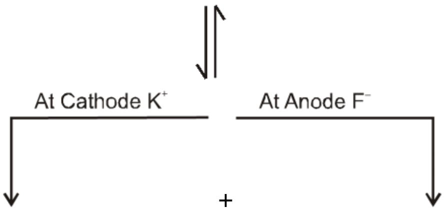
$$\begin{tikzcd} & \mathrm{XeO_3} + \mathrm{HF} \arrow[d, "OH^-/H_2O"] \\ & \overset{+6}{\mathrm{HXeO_4^-}}\,(aq) \arrow[d, "OH^-/H_2O"] \\ \mathrm{XeF_6} \arrow[r, "\text{Complete}", "\text{Hydrolysis}"'] & \overset{+8}{\mathrm{XeO_6^{4-}}} + \overset{0}{\mathrm{Xe}}\,(g) \end{tikzcd}$$

Additional Problems For Self Practice (APSP)

PART - I : PRACTICE TEST PAPER

1. **Sol.** Moissan method

$KHF_2 \xrightarrow{\text{electrolysis}} KF + HF$



$K^+ + e^- \longrightarrow K$ $\quad$ $F^- \longrightarrow F + e^-$

$K + HF \longrightarrow KF + H$ $\quad$ $F + F \longrightarrow F_2$

$H + H \longrightarrow H_2$

2. $4HCl + O_2 \xrightarrow[400°C]{CuCl_2} 2Cl_2 + 2H_2O$

3. **Sol.** KHF_2 solution in anhydrous HF (futZy HF esa KHF_2 foy;u).

4. **Sol.** Only $K_2Cr_2O_7$ and HCl will give Cl_2

$K_2Cr_2O_7 + 8\,HCl \longrightarrow 2KCl + 2CrCl_3 + 4H_2O + 3O$

$2HCl + O \longrightarrow H_2O + Cl_2 \times 3$

$K_2Cr_2O_7 + 14\,HCl \longrightarrow 2KCl + 2CrCl_3 + 7H_2O + 3Cl_2$

5. **Sol.** $2KMnO_4 + 16HCl \rightarrow 2KCl + 2MnCl_2 + 8H_2O + 3Cl_2$

6. **Sol.** $\underset{\text{Terpentine oil}}{C_{10}H_{16}} + 8Cl_2 \longrightarrow 10C + 16HCl$

7. **Sol.** NaCl has no reaction with iodine.

8. **Sol.** $3Br_2 + 6CO_3^{2-} + 3H_2O \longrightarrow 5Br^- + BrO_3^- + 6HCO_3^-$ (disproportionation reaction)

In this reaction O.S. of Br changes from 0 (in Br_2) to –1 (in Br^-) and +5 (in BrO_3^-). Thus, in this reaction bromine is both oxidised (increase in O.S.) and reduced (decrease in O.S.) –disproportionation reaction.

11. **Sol.** HCl is dried over conc. H_2SO_4. Because HBr, HI and H_2S are oxidised by H_2SO_4.
lkUnz H_2SO_4 ij HCl 'kq"d gks tkrk gS] D;ksafd H_2SO_4 }kjk HBr, HI rFkk H_2S vkWDlhd`r gks tkrs gSaA

12. **Sol.** The HBr so formed reduces H_2SO_4 and itself gets oxidised to evolve Br_2.
mRikfnr HBr, H_2SO_4 dks vipf;r djrk gS rFkk Lo;a vkWDlhd`r gksdj Br_2 fu"dkflr djrk gSA

$2HBr + H_2SO_4 \longrightarrow 2H_2O + SO_2 + Br_2$

13. **Sol.** Acid strength order : HI > HBr > HCl > HF
Amongs these HI, HBr, HCl are strong acids whereas HF is a weak acid.

14. **Sol.** $Au + H^+ + NO_3^- + Cl^- \longrightarrow AuCl_4^- + NO + H_2O$

15. **Sol.** BP↑ eq with increase in atomic mass of the hologes. HF has highest BP due to association of HF molecule through H-bonding.

16. **Sol.** When $KClO_3$ is heated with conc. HCl, a mix. of Cl_2 and ClO_2 is formeed known as euchlorine.

$$2KClO_3 + 4HCl \longrightarrow 2KCl + \underbrace{2ClO_2 + Cl_2}_{\text{euchlorine}} + 2H_2O$$

17. **Sol.** (1) Acidic strength : $HOCl < HClO_2 < HClO_3 < HClO_4$

(2) Oxidising power : $HOCl > HClO_2 > HClO_3 > HClO_4$

(3) Thermal stability : $HOCl < HClO_2 < HClO_3 < HClO_4$

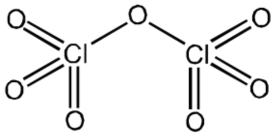
(4) Cl–O bond order : $HOCl < HClO_2 < HClO_3 < HClO_4$

18. **Sol.** $ClO_2 + O_3 \xrightarrow{0°C} Cl_2O_6$ (drark red)

$Cl_2O_6 + H_2O \longrightarrow HClO_3 + HClO_4$

$2HClO_4 \xrightarrow{-H_2O} Cl_2O_7$

$Cl_2O_7 \equiv$



$2 : \overset{(1.71Å)}{O - Cl}$ bond

$6 : \overset{(1.41Å)}{O = Al}$ bond

$I_2O_5 + 5CO \longrightarrow I_2 + CO_2$ (this I_2 titrated by hypo solution).

19. **Sol.** ClO_4^- , conjugate base is most stable as charge is dispersed over four oxygen atom and so $HClO_4$ is the strongest acid.

20. **Sol.** Interhalogen compounds are mostly liquid or solid at room temperature and are not highly volatile.

21. **Sol.** It is a fact

22. **Sol.** OCN^-, NNN^- are ambidentate and monodentate ligends both denate only one lone pair. So both are monodentate ligand.

.**23.** **Sol.** Due to short life-times, Rn has not been studied.

24. **Sol.** In clathrates the bonding between noble gas atom and water is dipole-induced dipole interaction.

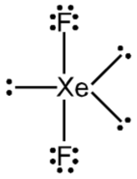
25. **Sol.** Out of He, Ne, Ar, Kr and Xe, Xe has the lowest ionisation energy as ionisation energies decreases down a group.

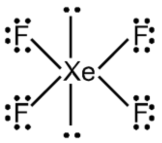
26. **Sol.** $2XeF_6 + SiO_2 \longrightarrow SiF_4 + 2XeOF_4$

27. **Sol.** (1) $XeF_2 + H_2O \longrightarrow Xe + 2HF + ½O_2$ (2) $XeF_4 + H_2O \longrightarrow XeOF_2 + 2HF$

(3) $XeF_6 + H_2O \longrightarrow XeOF_4 + 2HF$ (4) $XeOF_4 + H_2O \longrightarrow XeO_2F_2 + 2HF$

28. **Sol.**





Total number of lone pair = 9 Total number of lone pair = 14

Ratio = 9 : 14

30. **Sol.** (1) $XeF_4 + SbF_5 \rightarrow [XeF_3]^+ [SbF_5]^-$

(2) $XeF_6 + H_2O \rightarrow XeO_3 + HF$

(3) $XeF_6 + H_2 \rightarrow Xe + HF$

(4) $SiO_2 + XeF_6 \rightarrow \overset{+6}{X}eOF_4 + [SbF_5]^-$

PART - II : PRACTICE QUESTIONS

5. **Sol.** But error in dissociation of BrF_3. It dissociates into BrF_2^+ and BrF_4^-

11._ **Sol.** With increasing number of electrons in the molecule and hence increasing molecular size and increase in van der Waal's forces.

12._ **Sol.** N_3^- is pseudohalide

$(CN)_2$ and $(SCN)_2$ behave like pseudohalogen

I_3^- is polyhalide.

13._ **Sol.** $XeF_6 + 3H_2 \longrightarrow Xe + 6HF$

$XeF_6 + 6HCl \longrightarrow Xe + 6HF + 3Cl_2$

15. **Sol.** Cl_2 is oxidising agent.